



Developing numeracy strategies to improve interest and achievement in mathematics amongst post-primary students.

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Appendices

Appendix A: Student Handbook

Peer Tutoring



Programme

“Do not worry about your
difficulties in Mathematics.
I can assure you mine are still
greater.”

Albert Einstein

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Week 1

Lesson 1 - Time and Timetables

Learning Objectives

At the end of this lesson you will be able to;

- ☐ Tell the time using the 24 hour clock
- ☐ Read timetables correctly

Challenge 1

On the 24 hour clock what would the following times be?



a) 12:35am

b) 11:50pm

c) 11:30am



Task 1



For each of the clocks below, what would a 24 hour digital clock show;

a) If it was am

b) If it was pm



a. _____

b. _____



a. _____

b. _____



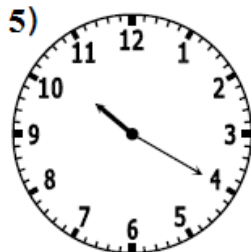
a. _____

b. _____



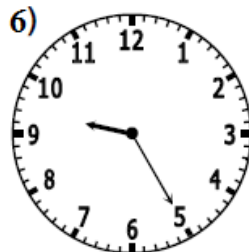
a. _____

b. _____



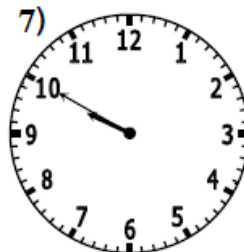
a. _____

b. _____



a. _____

b. _____



a. _____

b. _____



a. _____

b. _____

Task 2

Read the cinema timetable and answer the following questions;

| | | | |
|---|-----|--|-----|
| (2D) DESPICABLE ME 2 14:20 16:20 | Gen | (2D) MONSTERS UNIVERSITY 15:40 18:00 | PG |
| (2D) SMURFS 14:20 16:45 | Gen | ALAN PARTRIDGE: ALPHA PAPA 18:50 20:30 | 15A |
| GROWN-UPS 2 13:30 15:50 18:00 20:30 | 12A | HEAT 15:00 17:40 20:20 | 15A |
| NOW YOU SEE ME 20:30 | 12A | PERCY JACKSON : SEA OF MONSTER 13:30 15:45 18:00 | PG |
| RED 2 20:30 | 12A | THE CONJURING 14:30 17:00 20:10 | 15A |
| THE INTERSHIP 18:25 | 12A | THE LONE RANGER 14:10 17:20 20:30 | 12A |
| WOLVERINE (2D) 20:40 | 12A | | |



- Heat is shown at 17:40. What time is this in the 12 hour clock?
- Grown-ups 2 is 2 hours long. If I live 10 minutes away from the cinema and I have to be home by 20:00 what is the latest time I can go and see this movie?
- Red 2 is 2hours 30 minutes long? What time will the movie be over at?

d) Wolverine is 2 hours and 6 minutes long. If you go to see this movie at a different cinema and it finished at 20:15 what time did this movie start at?

e) Can you write your answer to part d in the 12 hour clock?

Task 3

Below is the train schedule from Dublin to Cork to Tralee. Study the schedule and answer the following questions.

| Baile Átha Cliath & Corcaigh – Trá Lí – Luan go Satharn (gan Saoire Phoiblí san áireamh) | | | | | | | | | | | | | | | | | | | | |
|--|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
| Dublin & Cork – Tralee – Monday - Saturday (excluding public holidays) | | | | | | | | | | | | | | | | | | | | |
| | | 2 | 1 2 | 2 | 1 2 | 2 | 2 | 2 | 2 | 2 | 1 2 | 2 | 1 2 | 2 | 2 | 2 | 1 2 | 1 2 | 2 | |
| | | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | |
| DUBLIN Heuston B L A | Dep | .... | 07.00 | .... | .... | 09.00 | .... | .... | 11.00 | .... | .... | 13.00 | .... | 15.00 | .... | .... | .... | 17.05 | 19.00 | .... |
| Newbridge | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Kildare | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Portlaoise | Dep | .... | 07.42 | .... | .... | 09.43 | .... | .... | 11.42 | .... | .... | 13.42 | .... | .... | .... | .... | .... | .... | 19.46 | .... |
| Ballybrophy | Dep | .... | .... | .... | .... | 09.58 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 18.00 | 20.01 | .... |
| Templemore | Dep | .... | .... | .... | .... | .... | .... | .... | 12.06 | .... | .... | .... | .... | .... | .... | .... | .... | 18.12 | 20.12 | .... |
| Thurles | Dep | .... | 08.13 | .... | .... | 10.15 | .... | .... | 12.15 | .... | .... | 14.13 | .... | 16.09 | .... | .... | .... | 18.21 | 20.21 | .... |
| Limerick Junction | Dep | .... | 08.34 | .... | .... | 10.36 | .... | .... | 12.36 | .... | .... | 14.34 | .... | .... | .... | .... | .... | .... | 20.42 | .... |
| Charleville | Dep | .... | .... | .... | .... | 10.57 | .... | .... | 12.57 | .... | .... | .... | .... | 16.45 | .... | .... | .... | 18.57 | 21.02 | .... |
| CORK Kent | Dep | 06.45 | .... | 08.55 | 10.20 | .... | .... | 12.20 | .... | .... | 14.20 | .... | .... | 16.55 | .... | .... | 18.45 | .... | .... | 20.55 |
| MALLOW | Arr | 07.08 | 09.07 | 09.18 | 10.41 | 11.13 | .... | 12.41 | 13.13 | .... | 14.41 | 15.07 | .... | 17.00 | 17.21 | .... | 19.11 | 19.14 | 21.17 | 21.18 |
| MALLOW | Dep | 07.25 | To Cork | 09.23 | To Heuston | To Cork | 11.20 | To Heuston | To Cork | 13.20 | To Heuston | To Cork | 15.18 | To Cork | .... | 17.25 | .... | 19.14 | To Cork | 21.24 |
| Banteer | Dep | 07.36 | .... | 09.34 | .... | 11.31 | .... | .... | 13.31 | .... | .... | 15.29 | .... | .... | 17.36 | .... | 19.30 | .... | 21.35 | .... |
| Millstreet | Dep | 07.47 | .... | 09.45 | .... | 11.42 | .... | .... | 13.42 | .... | .... | 15.40 | .... | .... | 17.47 | .... | 19.42 | .... | 21.46 | .... |
| Rathmore | Dep | 07.57 | .... | 09.56 | .... | 11.56 | .... | .... | 13.56 | .... | .... | 15.56 | .... | .... | 17.57 | .... | 19.55 | .... | 21.55 | .... |
| Killarney | Dep | 08.17 | .... | 10.15 | .... | 12.15 | .... | .... | 14.15 | .... | .... | 16.15 | .... | .... | 18.16 | .... | 20.15 | .... | 22.14 | .... |
| Farranfore | Dep | 08.36 | .... | 10.33 | .... | 12.33 | .... | .... | 14.33 | .... | .... | 16.33 | .... | .... | 18.34 | .... | 20.35 | .... | 22.32 | .... |
| TRALEE Casement | Arr | 08.52 | .... | 10.50 | .... | 12.50 | .... | .... | 14.50 | .... | .... | 16.50 | .... | .... | 18.51 | .... | 20.51 | .... | 22.49 | .... |

| Baile Átha Cliath & Corcaigh – Trá Lí – Dé Domhnaigh (Níl an Domhnach roimh shaoirí poiblí san áireamh) | | | | | | | | | | | | | | | | | | | | |
|---|-----|-------|------------|-------|---------|-------|------------|-------|---------|-------|------------|-------|-------|-------|-------|------|------|------|------|------|
| Dublin & Cork – Tralee – Sunday (Excluding Sundays prior to Public Holidays) | | | | | | | | | | | | | | | | | | | | |
| | | 2 | 1 2 | 1 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | | | |
| | | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | | | |
| DUBLIN Heuston B L A | Dep | .... | .... | 08.30 | 10.00 | .... | 13.00 | .... | .... | 15.00 | .... | 17.00 | .... | .... | 19.05 | .... | .... | .... | .... | .... |
| Newbridge | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Kildare | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Portlaoise | Dep | .... | .... | 09.12 | 10.42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Ballybrophy | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Templemore | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Thurles | Dep | .... | .... | 09.44 | 11.12 | .... | 14.08 | .... | .... | 16.08 | .... | 18.08 | .... | .... | 20.21 | .... | .... | .... | .... | .... |
| Limerick Junction | Dep | .... | .... | 10.08 | 11.37 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 20.47 | .... | .... | .... | .... | .... |
| Charleville | Dep | .... | .... | 10.28 | .... | .... | 14.45 | .... | .... | .... | .... | .... | .... | .... | 21.04 | .... | .... | .... | .... | .... |
| CORK Kent | Dep | 08.55 | 10.20 | .... | .... | 12.10 | .... | 14.35 | 16.20 | .... | .... | .... | .... | 18.45 | 20.50 | .... | .... | .... | .... | .... |
| MALLOW | Arr | 09.20 | 10.41 | 10.44 | 12.08 | 12.35 | 15.01 | 15.05 | 16.41 | 17.01 | .... | 19.01 | 19.15 | 21.16 | 21.20 | .... | .... | .... | .... | .... |
| MALLOW | Dep | 09.25 | To Heuston | 10.44 | To Cork | 12.44 | To Heuston | 15.17 | To Cork | 17.25 | To Heuston | 19.25 | .... | 21.21 | .... | .... | .... | .... | .... | .... |
| Banteer | Dep | 09.36 | .... | 10.59 | .... | 12.58 | .... | 15.31 | .... | 17.37 | .... | 19.37 | .... | 21.34 | .... | .... | .... | .... | .... | .... |
| Millstreet | Dep | 09.47 | .... | 11.10 | .... | 13.10 | .... | 15.43 | .... | 17.48 | .... | 19.48 | .... | 21.45 | .... | .... | .... | .... | .... | .... |
| Rathmore | Dep | 09.55 | .... | 11.20 | .... | 13.18 | .... | 16.01 | .... | 18.02 | .... | 20.04 | .... | 21.57 | .... | .... | .... | .... | .... | .... |
| Killarney | Dep | 10.14 | .... | 11.40 | .... | 13.40 | .... | 16.22 | .... | 18.25 | .... | 20.26 | .... | 22.18 | .... | .... | .... | .... | .... | .... |
| Farranfore | Dep | 10.33 | .... | 12.02 | .... | 13.59 | .... | 16.42 | .... | 18.44 | .... | 20.44 | .... | 22.38 | .... | .... | .... | .... | .... | .... |
| TRALEE Casement | Arr | 10.49 | .... | 12.20 | .... | 14.15 | .... | 17.00 | .... | 18.59 | .... | 21.02 | .... | 22.55 | .... | .... | .... | .... | .... | .... |

a) I leave Dublin Heuston at 09:00 on a Monday morning. How long does it take me to get to Thurles?

b) I arrive in Tralee at 10:49 on a Sunday. How long did it take me to travel to Tralee from Mallow?

c) I leave Dublin Heuston at 17:05 on a Wednesday. How long does it take me to get to Tralee?

d) I live in Mallow and need to be in Tralee for 3pm on a Sunday. What is the last train I should get from Mallow in order to be in Tralee on time?



Lesson 2 - Number

Learning Objectives

At the end of this lesson you will be able to;

- ☐ Understand the importance of BMDAS in the order of operations and apply BMDAS

Order of Operations

Challenge 1

Solve the following;

a) $(2 + 4) \div 6 + 7 \times 2 =$

b) $(13 + 83 - 6^2) \div (17 - 5)$



Task 1

a) If you go into Gala and buy three large bottles of Sprite for €2 each and 5 packets of crisps for €1, how much do you spend? Please show your workings.



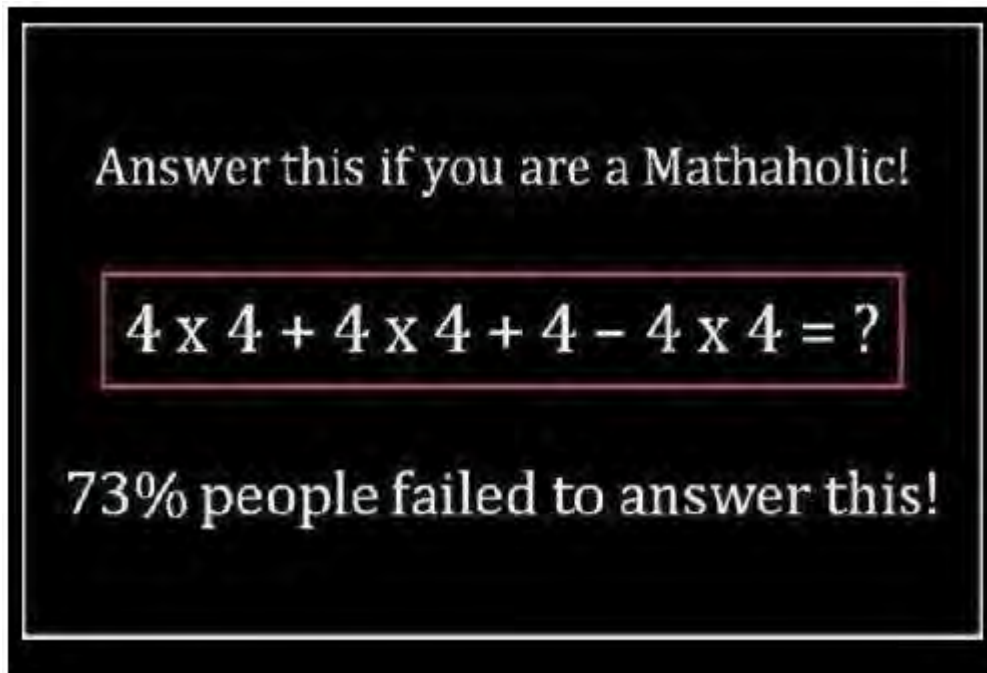
b) Solve the following $2 \times 3 + 1 \times 5$

c) Are your answers to part a and b the same? If so, why do you think this is?



d) Discuss the importance of the order of operations with your tutor.

Task 2



a) Why do you think 73% of people failed to answer this question?

b) What rule do you have to follow to help you answer this question?



c) What is the correct answer to this question?

d) What do the letters in BIMDAS stand for?

Task 3

Solve the following without using a calculator;

a) $3 \times 5 + 6 =$

b) $28 \div (4 - 6) =$

c) $16 + (24 \div 6) =$

d) $9 \times (0 + 6) - 3 =$

e) $3 - 0 \div 6 + 13 =$

f) $3 \times 9 - 5 \times 2^2 =$



Task 4

Using brackets, indices, multiplication, division, addition and subtraction create a numerical expression for each of the following and then simplify them;

- a) Jack buys 2 wrist bands at €2 each. He also buys a pair of Converse that were originally €60 euro but he gets an €11 discount. Write this problem mathematically.
How much does Jack spend?



b) Katie is 12 years old. One day, her parents took her and her younger brother to a Kerry football match. The tickets for the match were priced at €27 for adults and €18 for children 13 years and younger. What is the expression for the total cost of the tickets for Katie's family?
What was the total cost?



Task 5

Who wants to be a millionaire?

Solve the questions on the board to try and reach a million euro. When prompted, write your answer on your mini whiteboard. If you reach a million you will receive a prize!

Week 2

Lesson 3 - Number

Learning Objectives

At the end of this lesson you will be able to;

- ☐ Identify multiples
- ☐ Identify factors
- ☐ Identify prime numbers
- ☐ Understand basic set theory

Multiples

Challenge 1

- a) What is the lowest common multiple of 4 and 5?
- b) What is the lowest common multiple of 15 and 40?



Task 1

- a) Multiply 5 by 1, then 2, 3, 4, 5, 6, 7, 8, 9 and 10. Write your answer in a line below.



- b) Can you describe the relationship between 5 and your answer above?

- c) Write down the first fourteen multiples of 3.

Write down the first fourteen multiples of 4.



- d) Do they have any multiples in common? If so what multiples are common and what is the highest common multiple?

Factors

Challenge 2

- a) What is the highest common factor of 6 and 12?
- b) What is the highest common factor of 10 and 25?



Task 2

- a) The factors of 15 are 1, 3, 5 and 15. Can you now come up with a definition for the term factor?
- b) List the factors of 50.
- c) List the factors of 10.
- d) What is the highest common factor of 10 and 50?

Task 3

Under the supervision of your tutors, play the following game with the nearest 1st year student to you. Both roll a dice and the largest number goes first.

The first player chooses a number and crosses it out on the grid. This number must be a number over 70.

The second player chooses a number to cross out. The number must be a factor of the first number. Players continue to take it in turns to cross out numbers, at each stage choosing a number that is a factor of the number just crossed out by the other player.

Once a number is crossed out you cannot reuse it. If you are unable to cross out a number then your opponent gets a point.

The person with the most points at the end of the game wins. If time allows play the game on both grids.

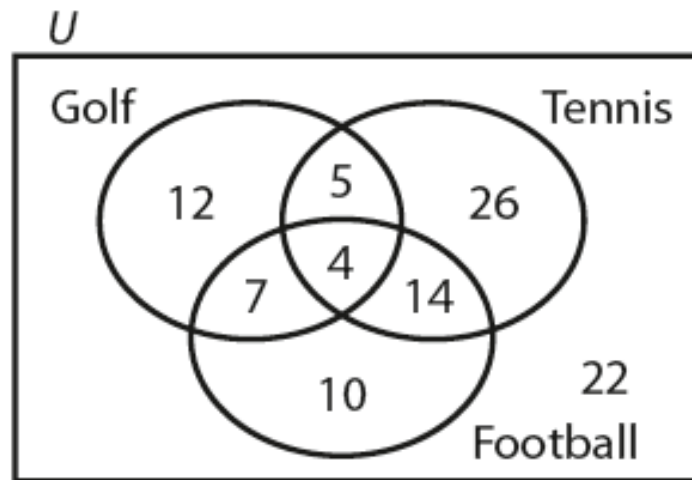
| | | |
|-----------|--|--|
| Name | | |
| Tally | | |
| Frequency | | |

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

d) Did you come across any strategy that helps in winning this game?

Sets

Challenge 3

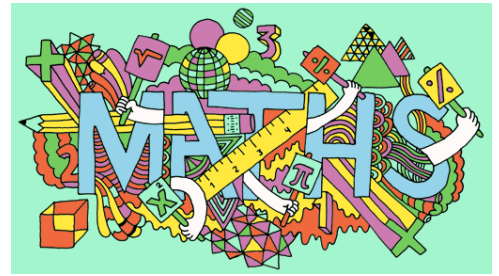


The Venn diagram on the right shows the results of a survey of a number of adults to find out which of the games golf, tennis or football, if any, they play. From the diagram, find the number of people who play;

- a) Golf
- b) Both golf and tennis
- c) All three games
- d) Football only
- e) None of these games
- f) Both football and tennis
- g) Both tennis and football but not golf
- h) What was the total number of people surveyed?

Task 4 <http://www.teacherled.com/resources/vennfactors/vennfactorload.html>

- What is this type of diagram called?
- Why do you think some of the numbers have gone red?
- What does the space in the middle of the two sets represent?
- What are the common factors of 9 and 12?
- What is the highest common factor of 9 and 12?

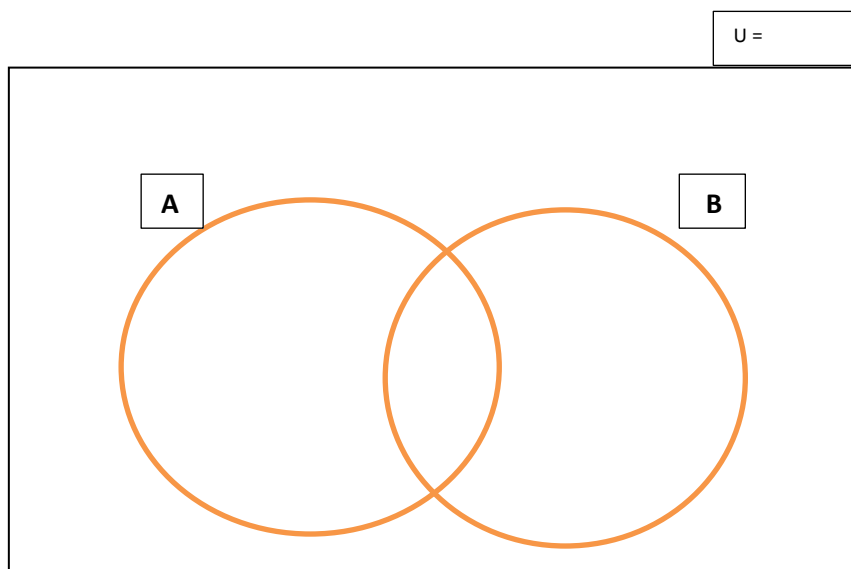


Task 5

- How many students are in this classroom?
- How many students have blonde hair?
- How many students have blue eyes?
- How many students have both blonde hair and blue eyes?



- e) Now try and fill this information in on the Venn diagram below. Let set A represent blonde hair and set B represent blue eyes. U equals the universal set which means all the people who took part in the survey



f) What should all the numbers in the Venn diagram add up to?

g) How many people have blonde hair or blue eyes or both?

h) What do you think $A \cup B$ means?

i) How many elements are in set A?

j) Can you explain what this means in the context of the question?

k) Do you know a way of writing this mathematically?

l) How many elements are in everything in the Universal set excluding set B?

m) Can you explain what this means in the context of the question?

n) Do you know a way of writing this mathematically?



Prime Numbers

Challenge 4

List the first ten prime numbers.



Task 6

a) There is a link between factors and prime numbers. From your previous maths experience, do you remember what type of numbers prime numbers are?

b) From this definition can you state the first 10 prime numbers?

c) Is there anything different you notice about 2 to all the other prime numbers?



Task 7

Under the supervision of your tutors, play the following game with the nearest 1st year student to you.

Both roll a dice and the largest number goes first. Start at zero.

Take turns rolling the two dice and using any single number rolled or any combination of numbers on the dice (addition or subtraction) try to reach another prime number. Example: Marker is on 5, Player rolls a 6 and a 2 Best choice: Move $(6+2=8)$ to 13. Could also: Move 6 to 11, Move 2 to 7 Not possible: $(6-2=4)$ to 9.

You cannot move backwards.

If no move can be made to a prime number, player stays on the original spot.

First player to reach 97 wins

Note that moves must be made only to PRIMES. If incorrect move is spotted, the player making the move must go back "one prime".

| | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | | 11 |
| 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | | 12 |
| 48 | | | | | | | | | | | 13 |
| 47 | 85 | 86 | 87 | 88 | 89 | 90 | | 59 | | | 14 |
| 46 | 84 | | | | | | | 60 | | | 15 |
| 45 | 83 | | | | | | 91 | 61 | | | 16 |
| 44 | 82 | | | | | | 92 | 62 | | | 17 |
| 43 | 81 | | | | | | 93 | 63 | | | 18 |
| 42 | 80 | | | | | | 94 | 64 | | | 19 |
| 41 | 79 | | | | | | 95 | 65 | | | 20 |
| 40 | 78 | | | | | | 96 | 66 | | | 21 |
| 39 | 77 | | | | | | | 67 | | | 22 |
| 38 | | | | | | | | 68 | | | 23 |
| 37 | 76 | 75 | 74 | 73 | 72 | 71 | 70 | 69 | | | 24 |
| 36 | 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 |

 97
 PRIME



Lesson 4 – Number

Learning Objectives

At the end of this lesson you will be able to;

- ☐ See how fractions add up to make one whole
- ☐ Convert fractions, decimals and percentages
- ☐ Calculate the percentage of a quantity

Fractions

Challenge 1

Solve the following;

a) $\frac{1}{4} + \frac{3}{4} =$

b) $\frac{1}{2} + \frac{2}{4} =$

c) $\frac{2}{10} + \frac{4}{5} =$



Write an equivalent fraction for each of the following;

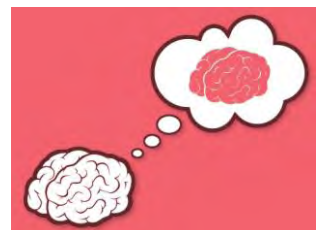
d) $\frac{1}{2}$

e) $\frac{2}{8}$

f) $\frac{3}{5}$

Task 1

a) Write down any words that you come into your mind when you think of fractions. Discuss with your tutor how these words relate to fractions.



b) Look at the following fractions table and discuss it with your tutor.

| 1 unit or 1 "whole" | | | | | | | | | | | | | |
|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| $\frac{1}{2}$ | | | | | | | $\frac{1}{2}$ | | | | | | |
| $\frac{1}{3}$ | | | | $\frac{1}{3}$ | | | | $\frac{1}{3}$ | | | | | |
| $\frac{1}{4}$ | | | $\frac{1}{4}$ | | | $\frac{1}{4}$ | | | $\frac{1}{4}$ | | | | |
| $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | | |
| $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | |
| $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ |
| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |
| $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ |
| $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ |
| $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ |
| $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ |
| $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ | $\frac{1}{15}$ |

c) You have been given two circles of the same size made from card. Put one on top of the other to prove that they are the same size.

Answer the following questions (you may use the table above to help you if you need to).

d) Fold one of the cards into two pieces of the same size. What have you divided the card into?

e) Fold the halves into two pieces of the same size. What have you divided the card into?

f) Fold the four quarters into two pieces of the same size. What have you divided the card into?

g) Using your whole circle and the one you have divided into eighths discuss with your tutor the different ways of making one whole. Write down the examples you come up with below.

h) $\frac{1}{8}$ is bigger than $\frac{1}{4}$. Discuss with your tutor whether this statement is true or false. Use your card to help you come up with your answer.

Converting Fractions, Decimals and Percentages

Challenge 2

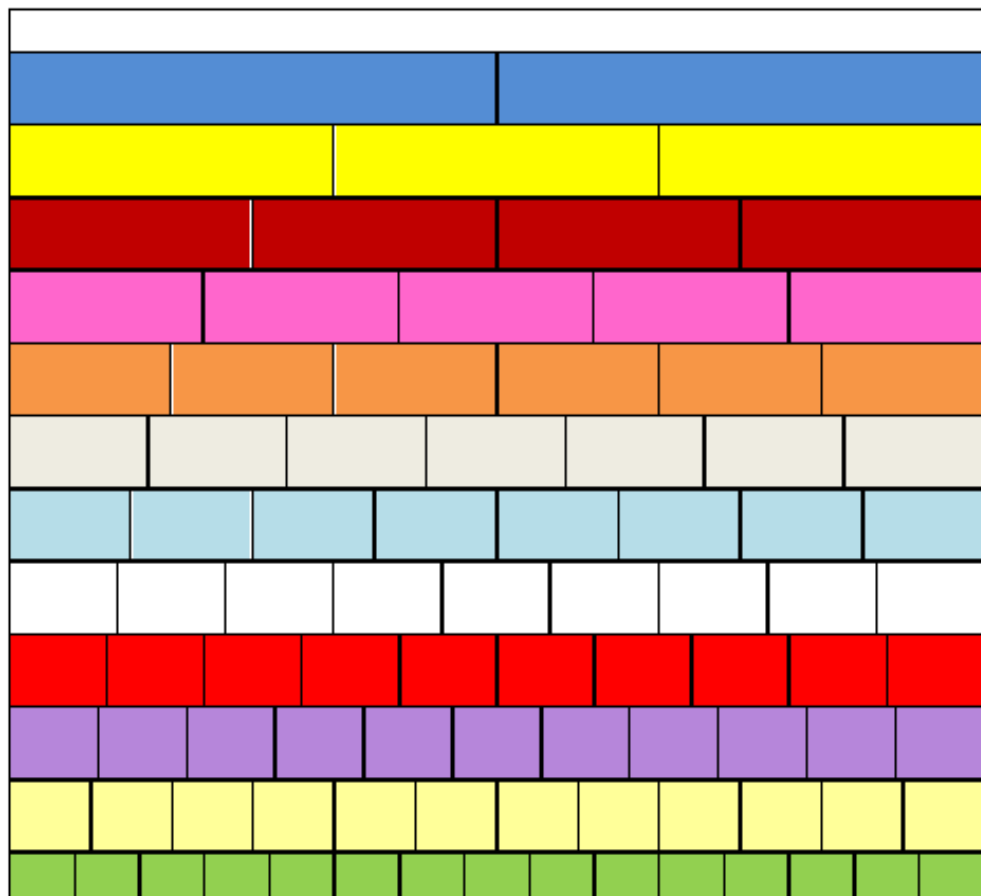
- a) Convert $\frac{1}{4}$ to a percentage.
- b) Convert 42% to a decimal.
- c) Convert 0.2 into a fraction.
- d) Convert 0.88 to a percentage.



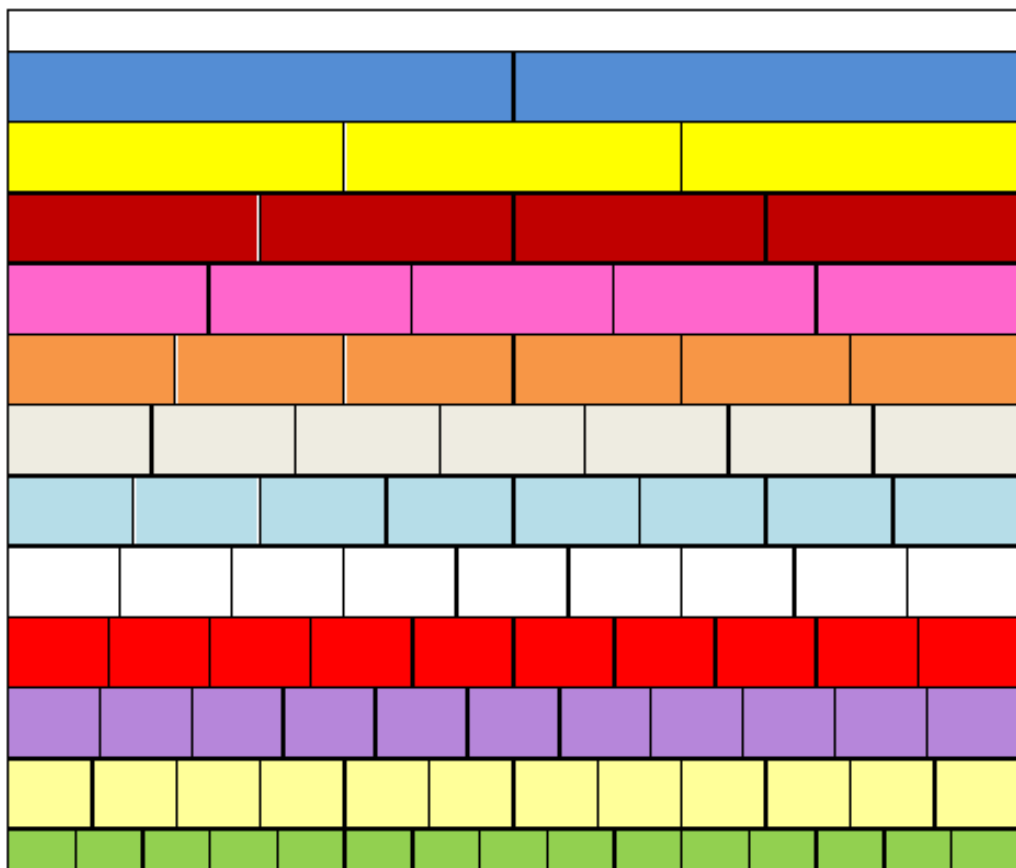
Task 2

- a) How are fractions linked to decimals and percentages?
- b) The fraction $\frac{1}{2}$ is the same as the decimal 0.5. What do you have to do to convert a fraction to a decimal?
- c) The fraction $\frac{1}{2}$ is the same as 50%. What do you have to do to convert a fraction to a percentage?

d) Fill in the correct decimals in the following diagram. You can round numbers to 2 decimal places.



e) Fill in the correct percentages into the following diagram;



Task 3

Equivalent squares.

Under the supervision of your tutor, work with the nearest first year student to you to match the squares that have been given to you.

Task 4

Find the answers to the following percentage problems without using a calculator

a) You have €60 to spend on a pair of trainers. You see a pair in Lifestyle Sports that you love. They are €80 euro but you are told that they are reduced by 30%. Can you afford the trainers?



b) My new headphones, 'Beats by Dr Dre' were €155 before tax. I also had to pay 6% tax on them. What was the total cost of the headphones?



c) The Munster Rugby Jersey costs €50. A limited a number of jerseys signed by Simon Zebo are available but they cost 12% more. What is the cost of a signed jersey?



d) Lifestyle sports had a 20% sale on all trainers for the month of September. If a pair of Nike high tops are normally priced at €90, how much did they cost during the sale?



e) Xtra-vision were selling off old computer game. All games were reduced by 30%. If one specific computer game cost €60 then how much did the game cost during the sale?



Week 3

Lesson 5 - Statistics

Learning Objectives

At the end of this lesson you will be able to;

- ☐ Tally data and record its frequency
- ☐ Understand the different types of data
- ☐ Identify bias in a survey and create a survey question that shows no bias
- ☐ Identify the best graph to use to represent different types of data

Tally & Frequency Tables

Task 1

a) Watch the following clip of this year's All Ireland football final between Kerry and Donegal and fill in the table below.

| OUTCOME | TALLY | FREQUENCY |
|---------------|-------|-----------|
| Points scored | | |
| Goals scored | | |
| Wides | | |
| Frees | | |
| Passes | | |
| Yellow cards | | |

Types of Data

Challenge 1

Here are examples of numerical and categorical data;



Sex, Height, Arm span, Eye colour, Weight, Favourite colour.

Which pieces of data are numerical and which are categorical?

| Numerical | Categorical |
|-----------|-------------|
| | |

Task 2

a) What is data?

b) Read one of the following articles and circle different pieces of data.

Just How Successful Is One Direction, Really?

If you're a One Direction fan, you already know how special they are. Isn't it obvious? But do you have any idea how successful the lads of London have become in just the last couple of years?

We've researched the hard numbers behind the runaway greatness of 1D and come up with some really interesting facts.

One Direction has sold a TON of albums. Just how many?

- *Up All Night* the group's debut, sold 4.5 million copies in 2012 – making it the third best-selling album of that year across the world.
- 1D's next album, *Take Me Home*, has also sold over four-and-a-half million copies since it was released in November of 2012.

If you've ever been to see 1D live, we're guessing it was pretty hard to get that ticket.


- Tickets for the band's first appearance at Madison Square Garden sold out in 10 minutes.
- When 1D announced a 2013 tour of the UK and Ireland, over 300,000 tickets were sold within 24 hours.

And if you're a One Direction fan, you are not alone. Just look at these statistics!

- One Direction has almost 14,000,000 followers on Twitter. They add an average of 25,000 followers every day.
- Harry Styles alone has almost 15,000,000 followers!

And finally, if you're constantly searching for your favorite band, you definitely aren't the only one:

- Over 58 million searches for "One Direction" were registered by Google in 2012 alone!



Ireland remain 70th as Germany top rankings

New world champions and Republic of Ireland Euro 2016 qualification opponents Germany climb one spot to lead the table for the first time in around 20 years, followed by Argentina, up three places to second and Netherlands in third.

Netherlands climbed 12 places thanks to their strong, third-place finish in the competition, and there are also improvements for Colombia (fourth, up four), Belgium (fifth, up six), France (tenth, up seven) and Costa Rica (16th, their highest ever ranking, up 12).

Spain's disastrous group-stage exit from the World Cup is reflected in a drop down the rankings from first to eighth. Italy (from ninth to 14th) and Portugal (fourth to 1th) also fell.

England's tame exit means they drop ten spots to 20th over all.

World Cup Brazil drop four place to seventh position following their humiliating finish to a disappointing tournament.

Scotland, also in Ireland's Euro 2016 group, meanwhile remain 27th in the rankings and Northern Ireland rise one spot to 89th.

Ireland open their qualification campaign away to Georgia on 7 September.



c) Can you see one major difference between some of the data you have found?

d) Data is divided into numerical data and categorical data. Using your answers from part b discuss the difference between the two types of data and decide which data is numerical and which is categorical.

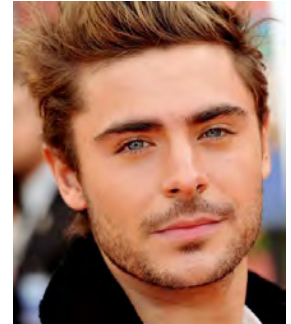
| Numerical | Categorical |
|---|---------------------------------------|
| e.g. 300,000 Tickets sold for One Direction concert | Germany is ranked first in the world. |

Task 3

Teen Vogue magazine want to get a popular film star for the front cover of their December edition. They have the option of 5 different film stars so they conducted a survey to see which star is most popular. They asked a group of teenagers the following question;

From the following five movie stars which is your favourite;

| | |
|-----------------|--------------------------|
| Channing Tatum | <input type="checkbox"/> |
| Selena Gomez | <input type="checkbox"/> |
| Robert Paterson | <input type="checkbox"/> |
| Miley Cyrus | <input type="checkbox"/> |
| Zac Efron | <input type="checkbox"/> |



a) What type of data does this survey question generate, numerical or categorical?

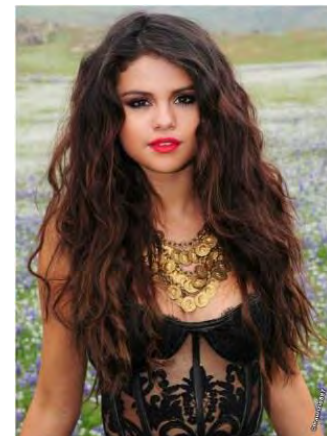
Surveys

Task 4

Initially, Teen Vogue came up with the following survey question;

From the following five movie stars is Channing Tatum your favourite or which other is your favourite?

| | |
|-----------------|--------------------------|
| Channing Tatum | <input type="checkbox"/> |
| Selena Gomez | <input type="checkbox"/> |
| Robert Paterson | <input type="checkbox"/> |
| Miley Cyrus | <input type="checkbox"/> |
| Zac Efron | <input type="checkbox"/> |



a) What is wrong with the way in which this question is asked?

b) With the help of your tutor, come up with a question you would like to ask the other 1st years in the room? Have 4 options for you answer, a, b, c and d.

c) In turn, ask your question to other first years in the room.

d) Is the data that you obtained numerical or categorical data?

e) How many people took part in your survey?

d) What fraction of the class answered;

a b c d



Graphical Representation



Challenge 2

a) Zoe got €50 for her birthday. She spent €12 at the cinema, €25 euro on a new pair of jeans, €10 on phone credit and €3 on a packet of chips. She wants to represent her spending in a graph/chart. Which type of graph/chart would you use to represent this data in a way that you can clearly see how Zoe spends all of her €50? Why did you select this graph?



b) A person is conducting a survey one evening at the door of the cinema. They survey the first 200 people they meet asking them the question, "Which is your favourite type of movie, comedy, action, romance, drama or sci-fi?" Which graph would be most suited to represent this data, a bar chart of a line plot? Explain your answer.

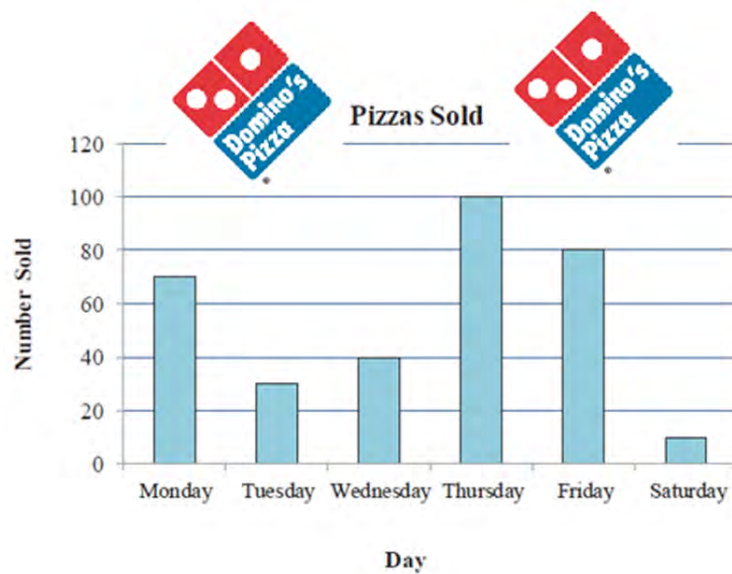
Task 5

a) With your tutor look at the features of all the graphs given in this task.

b) Look at the graphs and data and explain why you think each type of graph best represents the data given.

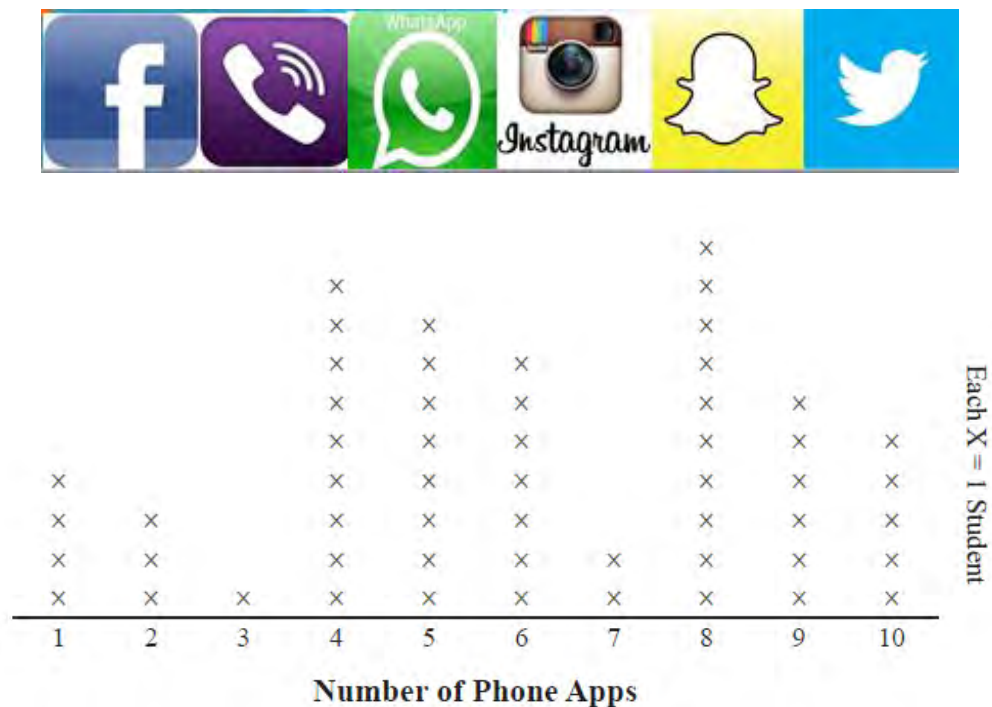
Bar chart

Domino's Pizza decided to see how many pizzas they sold in 6 days. They recorded their results in the bar chart below



Line plot

A school sent out a survey asking their 1st year students how many apps they have on their mobile phones. They published their results in this line plot. Answer the questions on the line plot.



Stem and Leaf

A group of young people were asked the question, "From the time you woke this morning, how many minutes did it take you to get to school?" Their answers are displayed in the stem and leaf plot shown.

| Stem | Leaf |
|------|-------------------|
| 6 | 1 1 4 6 7 8 |
| 7 | 2 3 5 7 9 |
| 8 | 1 3 5 6 6 7 7 8 9 |
| 9 | 0 0 3 4 6 8 9 9 |
| 10 | 0 0 |

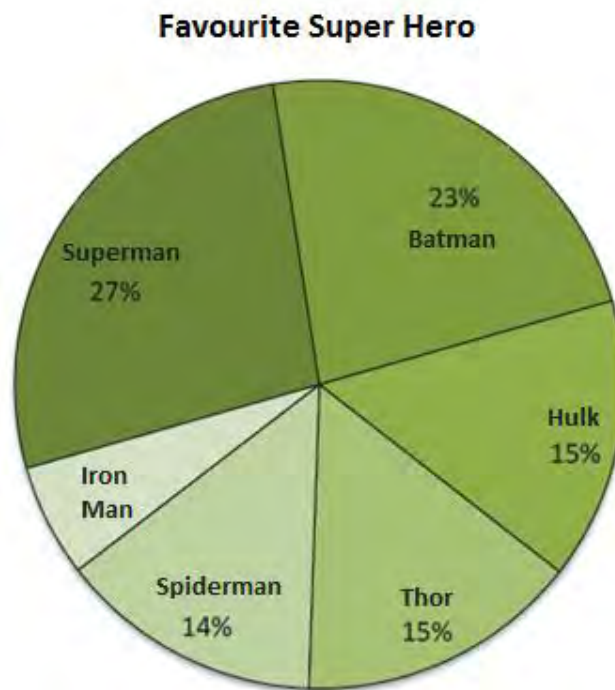
Key

8 | 3 = 83 min.



Pie chart

500 people were asked the question “Who is your favourite superhero?” The results are displayed on the pie chart below.



c) What type of data is represented in each of the charts?

| | Numerical | Categorical |
|---------------|-----------|-------------|
| Bar chart | | |
| Line plot | | |
| Stem and Leaf | | |
| Pie chart | | |

d) Can you represent both numerical and categorical data in a bar chart? Explain your answer.

e) Can you represent both numerical and categorical data on a line plot? Explain your answer.

f) Can you represent both numerical and categorical data in a stem and leaf? Explain your answer.

g) Can you represent both numerical and categorical data in a pie chart? Explain your answer.

h) Look at the bar chart and the line plot. In what way are they different?

i) What would stop you from representing the data that is on the bar chart on a line plot?

Lesson 6 - Probability

Learning Objectives

At the end of this lesson you will be able to;

- ☐ List outcomes and identify the number of outcomes
- ☐ Calculate the probability of an event occurring

Outcomes

Task 1

Jack has cereal and a glass of fruit juice every morning before school. He has the choice of Cornflakes, Weetabix, Special K, Cheerios' and Coco Pops for cereal and orange juice, apple juice and grapefruit juice. He can only have one bowl of cereal and one glass of juice for breakfast.

a) List all the breakfast options that Jack can have?



b) How many options does he have for breakfast?

Probability

Task 2

Open your packet of skittles. Count how many of each colour is in the packet and fill these numbers in to the table below.

| Yellow | Green | Red | Purple | Orange |
|--------|-------|-----|--------|--------|
| | | | | |

- How many skittles are in the packet in total?
- Looking at your table can you decide which skittle is most likely to be randomly selected from the pack? Can you give a reason for your answer?
- What is the probability of putting your hand in the packet and getting a yellow skittle?
- What is the probability of putting your hand in the packet and getting a red skittle?
- What is the probability of putting your hand in the packet and getting a pink skittle?



Task 3

You can eat your skittles!!!



Week 4

Lesson 7 - Geometry

Learning Objectives

At the end of this lesson you will be able to;

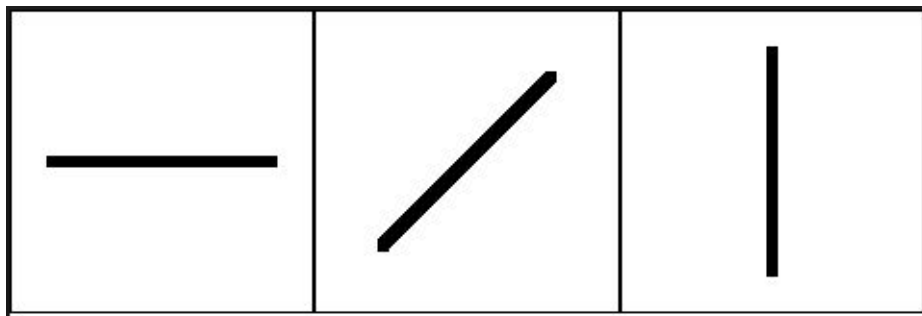
- ☐ Identify vertical, horizontal and oblique lines
- ☐ Distinguish between parallel and perpendicular lines.
- ☐ Measure angles

Vertical, Horizontal and Oblique lines

Challenge 1

Below we have one vertical, one horizontal and one oblique line.

a) Can you identify which line is which?



b) Now can you come up with a definition of each type of line?

Vertical:

Horizontal:

Oblique:

Task 1

a) Have you ever used the words vertical and horizontal? What do they mean?



b) Which word best describes a feature of each picture, vertical or horizontal?



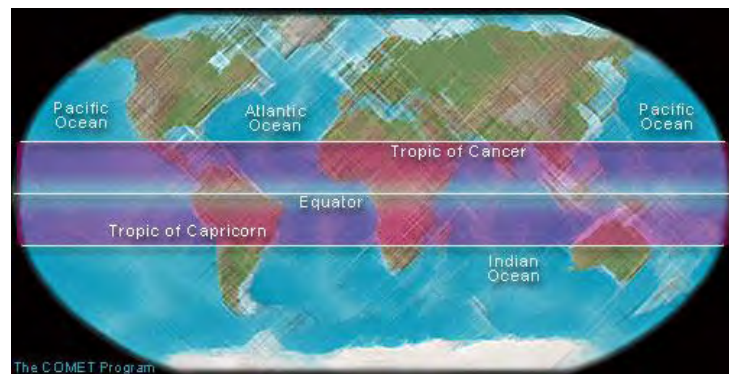
Are these books stacked vertically or horizontally?



Are the stripes on Pinks dress vertical or horizontal?



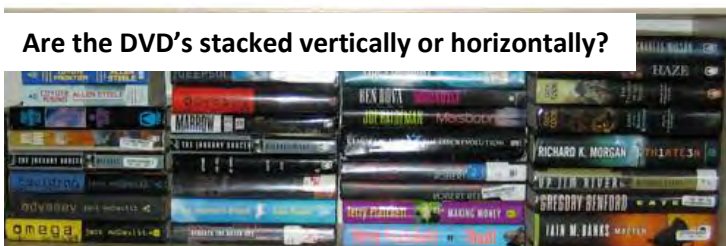
Is the equator vertical or horizontal?



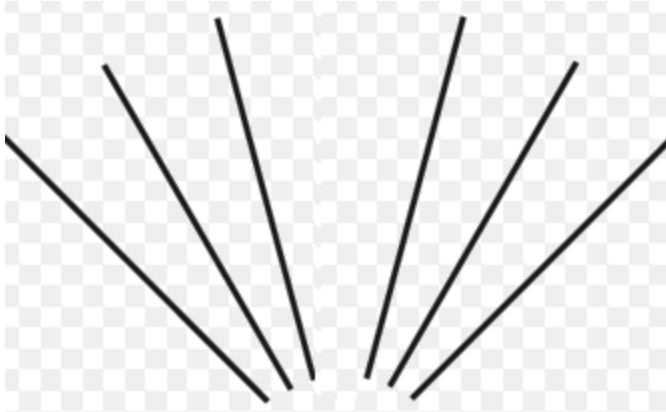
Are the stripes on Cameron Diaz top vertical or horizontal?



Are the DVD's stacked vertically or horizontally?



c) The lines in the image below are all Oblique lines. From looking at the image describe what you think oblique lines are.

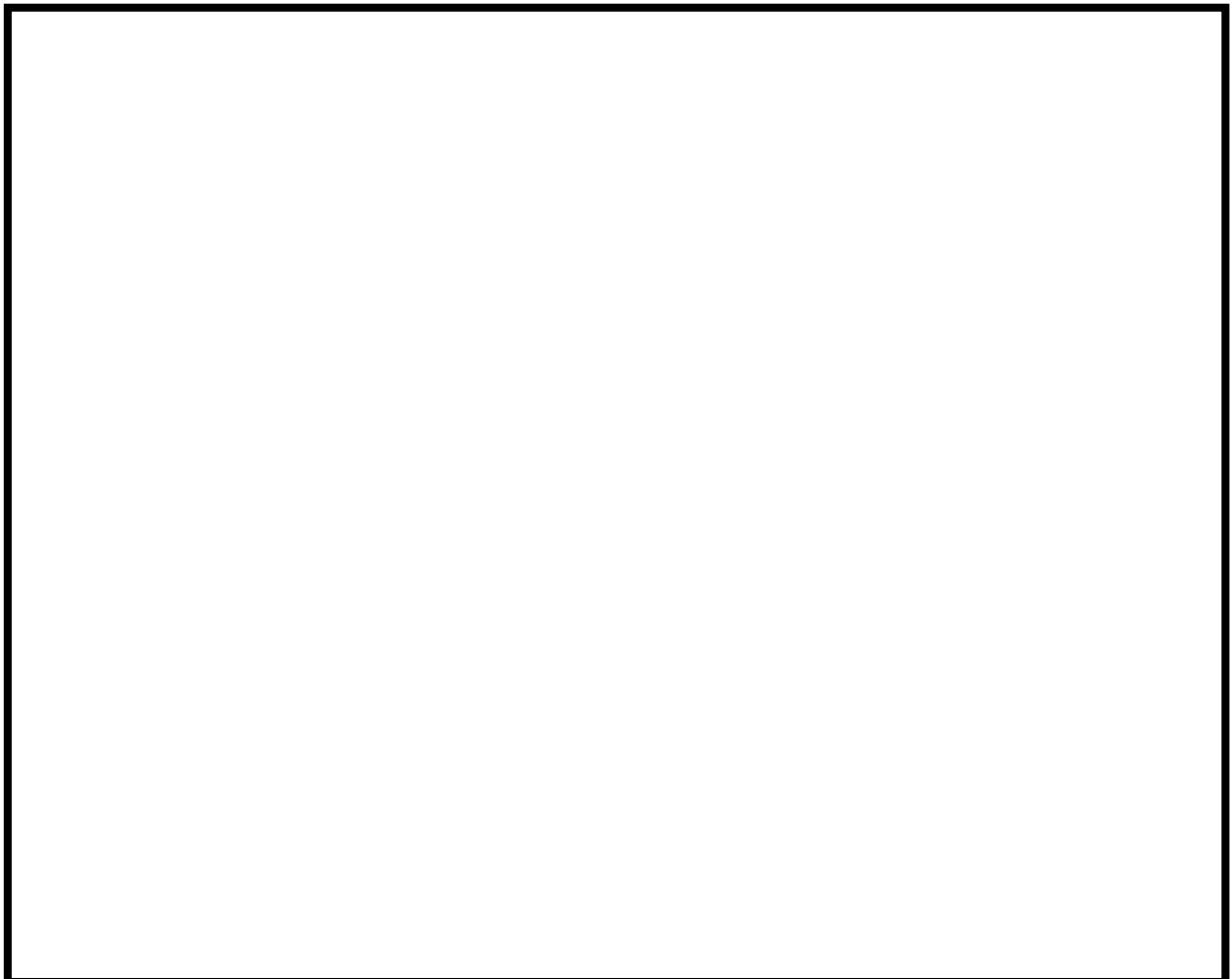


d) Draw a simple picture using vertical, horizontal and oblique lines.

Vertical lines must be red.

Horizontal lines must be black.

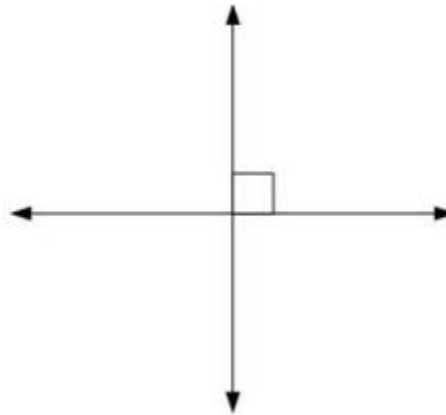
Oblique lines must be blue.



Challenge 2

a) Which of the following are parallel and perpendicular lines?





b) Describe the terms parallel and perpendicular.

Parallel:

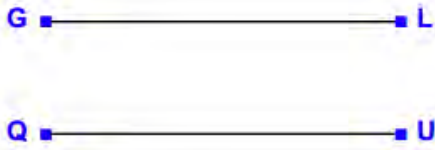
Perpendicular:

Task 2

a) Have you ever come across the terms parallel and perpendicular? If yes, when?

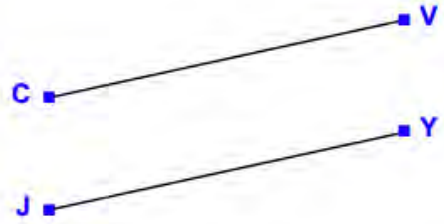
b) Can you tell which of these lines are parallel and which are perpendicular?

1)



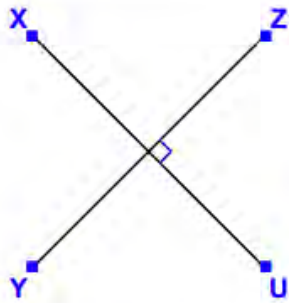
Answer: _____

2)



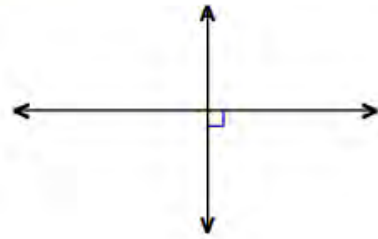
Answer: _____

3)



Answer: _____

4)



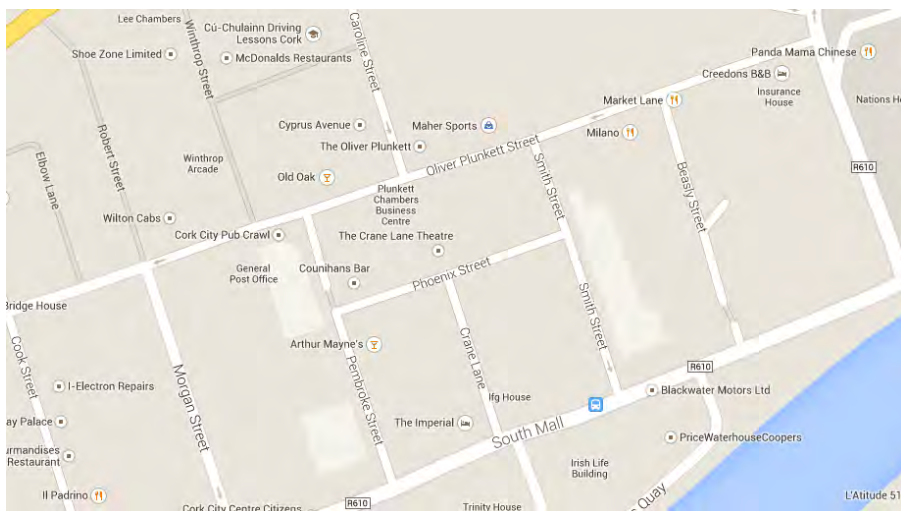
Answer: _____

c) Name one feature of parallel lines.

d) Name one feature of perpendicular lines.

Task 3

Look at the map of Cork city.



b) Which word best describes the relationship between Oliver Plunkett Street and Phoenix Street?

c) Which word best describes the relationship between Phoenix Street and Crane Lane?

d) Can you name two more streets that are perpendicular?

e) Can you name two more streets that are parallel?

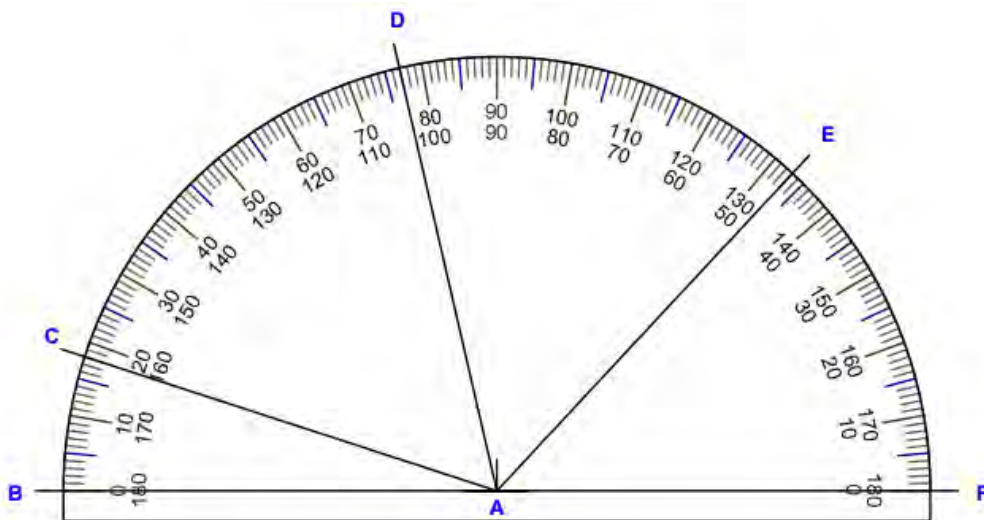
Measuring Angles

Challenge 3

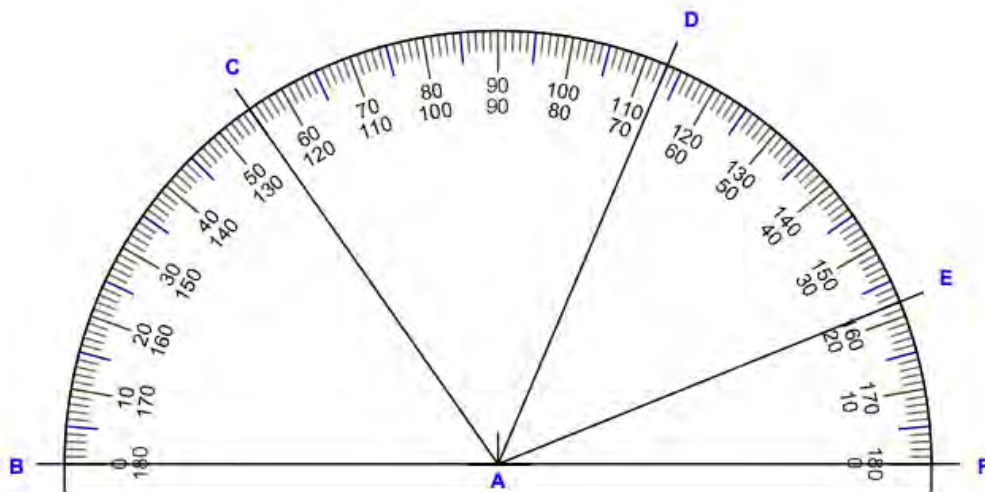
a) What do you need in order to create an angle?



b) With the help of the protractors, meaasure the following angles.



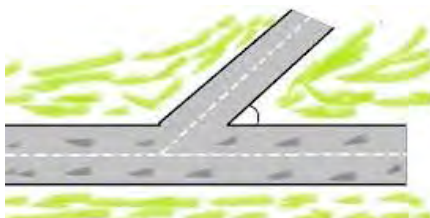
$\angle CAB$ _____ $\angle DAB$ _____ $\angle EAB$ _____ $\angle CAF$ _____ $\angle DAF$ _____ $\angle EAF$ _____



\angle CAB _____
 \angle DAB _____
 \angle EAB _____
 \angle CAF _____
 \angle DAF _____
 \angle EAF _____

Task 4

Your tutor will highlight an angle they want you to measure in the following images. Before you measure the angle estimate the size you think the angle is going to be.



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____

c) What angle is the floor to the wall in this room? Why do you think this is?

Lesson 8 - Geometry

Learning Objectives

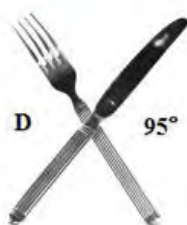
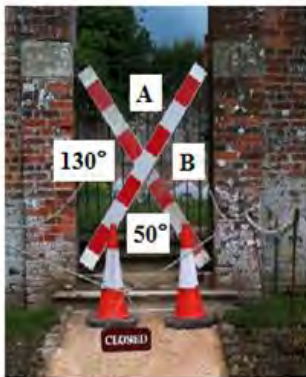
At the end of this lesson you will be able to;

- ☐ Understand what vertically opposite angles are
- ☐ Identify the size of the angles in a triangle
- ☐ Plot co-ordinates on a Cartesian graph and be able to read co-ordinates from a Cartesian graph.

Vertically Opposite Angles

Challenge 1

Find the missing angles in each of the following images;



A=

B=

C=

D=

E=

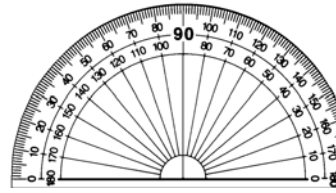
F=

A =

D =

Task 1

a) Using geo-strips, create 4 different vertically opposite angles, one at a time.



b) Using a mini whiteboard, show the vertically opposite angles and label them 1, 2, 3, 4.

c) Using a protractor measure the size of each angle and record this data in the following table;

| Angle 1 | Angle 2 | Angle 3 | Angle 4 | Total |
|---------|---------|---------|---------|-------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

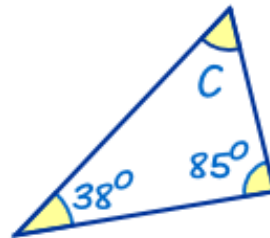
d) What do you notice that all the angles add up to?

e) What do you notice about angles that are vertically opposite from one another?

Challenge 2

a) In this triangle what is the value of angle C?

b) How do you know your answer is correct?



Task 2

Using geo-strips, create 4 different size triangles, one at a time.

a) Using a mini whiteboard, show the 3 angles in each triangle.

b) Measure each angle, fill them in on the table below and add you answers together to fill the total column.

| | Angle 1 | Angle 2 | Angle 3 | Total |
|-------------------|----------------|----------------|----------------|--------------|
| Triangle 1 | | | | |
| Triangle 2 | | | | |
| Triangle 3 | | | | |

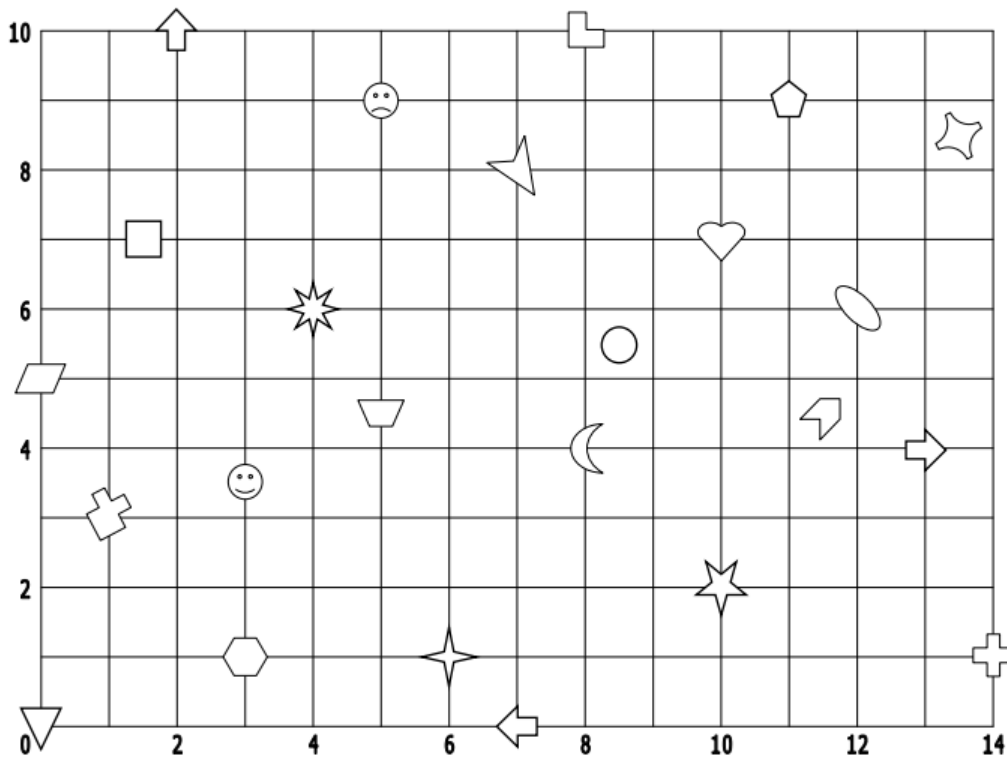
c) Can you make a statement about the 3 angles in a triangle?





Co-ordinates










Challenge 3

Write down the co-ordinates to match the symbols or fill in the symbol that matches the co-ordinate.

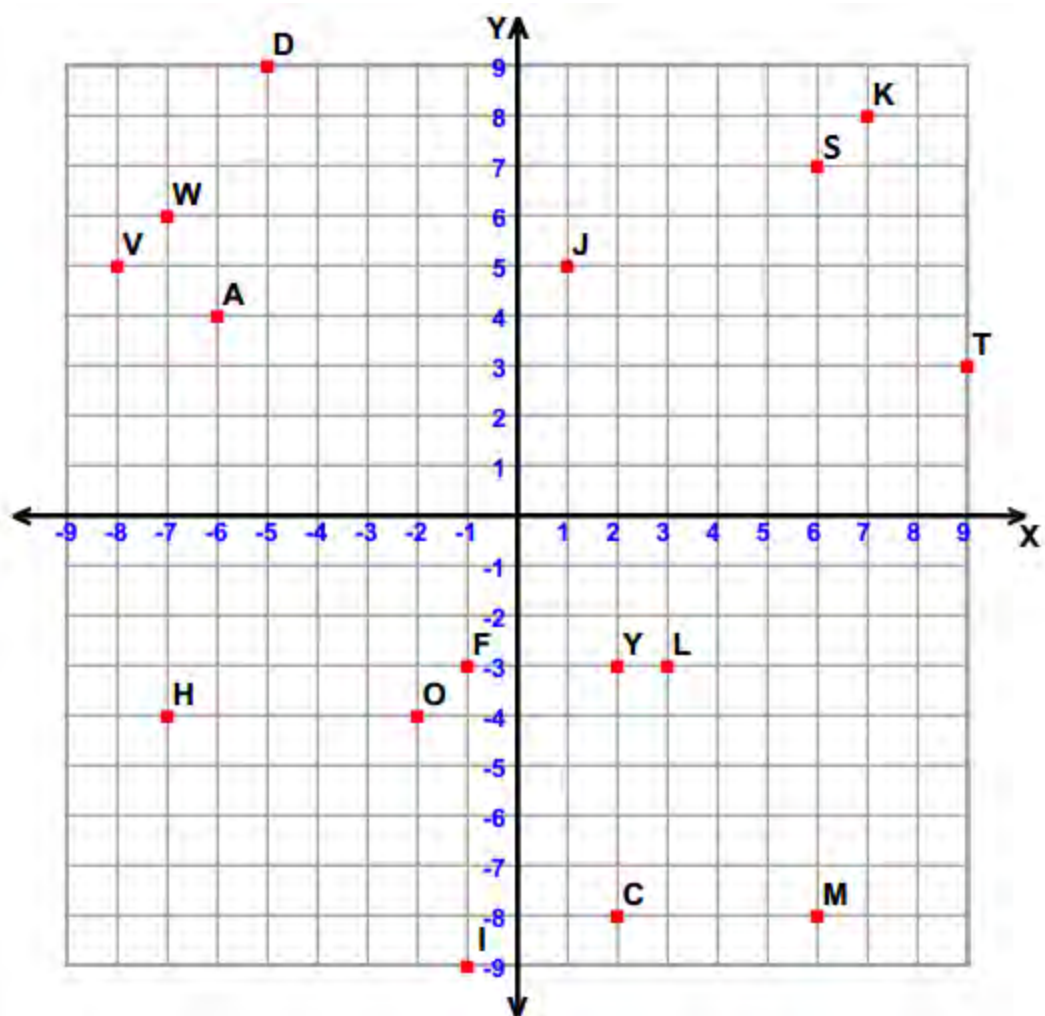


| | |
|---|---------|
|  | (4, 6) |
| | (7, 8) |
|  | |
| | (10, 7) |
|  | |
| | (8, 4) |
|  | |
| | (6, 1) |

| | |
|---|---------|
| | (5, 9) |
|  | |
|  | |
| | (12, 6) |
| | (0, 5) |
|  | |
| | (0, 0) |
|  | |

| | |
|---|-----------|
|  | |
| | (2, 10) |
|  | |
| | (3, 3½) |
| | (11½, 4½) |
|  | |
| | (8½, 5½) |
| | (1½, 7) |

Task 3



At each letter you have a co-ordinate. Write down the co-ordinate of each letter.

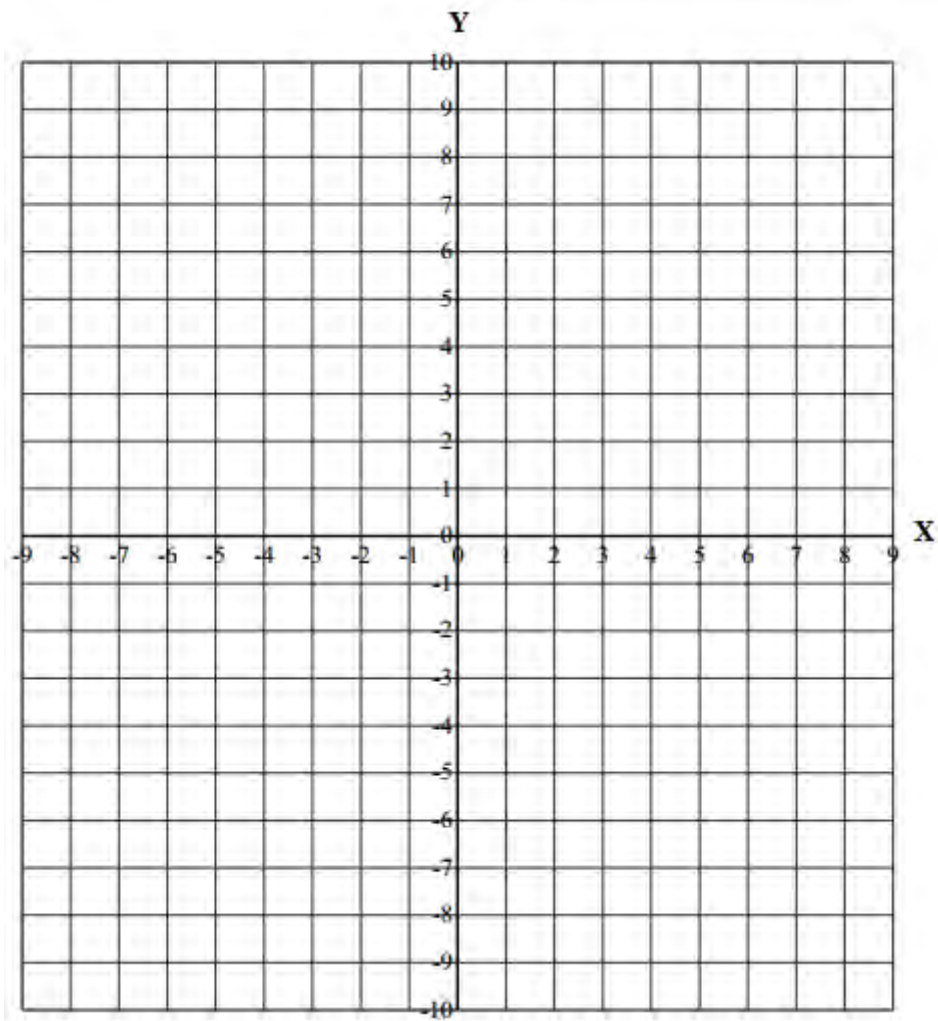
| | | | | |
|-----|-----|-----|-----|-----|
| A = | C = | D = | F = | H = |
| I = | J = | K = | L = | M = |
| O = | S = | T = | V = | W = |
| Y = | | | | |



Task 4

a) Plot the co-ordinates on the graph.

(1, -3), (5, -4), (4, -3), (9, 1), (7, 2), (8, 5), (5, 4), (5, 5), (3, 4), (4, 9), (2, 7),
(0,10), (-2, 7), (-4, 8), (-3, 3), (-5, 6), (-5, 4), (-8, 5), (-7, 2), (-9, 1), (-4, -3),
(-5,-4), (0, -3), (2, -7), (2, -6), (1, -3)



b) Join the points and identify the picture that is revealed.



Week 5

Lesson 9 - Algebra

Learning Objectives

At the end of this lesson you will be able to;

- ☐ Identify, complete and compose visual patterns
- ☐ Describe what is happening in a sequence in your own words – given a sequence in word form and writing down the first few terms
- ☐ Substitution
- ☐ Simplify an expression

Number Patterns

Challenge 1



Complete the following lists of numbers and describe what is happening in each pattern;

a) 1, 2, __, 4, 5, __, 7, 8, __ Pattern: _____

b) 4, 5, __, 7, 8, __, __ Pattern: _____

c) 12, 11, 10, __, 8, 7, __, __ Pattern: _____

d) 3, 2, __, 0, -1, __, -3, -4 Pattern: _____

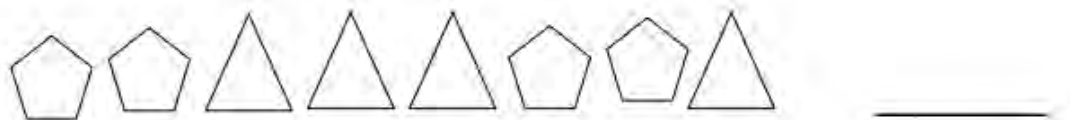
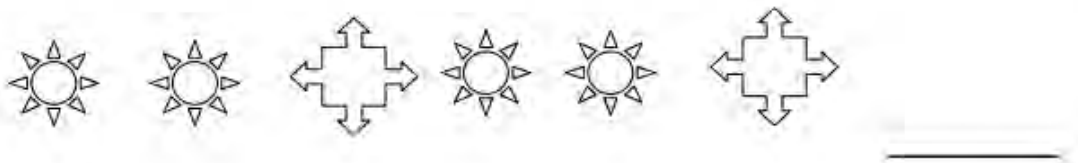
e) 2, 4, 6, __, 10, 12, __, __, 18, __ Pattern: _____

f) 3, 6, 9, __, 15, 18, __, __, __ Pattern: _____

Task 1

a) Do you understand what the term pattern means? Can you give an example of a pattern you have come across?

b) Draw the next picture in each of the following patterns.



b) Can you describe any pattern that you have ever seen?

c) Create a visual pattern of your choice below. Swap your pattern with the nearest first year to you and get them to fill in the next two terms in the pattern.

Task 2

a) You buy your Mum a plant that is 12cm in height. Each week after that the plant grows 10cm.

Note: The plant is 12cm high at the beginning of the first week. What will be the height of the plant at the beginning of the 1st, 2nd, 3rd, 4th and 5th weeks, if it follows the same pattern?



b) Toy makers generally make the same toy the same number of times per day. They keep a running total of the number of Rubik cubes they make every day.

On day 1 they started with 2 Rubik cubes in stock.

Continue the pattern to show the next three days totals.

2, 10, 18, 26, ____, ____, ____.

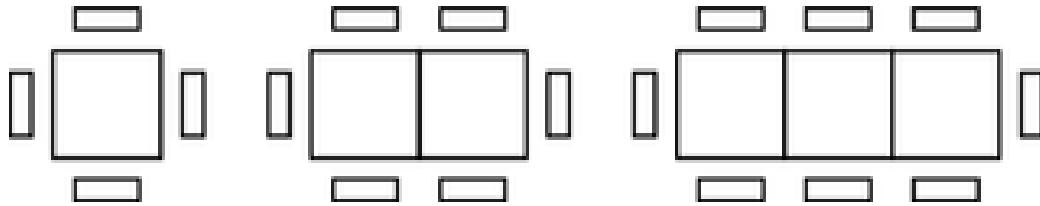
Number of toys produced per day: ____



Task 3

You and 3 friends decide to study for Maths and are sitting together at a square table. A few minutes later, 2 other friends arrive and would like to sit at your table. You move another table next to yours so that 6 people can sit at the table.

Another 2 friends also want to join your group, so you take a third table and add it to the existing tables. Now 8 people can sit together.



a) If another table was added draw the seating arrangement like the diagram above.

b) How many people can sit at the tables when four tables are pushed together?

c) Can you see a pattern emerging?

d) Complete the table below to see if you can identify a pattern.

| Number of tables | Number of people seated |
|------------------|-------------------------|
| 1 | 4 |
| 2 | $4+2=6$ |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |

e) Describe in words what is happening in this pattern?

f) Find the expression for the number of people seated at n tables.

g) Use the formula you have just derived to determine how many people can sit around 12 tables.

h) How many tables are needed to seat 20 people?

Substitution

Challenge 2

a) If $m = 5$ and $n = 2$ find the value of

i) $2m - 5n$

ii) $mn + 4$

iii) $2mn - 15$

b) If $a = 3$ and $b = 6$ find the value of

i) $2b^2 - 4a$

ii) $2ab$

iii) $a^2 - b$

c) If $g = 4$ and $h = 7$ find the value of

i) $4gh$

ii) $5g - 2h$

iii) $g2h$

Task 4

Board Game





Game Instructions.

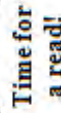
No calculators

If the answer is negative move back

The winner is the person to land **exactly** on finish second time round. **Good Luck!**

START | **FINISH**

The Food Stop Book 1



Are you heading the right way?

Task 5

a) The balls in Snooker have the following point values;

red=1 yellow=2 green=3 brown=4 blue=5 pink=6 black=7



Joe and Erin played a game of pool.

After 10 minutes of playing Erin potted 3 red balls and 2 green balls.

Joe had potted 1 blue ball, a yellow and 2 reds.

i) What was Erin's score after 10 minutes of playing?

ii) What was Joe's score after 10 minutes of playing?

iii) Who was winning the game after 10 minutes of playing?

3. In rugby a try is worth 5 points, a conversion is worth 2 points and a penalty/drop goal is worth 3 points.

Ireland played France recently in the third place play off in the Women's Rugby World Cup. Ireland scored 2 try's 2 conversions and 2 penalties. France scored 3 trys, 3 conversions and 1 penalty.



What was the score in the game?

Simplifying expressions

Challenge 3

Simplify the following expressions;

a) $4 - 3x - 7x - 3 + 7x$

b) $9w^2 - 2w - 7 + 2w^2 + 1$

c) $4x + 5y - x + 2$

d) $3t + 7ts + ts$



Task 6

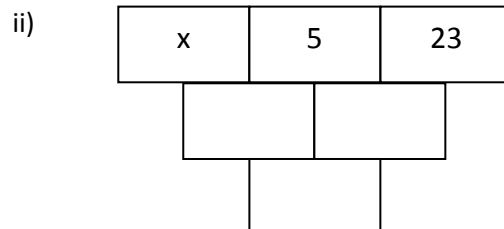
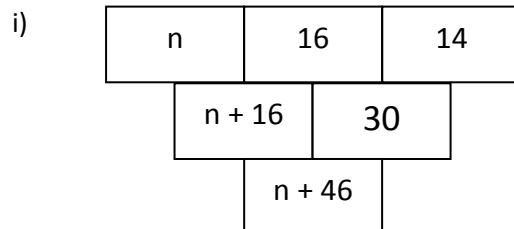
a) You should have come across the words coefficient, variable, constant, term and expression when you have studied algebra. In relation to the following;

$$4x + 3y + 2x - 3$$

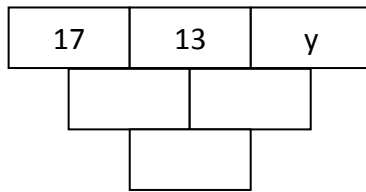
Can you identify the coefficients, variables, constant, terms and expression?

b) From your study of algebra can you remember what like terms are?

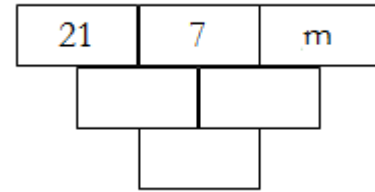
c) The following diagrams are called algebra pyramids. Add together each consecutive term and fill the answer in the box below. The first one is done for you.



iii)



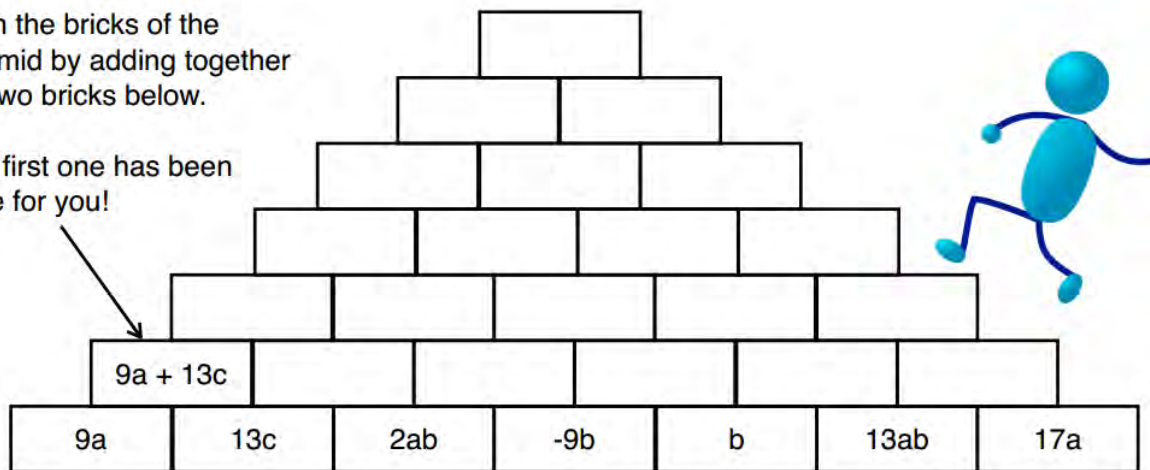
iv)



d) Try and reach the peak of this pyramid by adding each consecutive brick.

Fill in the bricks of the pyramid by adding together the two bricks below.

This first one has been done for you!



Task 7

a) Find an expression for the perimeter of the basketball court if its length is $4x + 2$ and its width is $3x$. Drawing a diagram of the pitch may help you. Please simplify this expression.



b) If you look at the previous question we found an expression for the perimeter of the basketball court. Can you now find an expression for the area of the basketball court? Please simplify the expression.

Week 6

Lesson 9 - Algebra

Learning Objectives

At the end of this lesson you will be able to;

- ☐ Solve an equation
- ☐ Create an equation and solve it.

Solving equations

Challenge 1

Solve the following;

a) $-7(4h - 5) = 30 + 6h$

b) $2s - 3s = -21$



Task 1

a) Look at the following;

$$3x + 2y$$

$$3x + 2y = 0$$

What is the biggest difference you see between the two calculations above?

b) From last week's session we learned that $3x + 2y$ is called an
After stating the difference in part a what do you think $3x + 2y = 0$ might be called?

c) Solve the following equations.



| | |
|--------------------|---------------------|
| i) $3x + 1 = 13$ | ii) $12x - 4 = 56$ |
| iii) $2x - 9 = 17$ | iv) $5x - 3 = 27$ |
| v) $6f + 12 = 48$ | vi) $4r + 20 = 16$ |
| vii) $3 = 6p + 21$ | viii) $2 = 3e + 17$ |

Task 2

Use the equations below to find out the value of each letter. Fill in the gaps to make a sentence.

____ ____ ____ ____ ____ ____ ____ ____ ____
1 2 3 4 5 6 7 8 9

____ ____ ____ ____ ____ ____ ____ ____ ____
9 10 11 3 12 1 6 4 5

$$2o = 12 \qquad l + 4 = 11 \qquad q - 3 = 7 \qquad 2a + 1 = 7$$

$$3s = 15 \qquad e - 5 = 4 \qquad 2i + 6 = 8 \qquad 3n + 1 = 13$$

$$2v - 1 = 15 \qquad 5c = 10 \qquad 3u = 33 \qquad \frac{t}{4} = 3$$



Task 3

Loop cards.

You will each be given a card with an equation. The person who goes first reads out an equation. You have to solve this equation and if you have that answer on your card you shout out the answer and then read out your equation.

Task 4

Solve the following word problems by using algebra to create an equation;

a) On John's last birthday he weighed x kg. He lost 3kg since then and now weighs 65kg. How much did John weigh on his last birthday? Justify your answer.



b) Let p be the number of DVD's Victoria has. When her friend Lisa borrows 9 DVD's Victoria has 12 left. How many DVD's does Victoria own? Justify your answer.



c) The length of a pitch is twice the size of its width. The perimeter of the pitch is 150m. How long is the width of the pitch? Justify your answer.



d) If the sum of three consecutive numbers is 72, what is the largest number? Justify your answer.

e) Marcus, James and Megan are sharing a share pack of Maltesers. James eats twice as many Maltesers as Marcus and Megan eats three times as many Maltesers as Marcus. There are 60 Maltesers in the packet. How many Maltesers does James eat?
Justify your answer.



f) Linda and Mark are brother and sister. Their ages added together equal their mother's age. Their mother is 50 and Mark is 4 years older than Linda. How old is Linda and Mark?
Justify your answer.



Appendix: Academic Test

Mercy Secondary School

Mounthawk



Numeracy Profiling Test

Name: _____

Class: _____

Date: _____

Section A

Concepts and Skills

QUESTION 1: Probability



- (a) A normal dice is thrown, list all the possible outcomes.

- (b) A dice and coin are thrown together. How many outcomes are possible?

QUESTION 2: Statistics

- (a) State whether each of the following data is numerical or categorical:

- The colours of cars in a car-park
- The number of houses on your street
- The types of animals on a farm
- The number of countries in the EU
- The different nationalities of Premier League soccer players

- (b) Daniel wrote down the number of minutes his phone calls lasted. His findings were as follows;

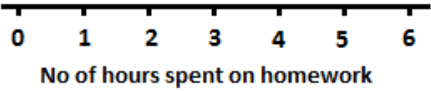
| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 08 | 10 | 16 | 03 | 01 | 24 | 25 | 30 |
| 36 | 17 | 19 | 11 | 16 | 18 | 04 | 03 |
| 07 | 02 | 01 | 04 | 17 | 19 | 23 | 26 |

Fill in the following frequency table:

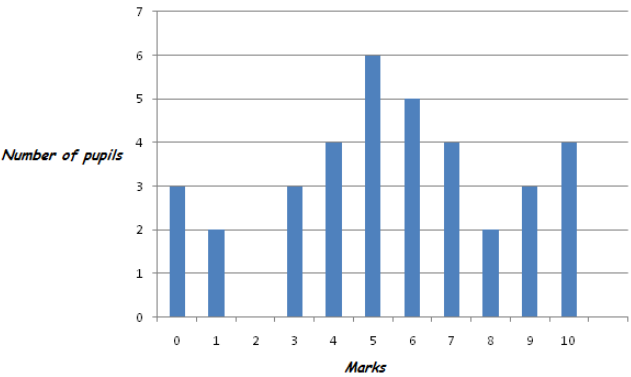
| NUMBER OF MINUTES | TALLY | FREQUENCY |
|-------------------|-------|-----------|
| 1-10 | | |
| 11-20 | | |
| 21-30 | | |
| 31-40 | | |

- (c) The data below shows the number of hours spent on homework in a particular week by a first-year class. Represent this data on a line plot.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2 | 1 | 5 | 2 | 6 | 3 | 3 | 4 |
| 2 | 4 | 0 | 3 | 4 | 1 | 4 | 5 |
| 4 | 5 | 3 | 6 | 2 | 5 | 3 | 3 |



- (d) A maths test consisted of 10 questions. 1 mark was given for a correct solution and 0 marks were given for an incorrect solution. The following bar chart represents the marks obtained by a class in the test:



(i) How many pupils scored 2 marks?

(ii) How many pupils scored 8 marks or more?

(iii) How many pupils took the test?

QUESTION 3: SYNTHETIC GEOMETRY:

- (a) (i) Measure the following line. Give your answer in centimetres (cm)



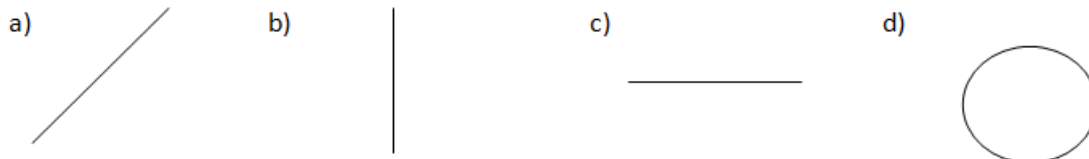
Answer =

- (ii) Measure the following line. Give your answer in millimetres (mm)

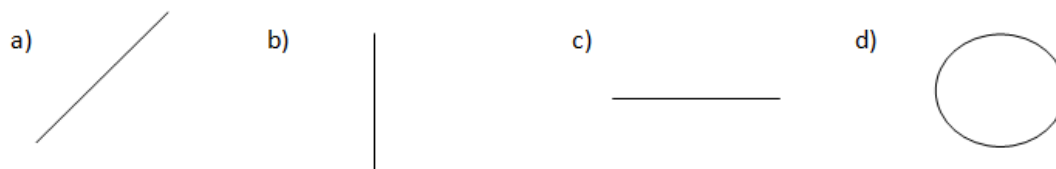


Answer =

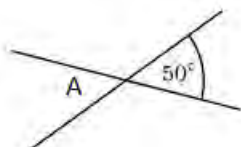
(b) (i) Put a circle around the vertical line



(ii) Put a circle around the horizontal line



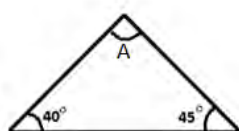
(c) In the following diagram write down the size of the angle marked with a letter.



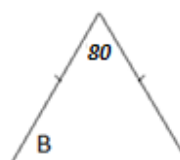
Give a reason for your answer.

(d) Find the size of the angles marked with a letter in each of the following diagrams

(i)

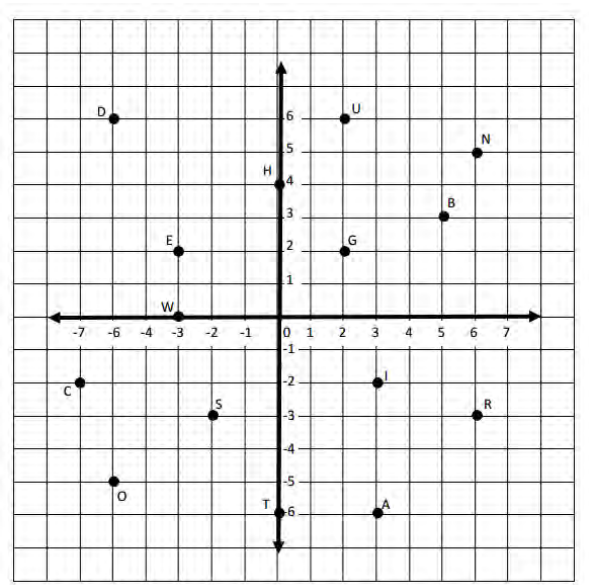


(ii)



Give a reason for your answers

(e) Write down the co-ordinates of the points asked for below



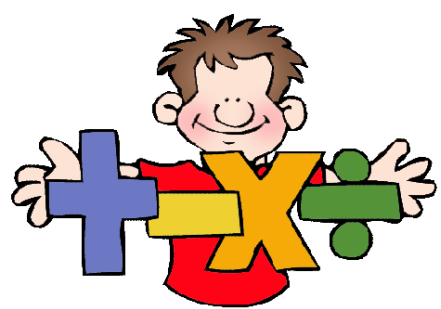
N =

E =

W =

S =

A =



QUESTION 4: The Number

(a) Calculate each of the following;

(i) $8 + 20 \div 4 = \underline{\hspace{2cm}}$

(ii) $5 + 4 \times 3 = \underline{\hspace{2cm}}$

(iii) $3 + 2 \times (5 - 2) = \underline{\hspace{2cm}}$

(iv) $(4 - 6 + 3)(6 - 2 - 1) = \underline{\hspace{2cm}}$

(b) Calculate

(i) 20% of €60

(ii) 75% of 88kg

(c) Example $20\% = \frac{1}{5} = 0.2$

(i) $80\% =$ $=$ _____ (ii) _____ $= \frac{3}{12} =$ _____

(d) List all the odd numbers between 48 – 59 inclusive.

(e) List the first five multiples of the following numbers

(i) 6 _____

(ii) 4 _____

(iii) What is the lowest common multiple (LCM) of 6 and 4?

(f) List the five smallest factors of the following numbers

(i) 16 _____

(ii) 24 _____

(iii) What is the highest common factor (HCF) of 16 and 24?

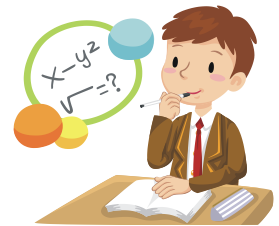
- (g) 12 is **not** a prime number. Give a reason why this statement is true.

- (h) List the elements of the following sets

- (i) $A = \{\text{Vowels in the words PROJECT MATHS}\}$

- (ii) $B = \{\text{The days of the week beginning with the letter T}\}$

- (iii) Is $\#A = \#B$?



QUESTION 5: Algebra

- (a) Complete the following lists of numbers;

(i) 2, 4, 6, __, 10, 12, __, __, 18, __

(ii) 7, 14, 21, __, 35, __, 49, 56, __, __

- (b) Describe in your own words the following sequence:

5, 9, 13, 17...

(c) Find the value of the following, when $a = 1$, $b = 2$:

$$2a + 1b$$

(d) Find the value of the following, when $y = -2$:

$$3(y + 4)$$

(e) Simplify Each of the Following:

(i) $6x - 2y + 6 + 3x + 5y - 11 =$

(ii) $8x^2 - 8 - 2x - 4 - 3x^2 + 11x =$

(iii) $3(2x + 1) + 5(x + 2) + 7 =$

(f) Simplify the following:

$$(x + 1)(x + 2)$$

(g) Solve the following equation:

$$6x + 3 = 2x + 11$$

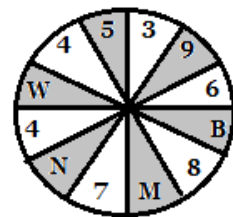
Section B

Contexts and Applications

QUESTION 1: Probability

(a) The spinner shown has 12 equal sectors. When the spinner is spun, **list the outcomes** for these events:

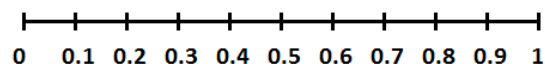
- The spinner stops on a shaded region
- The spinner stops on a letter
- The spinner stops on a number in a white sector
- The spinner stops on a letter in a white sector
- The spinner stops on an even number



(b) A pencil case contains 6 black pens and 4 blue pens. One pen is chosen at random from the box. Write down the probability that the pen chosen is:

- Black
- Not black

Represent each answer on the probability scale:



QUESTION 2: Statistics

- (a) Give two examples of categorical data that could be associated with a school uniform.

- (b) The following is a question that is **not** suitable for a questionnaire. Suggest a more suitable question.
Soccer is more exciting to watch than rugby. Do you agree?

Yes ☐ No ☐ Don't Know ☐

More suitable question:



- (c) Here are the marks, out of 50, scored by pupils in a Business Studies test:

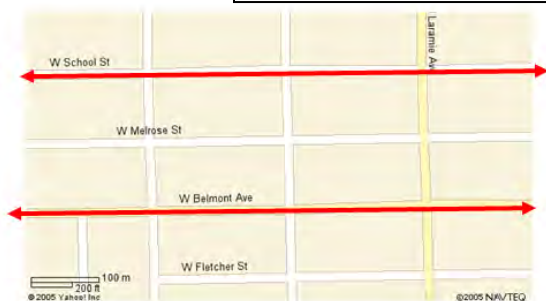
30, 36, 42, 18, 24, 27, 34, 11, 21, 28, 7, 32, 46, 24, 32, 43, 36, 27, 34, 36

Suggest an appropriate graphical method to illustrate this data. Give a reason for your answer

QUESTION 3: Synthetic Geometry

- (a) (i) What is the relationship between the two streets highlighted?

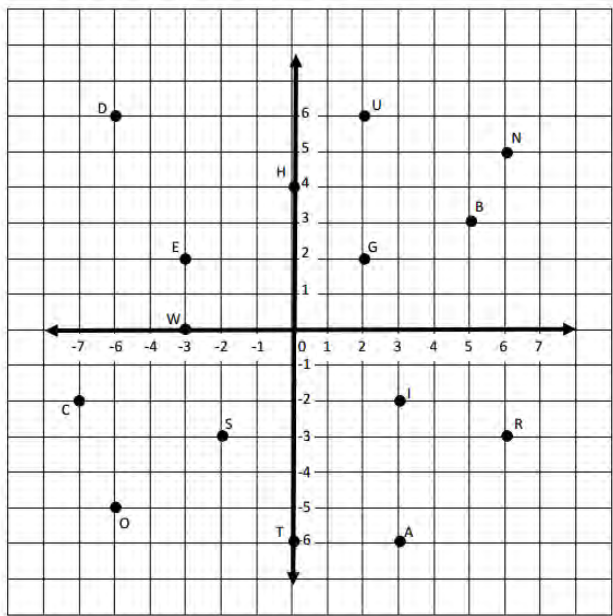
Parallel Diagonal Perpendicular Curved



(ii) What is the relationship between the two streets highlighted?



(b) Answer the following questions;



(i) Which two letters have the same x co-ordinate?

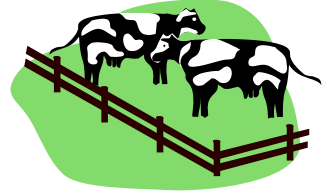
(ii) Which two letters have the same y co-ordinate?

QUESTION 4: The Number

(a) The population of a town was 30,000 in 2010. Now the population of the town is 23,500. How many people left the town?



- (b) A fence is built with posts three metres apart from each other. If a fence is made from 10 posts how long is the fence?



- (c) Sean buys a new bike for €350. A year later he sells it at a discount of 10%. How much did Sean sell the bike for?



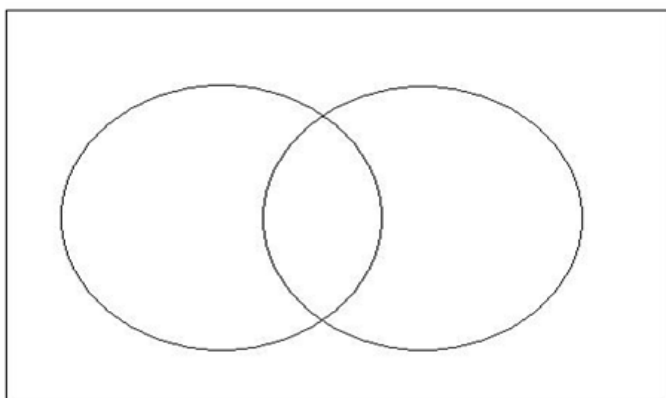
- (d) Liam buys a bottle of coke. His friend drinks one third of the bottle. What percentage of coke is left in the bottle?



- (e) There are 40 M&Ms in a packet. Half of them are green, 20% of them are red, and the rest are blue. How many blue M&Ms are there in the packet?



- (f) A farmer wishes to split his land into three sections. In the western field he wants to put his cows. In the eastern field he wants to put all of his sheep. In between the two fields the farmer has placed a pen for his chickens and pigs. The farmer has 15 cows, 12 sheep, 8 pigs and 3 chickens, and a dog who is never allowed enter the fields. Represent the given information on the Venn diagram below.

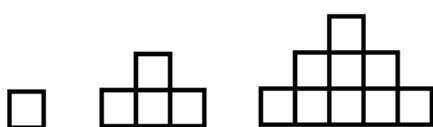


- (g) What do these symbols mean?

- (i) $A \cup B$ _____
(ii) A' _____

QUESTION 4: Algebra

- (a) (i) The following is a sequence of shapes each with a different number of levels. Using the pattern, draw the next shape.



- (ii) Complete the following table:

| | | | | |
|------------------------------------|---|---|---|---|
| Number of levels: | 1 | 2 | 3 | 4 |
| Number of squares in bottom level: | | | | |
| Total number of squares per shape: | | | | |



| |
|----|
| 10 |
| |
| |

- (b) A sequence is described as 'start with 15 and add 3 every term'. Write down the first five terms.

(c) Write down the value of x




x =

(d)

Find the value of , if  = 8



 =

(e) When 2 is taken from twice a certain number, the result is the same as adding 2 to the number.
Find this number

Appendix C: Tutor Handbook

Peer Tutoring



Programme

Tutor Handbook

“Do not worry about your
difficulties in Mathematics.
I can assure you mine are still
greater.”

Albert Einstein

Contents

| Week | Date | Lesson | Content | Tick on completion |
|------|------|--------|--|--------------------|
| 1 | | 1 | Time & Timetables | |
| | | 2 | Order of Operations | |
| 2 | | 3 | Multiples Factors Sets Prime numbers | |
| | | 4 | Fractions Converting Fractions Decimals & Percentages | |
| 3 | | 5 | Tally & Frequency Tables Types of Data Surveys Graphical Representation of Data | |
| | | 6 | Outcomes Probability | |
| 4 | | 7 | Vertical, Horizontal & Oblique lines Parallel & Perpendicular lines. Measuring angles | |
| | | 8 | Vertically opposite angles Angles in a Triangle Read and plot co-ordinates on a Cartesian Graph | |
| 5 | | 9 | Visual Patterns Sequences Substitution Simplifying expressions | |
| 6 | | 10 | Creating & Solving equations | |

Important Note:

“Never underestimate the difference **YOU** can make in the lives of others”.

Thank you for your become involved in the Peer Tutoring Programme.

Please make this experience a positive one by engaging fully with the programme content and being a positive role model to the 1st year students.

This handbook is a teaching tool for you to use to aid your teaching.

Attached to each question are a sample of possible questions and prompts that you could pose to students. This list is not exhaustive and it would be hoped that you would come up with some of your own when planning for the lesson.

Please familiarise yourself with all the content and make sure that you have solved every problem prior to teaching. Ensure you ask Ms.

Flanagan if there are any areas or questions that you are unsure of.

There is an answer book which accompanies this tutor handbook. Please refer to this regularly to check that your student's answers are correct.

Please remember to scaffold the support you give to your student. Offer them help when they need it by using prompts and engaging in discussion but do not simply give them the answers as by doing this your student learns nothing.

Week 1

Lesson 1 - Time and Timetables

Learning Objectives

At the end of this lesson your student should be able to;

- ☐ Tell the time using the 24 hour clock
- ☐ Read timetables correctly

Challenge 1

00:35

23:50

11:30

If your student answers all of these questions correctly, please go directly to Task 2.

On the 24 hour clock what would the following times be?

a) 12:35am

b) 11:50pm

c) 11:30am



Task 1

Tutor Guidelines

The aim of this task is to learn how to convert time from the 12 hour clock to the 24 hour clock. Use the clock below to help you explain how to convert time in the 12 hour clock to time in the 24 hour clock. In the 24 Hour Clock the time is shown as how many hours and minutes since midnight.

- How many hours are there in a day? 24.

The day is split into AM/PM, the 12 hours running from Midnight to Noon (the AM hours) and the other 12 hours running from Noon to Midnight (the PM hours).

- How many hours past midnight is 1am? 1 hour so in the 24 hours clock that's 01:00
- How many hours past midnight is 9am? 9 hours so in the 24 hours clock that's 09:00
- How many hours past midnight is 2pm? 14 hours so in the 24 hours clock that's 14:00
- How many hours past midnight is 11pm? 23 hours so in the 24 hours clock that's 23:00

The quick way of converting a pm time in the 12 hour clock to the 24 hours clock is by adding 12 to it as the 24 hours clock has 12 more hours in it than the 12 hour clock. The quick way of converting a pm time in the 24hour clock to the 12 hours clock is by taking 12 from it as the 12 hour clock has 12 less hours than the 24 hours clock.



For each of the clocks below, what would a 24 hour digital clock show;

- a) If it was am b) If it was pm



a. _____

b. _____



a. _____

b. _____



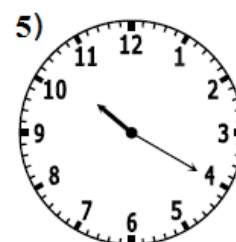
a. _____

b. _____



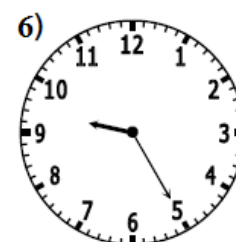
a. _____

b. _____



a. _____

b. _____



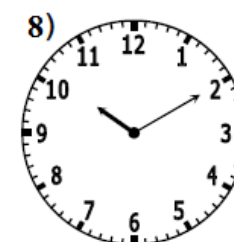
a. _____

b. _____



a. _____

b. _____



a. _____

b. _____

Task 2

Tutor Guidelines

The aim of this task is to develop students understanding of time and timetables. The key mathematical concepts that you will be required to teach students are the addition and subtraction of time. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

So before we jump into these questions let's imagine it is 8:30 on a Saturday and you sit down to watch an hour long episode of X Factor.

- What time will the programme be over at? 9:30
- So what did you do to find out the finishing time? (You want them to say here that they added 1 to 8).
- So you add hours with hours?
- Ok now looking at the cinema question here if we have to add hours and minutes to a certain time how would we write the problem mathematically? You want them to recognise the need to line up the times in the question i.e. hours under hours; minutes under minutes.

If they are struggling with this concept, explain that it is like algebra, you can only add and subtract like terms.

Don't forget there are only 60 minutes in an hour so anything over 60 minutes can be rewritten in terms of minutes and hours.

- Will it be the same when I am subtracting? Yes
- When looking to see the latest showing what do I need to take into consideration? Would a table help? Would a picture help?

When I am subtracting I am finding the difference between two times.

- As a result do you think there is any way you could check your answers?

a) Your student should be able to complete this question successfully after completing Task 1. If they need help then use the prompts from Task 1.

b)

- What does this question require you to do? Add and subtract time.
- What is your first step in this question? You need to figure out what is the latest time you can leave the cinema at.
- If you need to be at home at 20:00 and you live 10 minutes from the cinema, the latest time you can leave the cinema is what? 19:50.
- If you go to see the 18:00 screening of the movie will you be home in time? No as 2 hours added to 18:00 is 20:00 and I live 10 minutes from the cinema so I would not be home until 20:10.
- If you go to 15:50 screening will you be home on time? Yes, if you leave the cinema directly after the movie you will be home by 18:00.

c)

- What time is Red 2 on at? 20:30.
- If the movie is 2 hours and 30 minutes long, how will you figure out what time the movie is over at? Add 2 hours and 30 minutes to 20:30.

d)

- What does this question require you to do? Subtract time.
- What are you taking from what? I am taking 2 hours and 6 minutes from 20:15.

You must ensure that you line this calculation up correctly so that you end up with the correct solution so you line up hours under hours and minutes under minutes and then subtract your time.

e) Your student should be able to complete this question successfully after completing Task 1. If they need help then use the prompts from Task 1.

| | | | |
|---|-----|--|-----|
| (2D) DESPICABLE ME 2 14:20 16:20 | Gen | (2D) MONSTERS UNIVERSITY 15:40 18:00 | PG |
| (2D) SMURFS 14:20 16:45 | Gen | ALAN PARTRIDGE: ALPHA PAPA 18:50 20:30 | 15A |
| GROWN-UPS 2 13:30 15:50 18:00 20:30 | 12A | HEAT 15:00 17:40 20:20 | 15A |
| NOW YOU SEE ME 20:30 | 12A | PERCY JACKSON : SEA OF MONSTER 13:30 15:45 18:00 | PG |
| RED 2 20:30 | 12A | THE CONJURING 14:30 17:00 20:10 | 15A |
| THE INTERNSHIP 18:25 | 12A | THE LONE RANGER 14:10 17:20 20:30 | 12A |
| WOLVERINE (2D) 20:40 | 12A | | |



- a) Heat is shown at 17:40. What time is this in the 12 hour clock?
- b) Grown-ups 2 is 2 hours long. If I live 10 minutes away from the cinema and I have to be home by 20:00 what is the latest time I can go and see this movie?
- c) Red 2 is 2hours 30 minutes long? What time will the movie be over at?
- d) Wolverine is 2 hours and 6 minutes long. If you go to see this movie at a different cinema and it finished at 20:15 what time did this movie start at?
- e) Can you write your answer to part d) in the 12 hour clock?

Task 3

Tutor Guidelines

The aim of this task is to further develop students understanding of time and timetables in a different context. Again, the key mathematical concepts that you will be required to teach students are the addition and subtraction of time. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Your student firstly needs to identify what time the 09:00 train arrives at Thurles. Then just like the last task they need to be able to add and subtract time (please refer to task 1 for prompts if needed).

- What time does Monday's 09:00 train from Dublin Heuston arrive in Thurles? 10:15.
- How can I find out how long that journey takes? Take the time it left Heuston from the time it arrived in Thurles.

b)

- What do you need to know to be able to figure out to be able to answer this question? What time the train left Mallow.
- What time did the train leave Mallow? 09:25
- How can I figure out how long that journey takes? Take the time it left Mallow from the time it arrived in Tralee.

c)

- What do you need to know to be able to figure out the answer to this question? What time the train arrived in Tralee.
- What time did the train arrive in Tralee? 20:51
- How can I figure out how long that journey takes? Take the time it left Dublin Heuston from the time it arrived in Tralee.

d) Firstly get your student to look at the times the trains leave Mallow on a Sunday.

- What is the last train that arrives in Tralee before 3pm? 12:44 train.

Below is the train schedule from Dublin to Cork to Tralee. Study the schedule and answer the following questions.

| Baile Átha Cliath & Corcaigh – Trá Lí – Luan go Satharn (gan Saoire Phoiblí san áireamh) | | | | | | | | | | | | | | | | | | | | |
|--|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Dublin & Cork – Tralee – Monday - Saturday (excluding public holidays) | | | | | | | | | | | | | | | | | | | | |
| | | 2 | 1 2 | 2 | 1 2 | 2 | 2 | 2 | 2 | 2 | 1 2 | 2 | 1 2 | 2 | 2 | 2 | 2 | 1 2 | 1 2 | 2 |
| | | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT | MON TO SAT |
| DUBLIN Heuston B L A | Dep | .... | 07.00 | .... | .... | 09.00 | .... | .... | 11.00 | .... | .... | 13.00 | .... | 15.00 | .... | .... | .... | 17.05 | 19.00 | .... |
| Newbridge | Dep | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Kildare | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Portarlinton | Dep | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Portlaoise | Dep | .... | 07.42 | .... | .... | 09.43 | .... | .... | 11.42 | .... | .... | 13.42 | .... | .... | .... | .... | .... | .... | 19.46 | .... |
| Ballybrophy | Dep | .. | .. | .. | .. | 09.58 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 18.00 | 20.01 | .. |
| Templemore | Dep | .... | .... | .... | .... | .... | .... | .... | 12.06 | .... | .... | .... | .... | .... | .... | .... | .... | 18.12 | 20.12 | .... |
| Thurles | Dep | .... | 08.13 | .. | .. | 10.15 | .. | .. | 12.15 | .. | .. | 14.13 | .. | 16.09 | .. | .. | .. | 18.21 | 20.21 | .. |
| Limerick Junction | Dep | .... | 08.34 | .... | .... | 10.36 | .... | .... | 12.36 | .... | .... | 14.34 | .... | .... | .... | .... | .... | .... | 20.42 | .... |
| Charleville | Dep | .. | .. | .. | .. | 10.57 | .. | .. | 12.57 | .. | .. | .. | .. | 16.45 | .. | .. | .. | 18.57 | 21.02 | .. |
| CORK Kent | Dep | 06.45 | .... | 08.55 | 10.20 | .... | .... | 12.20 | .... | .... | 14.20 | .... | .... | 16.55 | .... | 18.45 | .... | .... | .... | 20.55 |
| MALLOW | Arr | 07.08 | 09.07 | 09.18 | 10.41 | 11.13 | .. | 12.41 | 13.13 | .. | 14.41 | 15.07 | .. | 17.00 | 17.21 | .. | 19.11 | 19.14 | 21.17 | 21.18 |
| MALLOW | Dep | 07.25 | To Cork | 09.23 | To Heuston | To Cork | 11.20 | To Heuston | To Cork | 13.20 | To Heuston | To Cork | 15.18 | To Cork | 17.25 | .... | 19.14 | To Cork | 21.24 | 21.25 |
| Banteer | Dep | 07.36 | 09.34 | 09.45 | 11.31 | 11.42 | .. | 13.31 | 13.42 | .. | 15.29 | 15.40 | .. | 17.36 | 17.47 | .. | 19.30 | 19.42 | 21.35 | 21.36 |
| Millstreet | Dep | 07.47 | 09.45 | 09.56 | 11.56 | 12.06 | .. | 13.56 | 14.06 | .. | 15.56 | 16.06 | .. | 17.57 | 18.07 | .. | 19.55 | 20.05 | 21.55 | 21.56 |
| Rathmore | Dep | 07.57 | 09.56 | 10.07 | 12.15 | 12.25 | .. | 14.15 | 14.25 | .. | 16.15 | 16.25 | .. | 18.16 | 18.26 | .. | 20.15 | 20.25 | 22.14 | 22.15 |
| Killarney | Dep | 08.17 | 10.15 | 10.26 | 12.33 | 12.43 | .. | 14.33 | 14.43 | .. | 16.33 | 16.43 | .. | 18.34 | 18.44 | .. | 20.35 | 20.45 | 22.32 | 22.33 |
| Farranfore | Dep | 08.36 | 10.33 | 10.44 | 12.51 | 13.01 | .. | 14.51 | 15.01 | .. | 16.51 | 17.01 | .. | 18.51 | 19.01 | .. | 20.51 | 21.01 | 22.49 | 22.50 |
| TRALEE Casement | Arr | 08.52 | 10.50 | 11.01 | 13.09 | 13.19 | .. | 15.09 | 15.19 | .. | 17.09 | 17.19 | .. | 19.09 | 19.19 | .. | 21.09 | 21.19 | 22.49 | 22.50 |

| Baile Átha Cliath & Corcaigh – Trá Lí – Dé Domhnaigh (Níl an Domhnach roimh shaoirí poiblí san áireamh) | | | | | | | | | | | | | | | | | | | | |
|---|-----|-------|------------|-------|---------|-------|------------|-------|---------|-------|------------|---------|-------|-------|-------|-------|------|------|------|------|
| Dublin & Cork – Tralee – Sunday (Excluding Sundays prior to Public Holidays) | | | | | | | | | | | | | | | | | | | | |
| | | 2 | 1 2 | 1 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 2 | 1 2 | 1 2 | 1 2 | 2 |
| | | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN | SUN |
| DUBLIN Heuston B L A | Dep | .... | .... | 08.30 | 10.00 | .... | 13.00 | .... | .... | 15.00 | .... | 17.00 | .... | .... | .... | 19.05 | .... | .... | .... | .... |
| Newbridge | Dep | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Kildare | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Portarlinton | Dep | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 19.42 | .. | .. | .. | .. |
| Portlaoise | Dep | .... | .... | 09.12 | 10.42 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Ballybrophy | Dep | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Templemore | Dep | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Thurles | Dep | .. | .. | 09.44 | 11.12 | .. | 14.08 | .. | .. | 16.08 | .. | 18.08 | .. | .. | .. | 20.21 | .. | .. | .. | .. |
| Limerick Junction | Dep | .... | .... | 10.08 | 11.37 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 20.47 | .... | .... | .... | .... |
| Charleville | Dep | .. | .. | 10.28 | .. | .. | 14.45 | .. | .. | .. | .. | .. | .. | .. | .. | 21.04 | .. | .. | .. | .. |
| CORK Kent | Dep | 08.55 | 10.20 | .... | .... | 12.10 | .... | 14.35 | 16.20 | .... | .... | .... | .... | 18.45 | 20.50 | .... | .... | .... | .... | .... |
| MALLOW | Arr | 09.20 | 10.41 | 10.44 | 12.08 | 12.35 | 15.01 | 15.05 | 16.41 | 17.01 | .. | 19.01 | 19.15 | 21.16 | 21.20 | .... | .... | .... | .... | .... |
| MALLOW | Dep | 09.25 | To Heuston | 10.44 | To Cork | 12.44 | To Heuston | 15.17 | To Cork | 17.25 | To Heuston | To Cork | 19.25 | .... | 21.21 | .... | .... | .... | .... | .... |
| Banteer | Dep | 09.36 | 10.59 | 11.10 | 12.58 | 13.10 | 15.31 | 15.43 | 17.37 | 17.48 | 19.37 | 19.48 | .... | 21.34 | .... | .... | .... | .... | .... | .... |
| Millstreet | Dep | 09.47 | 11.10 | 11.20 | 13.18 | 13.30 | 16.01 | 16.12 | 18.02 | 18.13 | 20.04 | 20.15 | .... | 21.57 | .... | .... | .... | .... | .... | .... |
| Rathmore | Dep | 09.55 | 11.20 | 11.30 | 13.40 | 13.50 | 16.22 | 16.32 | 18.25 | 18.35 | 20.26 | 20.36 | .... | 22.18 | .... | .... | .... | .... | .... | .... |
| Killarney | Dep | 10.14 | 11.40 | 11.50 | 13.59 | 14.09 | 16.42 | 16.52 | 18.44 | 18.54 | 20.44 | 20.54 | .... | 22.38 | .... | .... | .... | .... | .... | .... |
| Farranfore | Dep | 10.33 | 12.02 | 12.12 | 14.21 | 14.31 | 16.59 | 17.09 | 18.59 | 19.09 | 20.59 | 21.09 | .... | 22.55 | .... | .... | .... | .... | .... | .... |
| TRALEE Casement | Arr | 10.49 | 12.20 | 12.30 | 14.39 | 14.49 | 17.00 | 17.10 | 19.00 | 19.10 | 21.00 | 21.10 | .... | 22.55 | .... | .... | .... | .... | .... | .... |

a) I leave Dublin Heuston at 09:00 on a Monday morning. How long does it take me to get to Thurles?

b) I arrive in Tralee at 10:49 on a Sunday. How long did it take me to travel to Tralee from Mallow?

c) I leave Dublin Heuston at 17:05 on a Wednesday. How long does it take me to get to Tralee?

d) I live in Mallow and need to be in Tralee for 3pm on a Sunday. What is the last train I should get from Mallow in order to be in Tralee on time?



Lesson 2 - Number

Learning Objectives

At the end of this lesson your student should be able to;

- ☐ Understand the importance of BIMDAS in the order of operations and apply BIMDAS

Order of Operations

Challenge 1

a) Answer = 15

b) Answer = 5

If your student gets these correct please move directly to Task 4.

Solve the following;

a) $(2 + 4) \div 6 + 7 \times 2 =$

b) $(13 + 83 - 6^2) \div (17 - 5) =$

Task 1

Tutor Guidelines

The aim of this task is to develop students understanding of the importance of the order of operations. The key mathematical concept that you will be required to teach students is that in the order of operations you solve what's within the brackets first, then indices, followed by multiplication and division and then addition and subtraction (BIMDAS). The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a)

- How much is a bottle of Sprite? €2.
- How many bottles of Sprite do you buy? 3.
- How much do you spend on Sprite in total? €6
- How did you get this answer (write down your calculations)? I multiplied €2 by 3.
- How much is a packet of crisps? €1.
- How many packets do you buy? 5.
- How much do you spend on crisps in total? €5.
- How did you get this answer (write down your calculations)? I multiplied €1 by 5.
- How much do you spend in total on both the crisps and Sprite? €11.
- How did you get his answer (write down your calculations)? I added €4 to €5.

b) Let your student attempt this question and see if they get the same answer as the answer to part a).

c) If they do not get the same answer for both questions then tell them that the answer to part b) is also 11 and ask them to attempt the question again to try and get that answer. Get your student to look at the calculations they wrote down for part a).

- **Do you see any similarities between the calculations you made for part a) and the question in part b)?**
- **In question a) you multiplied €2 x 3, is this similar to any of the calculations in part b)?**
- **In question a) you multiplied €1 x 5, is this similar to any of the calculations in part b)?**
- **In part a) what did you do to the two answers of the afore mentioned calculations?**
- **How is this similar to part b)?**

d) Explain to your student that in order to ensure that questions like part b) are not open to interpretation we follow The Order of Operations. This is just an agreement that allows us all to do a problem the same way so we get the same answer. If we do not use this order then there could potentially be several answers to some questions rather than just one answer.

a) If you go into Gala and buy three large bottles of Sprite for €2 each and 5 packets of crisps for €1, how much do you spend? Please show your workings.



b) Solve the following $2 \times 3 + 1 \times 5$

c) Are your answers to part a) and b) the same? If so, why do you think this is?



d) Discuss the importance of the order of operations with your tutor.

Task 2

Tutor Guidelines

The aim of this task is to deepen your students understanding of the importance of the order of operations. Again the key mathematical concept that you will be required to teach students is that in the order of operations you solve what's within the brackets first, then indices, followed by multiplication and division and then addition and subtraction (BIMDAS). The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

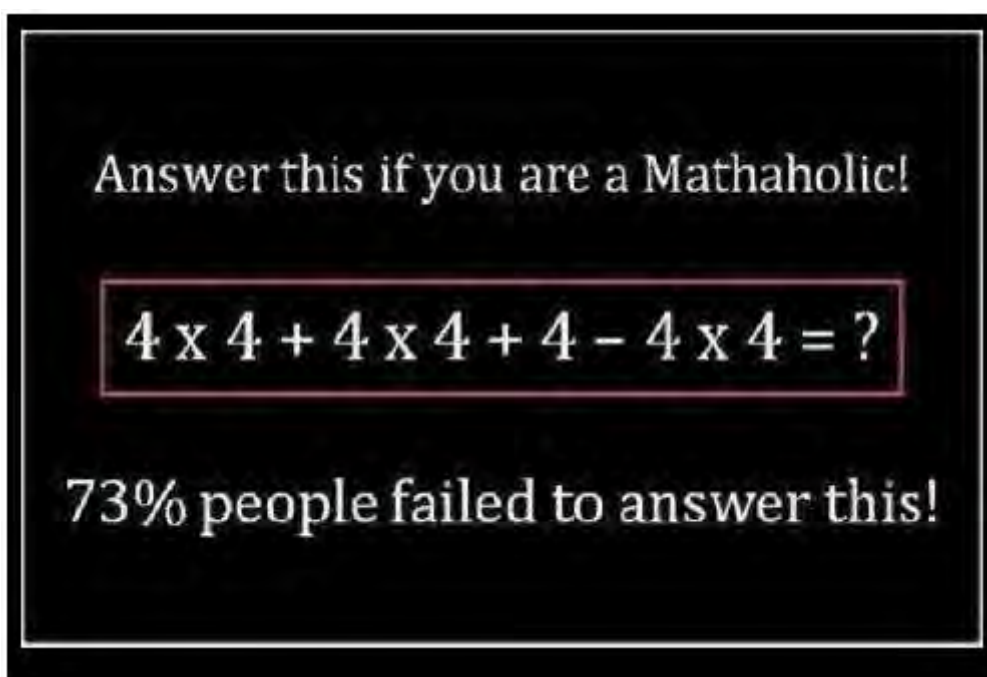
a) From completing the previous task your student should be able to successfully attempt this question.

b) Brackets, Indices, Multiplication, Division, Addition, Subtraction (BIMDAS).

c) Brackets, Indices, Multiplication, Division, Addition, Subtraction (BIMDAS).

d) Prior to solving this question advise your student to underline each calculation they solve and write their solution to it underneath. Explain that this allows them to keep track of what they are doing and ensures that they won't miss a calculation.

- Should we do all the addition first? No.
- Why not? BIMDAS reminds us that multiplication comes before addition and subtraction so we must solve each multiplication part of the question first, then solve the addition parts of the question and finally the subtraction parts to the question.



a) Why do you think 73% of people failed to answer this question?



b) What rule do you have to follow to help you answer this question?

c) What is the correct answer to this question?

d) What do the letters in BIMDAS stand for?

Task 3

Tutor Guidelines

The aim of this task is for your student to become familiar with performing the order of operations correctly. Again the key mathematical concept that you will be required to teach students is that in the order of operations you solve what's within the brackets first, then indices, followed by multiplication and division and then addition and subtraction (BIMDAS). The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

Prior to solving these question advise your student to underline each calculation they solve and write their solution to it underneath. Explain that this allows them to keep track of what they are doing and ensures that they won't miss a calculation. For each of these questions the following prompts are appropriate.

- Are there any brackets in this question? If yes then underline the bracket, solve what is inside the bracket, write the answer underneath the line and write the rest of the question around it.
- Are there any indices in this question? If yes then underline the indices, solve it, write the answer underneath the line and write the rest of the question around it.

Follow with the same prompts for multiplication, division, addition and then subtraction.

a) $3 \times 5 + 6 =$

b) $28 \div (4 - 6) =$

c) $16 + (24 \div 6) =$

d) $9 \times (0 + 6) - 3 =$

e) $3 - 0 \div 6 + 13 =$

f) $3 \times 9 - 5 \times 2^2 =$



Task 4

Tutor Guidelines

The aim of this task is for your student to solidify their knowledge of the order of operations. Here the students will have to create a numerical expression for each question and then simplify the expression using BMDAS. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a)

- How much were the wrist bands? €2.
- How many of these did Jack buy? 2.
- How would you figure out how much Jack spent on wristbands in total? Multiply €2 by 2
- Can you write this mathematically? 2×2
- How much did he pay for the converse? €49
- How did you figure this out? Subtract the discount of €11 from €60.
- Can you write this mathematically? $60 - 11$.
- Now, to find out how much Jack spent in total, what will we do to our two previous calculations? Add them together.

Write this entire question mathematically and then simplify it.

b)

- How many adults went to the game? 2.
- How much was an adult ticket? €27.
- How can I figure out how much they spent in total on adult tickets? Multiply €27 by 2.
- Can you write this mathematically? 27×2 .
- How many children went to the game? 2.
- How much did a child ticket cost? €18
- How can I figure out how much they spent on children's tickets in total? Multiply €18 by 2.
- Can you write this calculation numerically? 18×2
- Now, to find out how much Katie's family spent in total what will we do to our two previous calculations? Add them together.

Write this entire question mathematically and then simplify it.

Using brackets, indices, multiplication, division, addition and subtraction create a numerical expression for each of the following and then solve the expression;

a) Jack buys 2 wrist bands at €2 each. He also buys a pair of converse that were originally €60 euro but he gets an €11 discount. Write this problem mathematically.
How much does Jack spend?



b) Katie is 12 years old. One day, her parents took her and her younger brother to a Kerry football match. The tickets for the match were priced at €27 for adults and €18 for children 13 years and younger. What is the expression for the total cost of the tickets for Katie's family?
What was the total cost?



Task 5

Who wants to be a millionaire?

Solve the questions on the board to try and reach a million euro. When prompted, write your answer on your mini whiteboard. If you reach a million you will receive a prize!

Tutor Guidelines

The class teacher will run this activity. The questions in this task are questions on the order of operations. Each 1st year student will be provided with a mini whiteboard, a marker and a duster. The class teacher will project the questions on to the whiteboard. The questions, similar to Task 3 will be put on the board, one at a time, beginning easy and becoming progressively more difficult. Students will be given a question and then have to provide a solution to the question. They write their answer on their boards and they all must raise their boards at the same time to reveal their answers. If they answer correctly they can keep playing, if they answer incorrectly then they are out of the game. Tutors should not offer help with these questions as the first year students are competing against one another for the prize.

Week 2

Lesson 3 - Number

Learning Objectives

At the end of this lesson your student should be able to;

- ☐ Identify multiples
- ☐ Identify factors
- ☐ Identify prime numbers
- ☐ Understand basic set theory

Multiples

Challenge 1

a) 20 b) 120

If your student answers this question correctly, then please go directly to the next challenge.

- a) What is the lowest common multiple of 4 and 5?
- b) What is the lowest common multiple of 15 and 40?

Task 1

Tutor Guidelines

The aim of this task is for your student to develop an understanding of multiples. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) You want your student to identify what a multiple is by creating a list of multiples.

b)

- What is the difference between each number? 5. So they are going up in 5's.
- Could you say that all these numbers are multiples of 5? Yes seen as you got each number by multiplying it by a natural number greater than the previous.

c)

- What is 3 multiplied by 1? 3.
- What is 3 multiplied by 2? 6 etc.

d)

- Do the list of multiples of 3 and 4 share any numbers in common? 12, 34, 36.
- Which of these multiples is the lowest (Lowest common multiple)? 12.

a) Multiply 5 by 1, then 2, 3, 4, 5, 6, 7, 8, 9 and 10. Write your answer in a line below.



b) Can you describe the relationship between 5 and your answer above?

c) Write down the first fourteen multiples of 3.

Write down the first fourteen multiples of 4.



d) Do they have any multiples in common? If so what multiples are common and what is the highest common multiple?

Factors

Challenge 2

a) 6 b) 5

If your student answers this question correctly, then please go directly to Task 3.

a) What is the highest common factor of 6 and 12?

b) What is the highest common factor of 10 and 25?

Task 2

Tutor Guidelines

The aim of this task is for your student to develop an understanding of factors. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) By looking at 1, 3, 5 and 15 you expect that your students will say that all these numbers divide evenly into 15 thereby giving you your definition of a factor. If they do not identify this then you may prompt by firstly stating that 1 divides into every whole number and continuing until they make the connection.

b) At this stage your student should know that a factor of a number is a number that divides in evenly to that number.

- Does 1 divide evenly into 50? Yes.
- Does 2? Yes.
- Does 3? No.
- Does 4? No.
- Does 5? Yes.
- Does 6? No. etc.

c) Use same strategy as part b).

d) You now have a list of the factors of 50 and 10.

- Do they have any factors in common? Yes, 1, 2, 5, 10.
- Which of these factors has the highest value? 10.
- What do you think is the highest common factor of 10 and 50? 10.

a) The factors of 15 are 1, 3, 5 and 15. Can you now come up with a definition for the term factor?

b) List the factors of 50.

c) List the factors of 10.

d) What is the highest common factor of 10 and 50?

Task 3

Tutor Guidelines

This task requires students to have a good understanding of factors.

a) The class teacher will provide each student with dice and counters. You need to supervise your student's participation in this task to ensure that they stay on task and play the game correctly.

Please familiarise yourself with the rules given below.

b)

- When you get an opportunity to pick any number you want on the board did you go for a high or low number?
- Which number would have been better to choose and why? A lower number, as if for example it had only two factors remaining your opponent would not be able to cross out a third factor therefore you would get the point.

a) Under the supervision of your tutor, play the following game with the nearest 1st year student to you. Both roll a dice and the largest number goes first.

The first player chooses a number and crosses it out on the grid. This number must be a number over 70.

The second player chooses a number to cross out. This number must be a factor of the first number.

Players continue to take it in turns to cross out numbers, at each stage choosing a number that is a factor of the number just crossed out by the other player.

Once a number is crossed out you cannot reuse it. If you are unable to cross out a factor of the number then your opponent gets a point. If you win a point the next move is yours.

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

The person with the most points at the end of the game wins. If time allows play the game on both of your grids.

| | | |
|-----------|--|--|
| Name | | |
| Tally | | |
| Frequency | | |

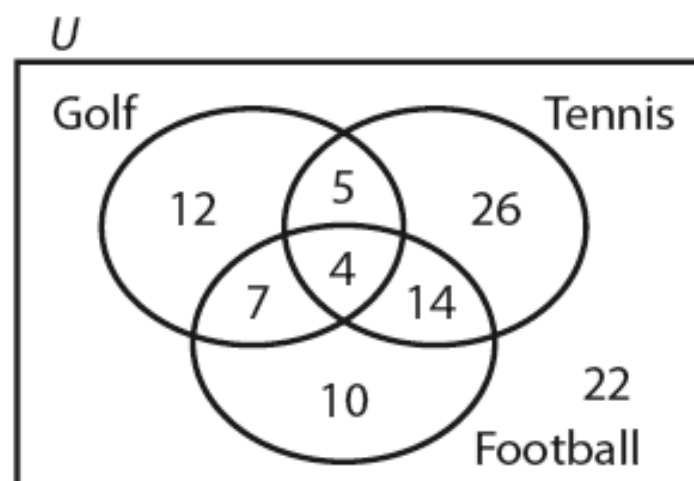
b) Did you come across any strategy that helps in winning this game?

Sets

Challenge 3

a) 28 b) 9 c) 4 d) 10 e) 22 f) 18 g) 14

If your student answers this question correctly, then please go directly to the next Challenge.



The Venn diagram on the right shows the results of a survey of a number of adults to find out which of the games golf, tennis or football, if any, they play. From the diagram, find the number of people who play;

- a) Golf
- b) Both golf and tennis
- c) All three games
- d) Football only
- e) None of these games
- f) Both football and tennis
- g) Both tennis and football but not golf
- h) What was the total number of people surveyed?

Task 4

Tutor Guidelines

The aim of this task is to develop students understanding of set theory. The key mathematical concepts that you will be required to teach students are the universal set, set union, set intersection and the number of elements in a set.

Students who successfully completed the challenge will not be taking part in this task.

The class teacher will project two sets on the board, the factors of 9 and the factors of 12. The teacher will put all the factors of 9 in the far right of that set and the remaining numbers in the far left of the factors of 12 set. The intersection will remain empty for now.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) If your student does not know what type of diagram this is you need to tell them that it is a Venn diagram. A Venn diagram is a diagram using circles to represent sets, with the position and overlap of the circles indicating the relationships between the sets.

b) Before your student attempts this question the class teacher will discuss with the students what each part of the Venn diagram represents.

- Why do you think that 1 and 3 have gone red? Because they are not in the correct position.

c)

- What does the space in the middle of the two sets represent? What the two sets have in common.
- Why is the middle part empty? It shouldn't be.
- What should go there? 1 and 3.

d)

- Why should they go in the middle? Because they are common factors of 9 and 12.

At this stage the class teacher will ask the class what should be done with 1 and 3 and why. When she moves 1 and 3 into their correct position they are no longer red.

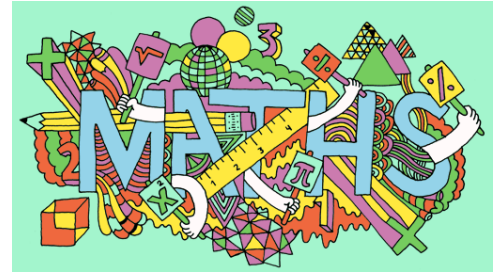
e)

- What is the largest factor of 9 and 12? 3.

This is called the highest common factor.

a) What is this type of diagram called?

b) Why do you think some of the numbers have gone red?



c) What does the space in the middle of the two sets represent?

d) What are the common factors of 9 and 12?

e) What is the highest common factor of 9 and 12?

Task 5

Tutor Guidelines

The aim of this task is to deepen your students understanding of [set](#) theory by using a real life context. The key mathematical concepts that you will be required to teach students are the universal set, set union, set intersection and the number of elements in a set. The class teacher will guide this task. Students who successfully completed the challenge can pause what they are currently doing and take part in this survey (parts a-d).

a) The class teacher in the classroom will have counted all the students at the start of the lesson and written the total number of students on the board.

b) The class teacher will then ask “hands up any student who has blonde hair” and each student can count the number of hands raised and take note of the number.

c) The class teacher will then ask “hands up if you have blue eyes” and everyone can count the number of hands raised again and take note of the number.

d) The class teacher will then ask “hands up if you have both blonde hair and blue eyes” and again everyone will count the number of hands raised.

d) The class teacher will then ask “hands up if you have both blonde hair and blue eyes” and again everyone will count the number of hands raised.

e) Your student now needs to attempt filling in the Venn diagram. Give them an opportunity to fill this in (using a pencil) without your support. When they have made an attempt at this go through questions f) to n) which are scaffolded in order to enable your student to deepen their understanding of Venn diagrams.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

f) The U at the top of your Venn diagram stands for the Universal set which is everyone who has taken part in the survey. This rectangle’s contents must add up to the total number of people surveyed.

- How many people were surveyed?
- What should all the numbers in the Venn diagram add up to?

g) This is the total number of people who raised their hand to the questions asked earlier.

h) $A \cup B$ means A union B.

- What does the term Union mean? Joining together.
- In this context what do you think that $A \cup B$ mean? The sets A and B together so those who have either blonde hair or blue eyes or both.

i)

- How many people responded that they had blonde hair?

This is what all of set A’s circle should add up to.

j) The number of people who have blonde hair in the room.

k) $\#A =$

l)

- How many people responded to having blue eyes?

This is set B.

- How many people are in the Universal set?
- With this information in mind how will you figure out how many elements in the universal set excluding B? Take the number of elements in B from the number of elements in U.

m)

- What does set B represent? Those in the class who have blue eyes.
- What do set U represent? All the students in this class.
- What does everything in U excluding B represent? All the students in this class who do not have blue eyes.

n) U/B Ensure that your student understands that the symbol between U and B means less.

You now need to go to their Venn diagram to correct any errors they may have made.

- What should go in the intersection of A and B? The number of students who have both blonde hair and blue eyes.
- What should all of set A add up to?
- What should set A not B then equal?
- What should all of set B add up to?
- What should set B not A then equal?
- How many students in the class do not have blonde hair and blue eyes?
- Where do you think this value should go?
- Does everything in the universal set add up to the number of students in the class?

a) How many students are in this classroom?



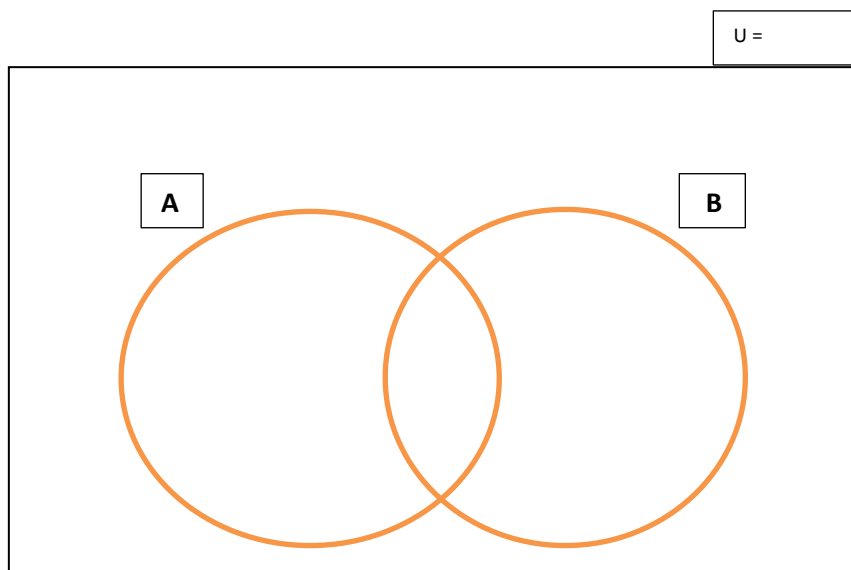
b) How many students have blonde hair?



c) How many students have blue eyes?

d) How many students have both blonde hair and blue eyes?

e) Now try and fill this information in on the Venn diagram below. Let set A represent blonde hair and set B represent blue eyes. U equals the universal set which means all the people who took part in the survey.



- f) What should all the numbers in the Venn diagram add up to?
- g) How many people have blonde hair or blue eyes or both?
- h) What do you think $A \cup B$ means?
- i) How many elements are in set A?
- j) Can you explain what this means in the context of the question?
- k) Do you know a way of writing this mathematically?
- l) How many elements are in everything in the Universal set excluding set B?
- m) Can you explain what this means in the context of the question?
- n) Do you know a way of writing this mathematically?

Prime Numbers

Challenge 4

2, 3, 5, 7, 11, 13, 17, 19, 23, 29

If your student answers this question correctly, then please go directly to Task 7.

List the first ten prime numbers.

Task 6

Tutor Guidelines

The aim of this task is to develop your students understanding of prime numbers. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Try and see if your student has any knowledge of what a prime number is.

- Do you know any number that is a prime number?
- Why is it a prime number?

If your student is unresponsive then you could write down the numbers 1 to 10 and circle the prime numbers saying to the students that these are the first four prime numbers, 2, 3, 5 and 7.

- How are these different to the other numbers?

Remind your student of what a factor is and tell them that it has something to do with factors.

b) When you have established what prime numbers are (numbers greater than 1 that have only two factors, themselves and 1) get the students to continue their list by writing down the first 10 prime numbers.

- How many numbers divide evenly into 11?
- Does 1,2,3 etc.?

c) Get your student to look at the list of the first 10 prime numbers.

- Which numbers are odd numbers and which are even numbers? 2 is the only even number.
- Do you think that if I continue the list of prime numbers that there would be more even prime numbers? No.
- Why not? Every other even number has at least 3 factors, itself, 1 and 2. 2 will divide into every

a) There is a link between factors and prime numbers. From your previous maths experience, do you remember what type of numbers prime numbers are?

b) From this definition can you state the first 10 prime numbers?

c) Is there anything different you notice about 2 to all the other prime numbers?



Task 7

Tutor Guidelines

This task aims to deepen your student's knowledge of prime numbers as they will need to be able to identify prime numbers between 1 and 100.

The class teacher will provide a laminated board, die and counters for this game.

You will need to offer a lot of support to your student during this task to ensure your student plays the game correctly.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task. If your student rolls the die and gets 4 and 1 - You need to look at what you get by adding or subtracting those 2 numbers. So $4 + 1 = 5$, $4 - 1 = 3$. Your student's option is to move 5 spaces forward, 3 spaces forward or either one of the options rolled on the die, 4 and 1. However whatever number of spaces they move, they have to land on a prime number, otherwise they cannot move at all. You could ask your student

- What are your options for the number of spaces you can move forward?
- Will you land on a prime number if you move that number of spaces?

Please read the instructions below.

Under the supervision of your tutors, play the following game with the nearest 1st year student to you.

Both roll a dice and the largest number goes first. Start at zero.

Take turns rolling the two dice and using any single number rolled or any combination of numbers on the dice (addition or subtraction) to try to reach another prime number. Example: Marker is on 5, Player rolls a 6 and a 2 Best choice: Move $(6+2=8)$ to 13 Could also: Move 6 to 11, Move 2 to 7 Not possible $(6-2=4)$ to 9.

You cannot move backwards.

If no move can be made to a prime number, player stays on the original spot.

First player to reach 97 wins

Note that moves must be made only to PRIMES. If incorrect move is spotted, the player making the move must go back "one prime".

| | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | | 11 |
| 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | | 12 |
| 48 | | | | | | | | | | | 13 |
| 47 | | 85 | 86 | 87 | 88 | 89 | 90 | | 59 | | 14 |
| 46 | | 84 | | | | | | | 60 | | 15 |
| 45 | | 83 | | | | | 91 | | 61 | | 16 |
| 44 | | 82 | | | | | 92 | | 62 | | 17 |
| 43 | | 81 | | | | | 93 | | 63 | | 18 |
| 42 | | 80 | | | | | 94 | | 64 | | 19 |
| 41 | | 79 | | | | | 95 | | 65 | | 20 |
| 40 | | 78 | | | | | 96 | | 66 | | 21 |
| 39 | | 77 | | | | | | | 67 | | 22 |
| 38 | | | | | | | | | 68 | | 23 |
| 37 | | 76 | 75 | 74 | 73 | 72 | 71 | 70 | 69 | | 24 |
| | 36 | 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 | 26 |
| | | | | | | | | | | | 25 |

WE HAVE A
WINNER

97

Prime Numbers Game

Lesson 4 – Number

Learning Objectives

At the end of this lesson your student should be able to;

- ☐ See how fractions add up to make one whole
- ☐ Convert fractions, decimals and percentages
- ☐ Calculate the percentage of a quantity

Fractions

Challenge 1

a) 1

b) 1

c) 1

d) Any equivalent fraction eg. $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$

e) Any equivalent fraction eg. $\frac{1}{4}$, $\frac{3}{12}$, $\frac{4}{16}$

f) Any equivalent fraction eg. $\frac{6}{10}$, $\frac{9}{15}$, $\frac{12}{20}$

If your student answers this question correctly, then please go directly to Challenge 2.

Solve the following;

a) $\frac{1}{4} + \frac{3}{4} =$

b) $\frac{1}{2} + \frac{2}{4} =$

c) $\frac{2}{10} + \frac{4}{5} =$

Write an equivalent fraction for each of the following.

d) $\frac{1}{2}$

e) $\frac{2}{8}$

f) $\frac{3}{5}$

Task 1

Tutor Guidelines

The aim of this task is to develop your students understanding of what a fraction is in relation to one whole and what fractions add up to make up one whole. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Ask your student what words or phrases they think of when they think of fractions. They may say, numerator, denominator, part of a whole, division or other words. The numerator is the number on the top of the fraction, the denominator is the number on the bottom of the fraction. Other real life examples that you could mention to your student are, half-price sale, save a quarter every month from your heating bill, quarter to the hour etc. Explain that we use fractions all the time in our daily life which is why it is important to have a good understanding of them.

b) With your student look at the table and look at how many of each fraction make up one whole. Two halves make one whole.

- How many twelfths make up one whole? 12.
- How many sevenths make up one whole? 7.
- Can you see a link between the fraction name and the number of parts required to make up one whole?

You then need to look at the table and get students to identify fractions that are equal.

- Are there any fractions that together equal $\frac{1}{2}$? E.g. $\frac{2}{4}$ or $\frac{3}{6}$.

Identify several examples of equivalent fractions from the table.

c) The class teacher will hand out the two circles.

d) e) f) If your student is struggling with this task then get them to look at the fractions table for support. You have divided your circle in two.

- What fraction on your table is divided into two parts that make up one whole? $\frac{1}{2}$

Repeat this type of question for parts e) and f) if required.

g) A way of prompting students to come up with a suggestion would be to look at the fractions table and tell them to pick any fraction on it.

- Is there any other fractions that when put together make one whole?

h) Their immediate answer to h may be yes but get them to prove their answer by looking at the fractions table.

- How many eighths make up one whole? 8.
- How many quarters make up one whole? 4.
- Does it then make sense that $\frac{1}{8}$ is greater than $\frac{1}{4}$ if you need 8 eighths to make one whole and only 4 quarters to make one whole.

a) Write down any words that you come into your mind when you think of fractions. Discuss with your tutor how these words relate to fractions.



b) Look at the following fractions table and discuss it with your tutor.

| 1 unit or 1 "whole" | | | | | | | | | | | |
|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| $\frac{1}{2}$ | | | | | | $\frac{1}{2}$ | | | | | |
| $\frac{1}{3}$ | | | | $\frac{1}{3}$ | | | | $\frac{1}{3}$ | | | |
| $\frac{1}{4}$ | | | $\frac{1}{4}$ | | | $\frac{1}{4}$ | | | $\frac{1}{4}$ | | |
| $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | |
| $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | |
| $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ |
| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |
| $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ |
| $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ |
| $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ | $\frac{1}{11}$ |
| $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ |

c) You have been given two circles of the same size made from card. Put one on top of the other to prove that they are the same size.

Answer the following questions (you may use the table above to help you if you need to).

d) Fold one of the cards into two pieces of the same size. What have you divided the card into?

e) Fold each new piece into two pieces of the same size. What have you divided the card into?

f) Fold each new piece into two pieces of the same size. What have you divided the card into?

g) Using your whole circle and the one you have divided into eighths discuss with your tutor the different ways of making one whole. Write down the examples you come up with below.

h) $\frac{1}{8}$ is bigger than $\frac{1}{4}$. Discuss with your tutor whether this statement is true or false. Use your card to help you come up with your answer.

Converting Fractions, Decimals and Percentages

Challenge 2

a) 25% b) 0.42 c) $\frac{2}{10}$ or $\frac{1}{5}$ d) 88%

If your student answers this question correctly, then please go directly to Task 3.

a) Convert $\frac{1}{4}$ to a percentage.

b) Convert 42% to a decimal.

c) Convert 0.2 into a fraction.

d) Convert 0.88 to a percentage.

Task 2

Tutor Guidelines

The aim of this task is to develop your students understanding of the link between fractions, decimals and percentages and convert fractions to decimals, decimals to percentages, percentages to fractions and vice versa.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Decimals, fractions and percentages are just different ways of showing the same value. Decimals are another way of writing fractions. Percentages are another way of writing hundredths. Percentage means out of a hundred so it is a fraction with 100 as its denominator that can be simplified.

b) Students may be able to recall from previous experience how to convert a fraction to a decimal. If not, you can ask them to look at the fraction $\frac{1}{2}$ and think what is happening between the numbers 1 and 2.

- Why does the 2 on the bottom mean? 1 is being divided into 2 parts.
- What value does 1 divided by 2 give you? 0.5

0.5 is the value of $\frac{1}{2}$ in decimal form. To convert any fraction to a decimal you divide the numerator by the denominator.

c) Firstly discuss with your student what the term percentage means.

- What does per cent mean? Per 100.

So the total percentage is 100% and the total decimal amount adds up to 1.

- So how can I make 1 into 100? I multiply by 100.

So to convert fractions to percentages I multiply by 100.

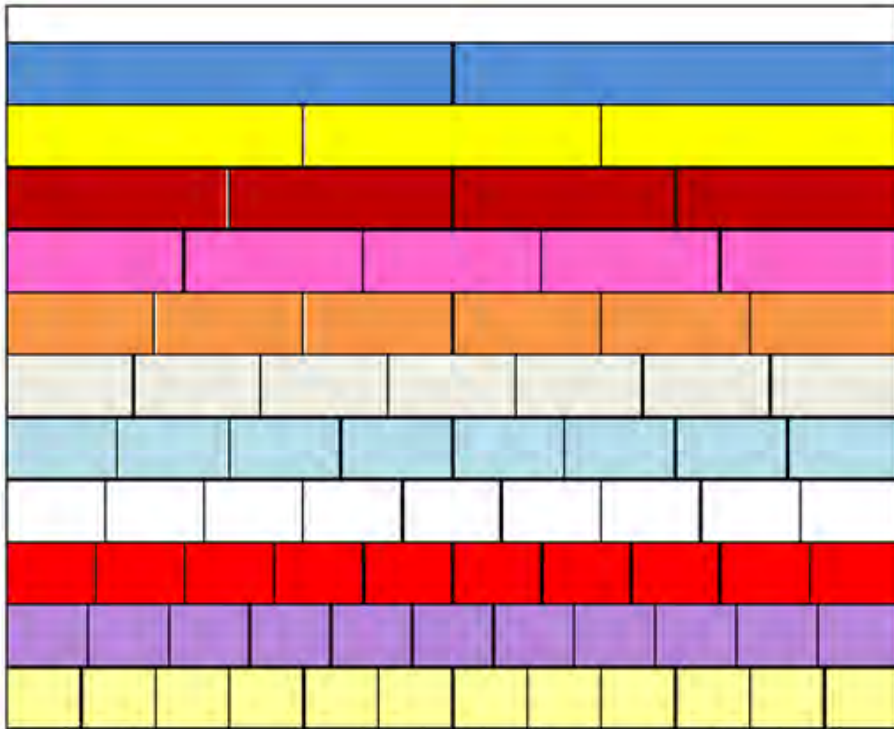
d) Using the method discussed in part b) of this question convert the fractions in the table on page 23 to decimals.

e) Using the method discussed in part c) of this question convert the fractions in the table on page 23

a) How are fractions linked to decimals and percentages?

b) The fraction $\frac{1}{2}$ is the same as the decimal 0.5. What do you have to do to convert a fraction to a decimal?

d) Fill in the correct decimals in the following diagram. You can round numbers to 2 decimal places.



A colorful mosaic composed of horizontal bands of rectangular blocks. The colors from top to bottom are: blue, yellow, red, pink, orange, light blue, white, red, purple, and yellow. The blocks are arranged in a staggered pattern, with some bands having fewer blocks than others, creating a textured, brick-like appearance. The colors are vibrant and the blocks are outlined in black.

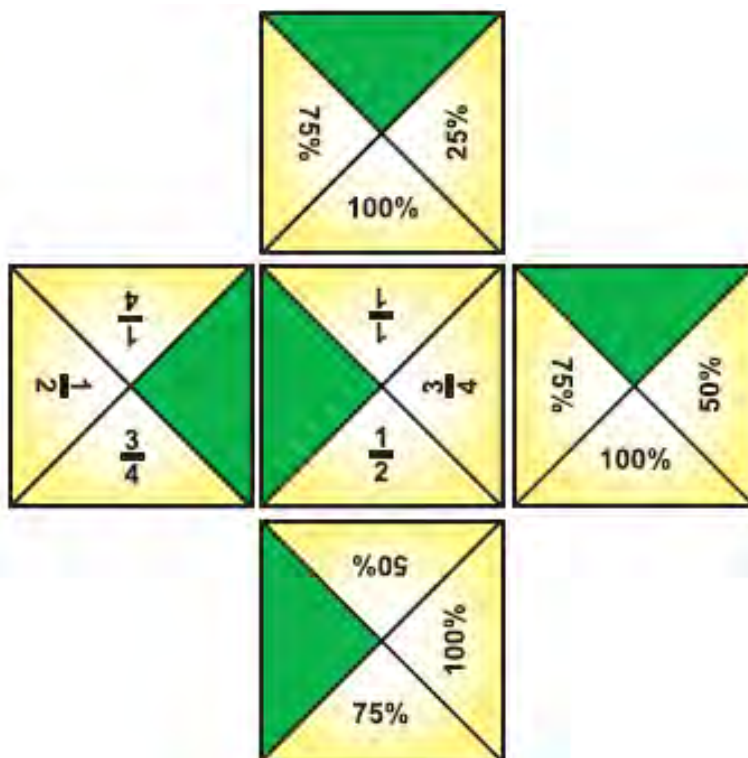
Task 3

Tutor Guidelines

This task aims to deepen your student's knowledge of fraction, decimal and percentage equivalence.

The class teacher will hand out the dominoes to each first year pair.

The students are required to match the dominoes so that equivalent values are beside each other.



If your student is struggling with this task get them to return to the previous task where they learned how to convert a fraction to a decimal and percentage.

Equivalent Squares.

Under the supervision of your tutor, work with the nearest first year student to you to match the squares that have been given to you.

Task 4

Tutor Guidelines

The aim of this task is to deepen your students understanding of percentages by using real life contexts. The key mathematical concept that you will be required to teach your student is how to calculate a percentage of a quantity.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

The percentages used in this task are round figures and the idea is that the student should develop a strategy to calculate this type of percentages without the use of a calculator.

a) Your student will firstly have to find 10% of €80. When you are dividing 80 by 10 what you are actually doing is calculating how many 10's are in 8.

- Exactly how many 10's are in 80? 8
- $80 \div 10 = ?$ 8

A fast way of doing this is by moving the decimal point one place to the left.

Then to find 20% you multiply this answer by 2 and to find 30% you multiply this answer by 3 etc.

b) To find 1% of a quantity you move your decimal place 2 places to the left. Then how would you find 8%? You multiply that answer by 8.

Part c), d) and e) require the same strategy.

Find the answers to the following percentage problems without using a calculator

a) You have €60 to spend on a pair of trainers. You see a pair in Lifestyle Sports that you love. They are €80 euro but you are told that they are reduced by 30%. Can you afford the trainers?



b) My new headphones, 'Beats by Dr Dre' were €155 before tax. I also had to pay 6% tax on them. What was the total cost of the headphones?



c) The Munster Rugby Jersey costs €50. A limited a number of jerseys signed by Simon Zebo are available but they cost 12% more. What is the cost of a signed jersey?



d) Lifestyle sports had a 20% sale on all trainers for the month of September.
If a pair of Nike high tops are normally priced at €90, how much did they cost during the sale?



e) Xtra-vision were selling off old computer game. All games were reduced by 30%. If one specific computer game cost €60 then how much did the game cost during the sale?



Week 3

Lesson 5 - Statistics

Learning Objectives

At the end of this lesson you student should be able to;

- ☐ Tally data and record its frequency
- ☐ Understand the different types of data
- ☐ Identify bias in a survey and create a survey question that shows no bias
- ☐ Identify the best graph to use to represent different types of data

Tally & Frequency Tables

Task 1

Tutor Guidelines

The aim of this task is to develop your students understanding of tallying data and using frequency tables.

The class teacher will play a short video clip of the 2014 All Ireland football final between Kerry and Donegal. Your student will be required to carefully observe the clip and tally whenever they notice a point, goal, wide, free, pass and yellow card.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

In this task you want students to be able to tally data and calculate the frequency. Tallying is the same as counting except for you put a line for every one you count. If you have to count to four you have four lines and when you count to 5 you put a line diagonally through the four lines to count five. Then you start tallying again.

Example

| | | |
|--------|---|---|
| Yellow | \|\|\|\| | 4 |
| Red | \|\|\|\| | 5 |
| Blue | \|\|\|\| / | 6 |
| Green | \| | 1 |
| Pink | \|\|\|\| | 4 |

- What does the word frequency mean?
- Have you ever heard somebody say “I frequently forget to lock the door”?
- What do you think that means? You often forget. So to calculate frequency you calculate how frequently something occurs. So we add each tally to get our frequency.

a) Watch the following clip of this year's All Ireland football final between Kerry and Donegal and fill in the table below.

| OUTCOME | TALLY | FREQUENCY |
|---------------|-------|-----------|
| Points scored | | |
| Goals scored | | |
| Wides | | |
| Frees | | |
| Passes | | |
| Yellow cards | | |

Types of Data

Challenge 1

Numerical: Values or observations that can be measured. And these numbers can be placed in ascending or descending order. E.g. Height, arm span and weight.

Categorical: Values or observations that can be sorted into groups or categories. E.g. Sex, eye colour and favourite colour.

If your student answers this question correctly, then please go directly to Task 3.

Here are examples of numerical and categorical data;
Sex, Height, Arm span, Eye colour, Weight, Favourite colour.

Which pieces of data are numerical and which are categorical?

| Numerical | Categorical |
|-----------|-------------|
| | |

Task 2

Tutor Guidelines

The aim of this task is to develop your students understanding of different types of data. The key mathematical concept that you will be required to teach your student is the difference between numerical and categorical data.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

- Have you ever heard of the word data before?
- In what context have you heard it?

You may have heard that computers store data.

- What does that mean? Data is information.

There are two types of data, numerical and categorical. You need to know the difference between these two types of data. The word numerical is similar to the word number.

- What type of data do you think numerical data is? Data that is numbers. (See full definition in the challenge).
- Now that you know what numerical data is would you be able to tell me what categorical data is? Data that is not numbers, which can be put into categories (See full definition in the challenge).

Remembering the difference between the two types of data can you identify numerical and categorical data in one of the following pieces of writing?

a) What is data?

b) Read one of the following articles and circle different pieces of data, some of the data must be numbers and some must be words.

Just How Successful Is One Direction, Really?

If you're a One Direction fan, you already know how special they are. Isn't it obvious? But do you have any idea how successful the lads of London have become in just the last couple of years?

We've researched the hard numbers behind the runaway greatness of 1D and come up with some really interesting facts.

One Direction has sold a TON of albums. Just how many?

- *Up All Night* the group's debut, sold 4.5 million copies in 2012 – making it the third best-selling album of that year across the world.
- 1D's next album, *Take Me Home*, has also sold over four-and-a-half million copies since it was released in November of 2012.

If you've ever been to see 1D live, we're guessing it was pretty hard to get that ticket.

- Tickets for the band's first appearance at Madison Square Garden sold out in 10 minutes.
- When 1D announced a 2013 tour of the UK and Ireland, over 300,000 tickets were sold within 24 hours.

And if you're a One Direction fan, you are not alone. Just look at these statistics!

- One Direction has almost 14,000,000 followers on Twitter. They add an average of 25,000 followers every day.
- Harry Styles alone has almost 15,000,000 followers!

And finally, if you're constantly searching for your favorite band, you definitely aren't the only one:

- Over 58 million searches for "One Direction" were registered by Google in 2012 alone!



Ireland remain 70th as Germany top rankings

New world champions and Republic of Ireland Euro 2016 qualification opponents Germany climb one spot to lead the table for the first time in around 20 years, followed by Argentina, up three places to second and Netherlands in third.

Netherlands climbed 12 places thanks to their strong, third-place finish in the competition, and there are also improvements for Colombia (fourth, up four), Belgium (fifth, up six), France (tenth, up seven) and Costa Rica (16th, their highest ever ranking, up 12).

Spain's disastrous group-stage exit from the World Cup is reflected in a drop down the rankings from first to eighth. Italy (from ninth to 14th) and Portugal (fourth to 1th) also fell.

England's tame exit means they drop ten spots to 20th over all.

World Cup Brazil drop four place to seventh position following their humiliating finish to a disappointing tournament.

Scotland, also in Ireland's Euro 2016 group, meanwhile remain 27th in the rankings and Northern Ireland rise one spot to 89th.

Ireland open their qualification campaign away to Georgia on 7 September.



c) Can you see one major difference between some of the data you have found?

d) Data is divided into numerical data and categorical data. Using your answers from part b discuss the difference between the two types of data and decide which data is numerical and which is categorical.

| Numerical | Categorical |
|---|---------------------------------------|
| e.g. 300,000 Tickets sold for One Direction concert | Germany is ranked first in the world. |

Task 3

Tutor Guidelines

The aim of this task is to develop your students understanding of the type of information gathered from a survey question.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

In the last task we looked at the difference between numerical and categorical data.

- Can you please state the difference between the two types of data?

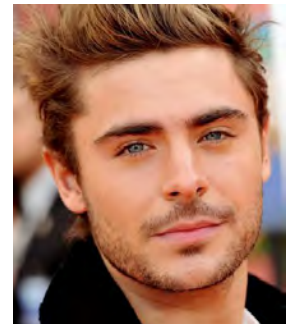
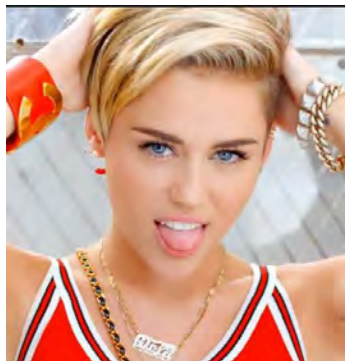
Look at the options that the survey questions gives.

- Are the potential answers to this question words or numbers? Words.
- What type of data does this survey question collect? Categorical data.

Teen Vogue magazine want to get a popular film star for the front cover of their December edition. They have the option of 5 different film stars so they conducted a survey to see which star is most popular. They asked a group of teenagers the following question;

From the following five movie stars which is your favourite;

- | | |
|-----------------|--------------------------|
| Channing Tatum | <input type="checkbox"/> |
| Selena Gomez | <input type="checkbox"/> |
| Robert Paterson | <input type="checkbox"/> |
| Miley Cyrus | <input type="checkbox"/> |
| Zac Efron | <input type="checkbox"/> |



What type of data does this survey question generate, numerical or categorical?

Surveys

Task 4

Tutor Guidelines

The aim of this task is to develop your students understanding of how to correctly word survey questions. The key concepts you will be teaching your student is identifying is leading questions which can make your survey question biased.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task

a) Ask your student to first look at the options and then read the question.

- Can you identify anything unusual in the question?
- From looking at the options for the question and reading the question itself, can you see something that is in both? Channing Tatum.
- Why are none of the other movie stars names in the question? None of the movie stars names should be in the question?
- Do you think they should have put Channing Tatum's name in the question? No they should not have. This makes the question a leading question. It is leading you to choose Channing Tatum as the answer to the survey question.

b) Get your student to come up with any basic question that they would like to put to the class. Make sure that the question is not inappropriate or personal. Allow them to have four choices for their answers. When the class teacher allows, your student must ask 10 students their question.

d) Are the answers to your questions numbers or words?

e) 10

f)

- How many students answered a?
- How many students did you survey in total?
- What fraction of your students answered a?

Repeat the prompts for the other options if required.

From the following five movie stars is Channing Tatum your favourite or which other is your favourite;

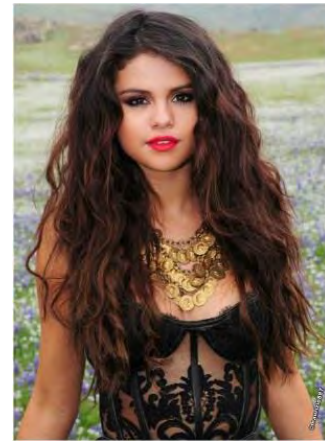
Channing Tatum ☐

Selena Gomez ☐

Robert Paterson ☐

Miley Cyrus ☐

Zac Efron ☐



a) What is wrong with the way in which this question is asked?

b) With the help of your tutor, come up with a question you would like to ask the other 1st years in the room? Have 4 options for you answer, a, b, c and d.

c) In turn, ask your question to other first years in the room

.

d) Is the data that you obtained numerical or categorical data?

e) How many people took part in your survey?

f) What fraction of the class answered;

a

b

c

d



Graphical Representation

Challenge 2

a) Pie Chart as you can clearly see what the entire €50 was spent on.

b) A bar chart. It would be too difficult to represent 200 people on a line plot as you have to plot a dot or x for each person. A line plot is better used for small amounts of data,

If your student answers this question correctly, then please go directly to Lesson 6, Task 1.

a) Zoe got €50 for her birthday. She spent €12 at the cinema, €25 euro on a new pair of jeans, €10 on phone credit and €3 on a packet of chips. She wants to represent her spending in a graph/chart. Which type of graph/chart would you use to represent this data in a way that you can clearly see how Zoe spends all of her €50? Why did you select this graph?



b) A person is conducting a survey one evening at the door of the cinema. They survey the first 200 people they meet asking them the question, "Which is your favourite type of movie, comedy, action, romance, drama or sci-fi?" Which graph would be most suited to represent this data, a bar chart or a line plot? Explain your answer.

Task 5

Tutor Guidelines

The aim of this task is to develop your students understanding of different ways to represent data graphically. The key concepts you will be teaching your student is identifying what type of graph is best suited to your data.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task

a) In this task you want students to be able to see the main features of each graph/chart. For each graph chart you can ask the students the following;

- Is the data represented on the graph/chart numerical or categorical?
- Is the amount of data represented on the graph/chart large or small?
- Has the graph got 1 or 2 axis?
- What does each axis represent?
- In the line plot what does each x stand for?
- In the stem and leaf what does the stem represent and what does the leaf represent?

b) Bar chart

- What type of data is it representing? Numerical.
- Is there a large amount of data in this graph? Yes, there are large values on the vertical axis.
- What does the vertical axis represent? The number of pizzas sold
- Can you change the numbers on the vertical axis for different types of data? Yes you can which is why bar charts are excellent for representing large amounts of data.

Line plot

- What type of data is it representing? Numerical.
- In the line plot what does each x stand for? 1 student
- Is there a large amount of data in this graph? No.
- Do you think that a line plot would be a good way of representing large amounts of data? No as each x has to represent 1 so if you had a lot of data a line plot would be impractical.

Stem and leaf

- What type of data is it representing? Numerical.
- Is there a large amount of data in this graph? No.
- What does the leaf represent? The final digit of your number, the units in this question.
- What does the stem represent? The other digits, the tens and hundreds in this question.
- Do you think that a stem and leaf would be a good way of representing large amounts of data? No it is best for graphing small amounts of data.

Pie chart

- What type of data is it representing? Categorical.
- Is there a large amount of data in this graph? Yes, 500 people were surveyed so a pie chart is suitable for large and small amounts of data.

c) This information has already been teased out in part b).

d) Look at the bar chart given.

If the data you were representing asked the question, "On what day was the most pizza's sold" this data is categorical data.

- So can both types of data be represented on a bar chart? Yes

Yes. To represent categorical data on a bar chart put the category on the horizontal axis.

e) Look at the line plot given.

- If the vertical axis represented the name of phone apps, what type of data would you have? Categorical data.

Therefore both types of data can be represented on a line plot?

f) Look at the stem and leaf given.

- Is there anywhere in the stem and leaf that you could represent categories instead of numbers? No, so only numerical data can be represented on a stem and leaf.

g) Look at the pie chart given.

Could you represent numerical data on this chart instead of categorical? Yes but there would have to be a small number of numbers.

h)

- What are the main visual differences you can see? The bar chart has a vertical axis. The bar chart has bars, the line plot has x's to represent each one.

i)

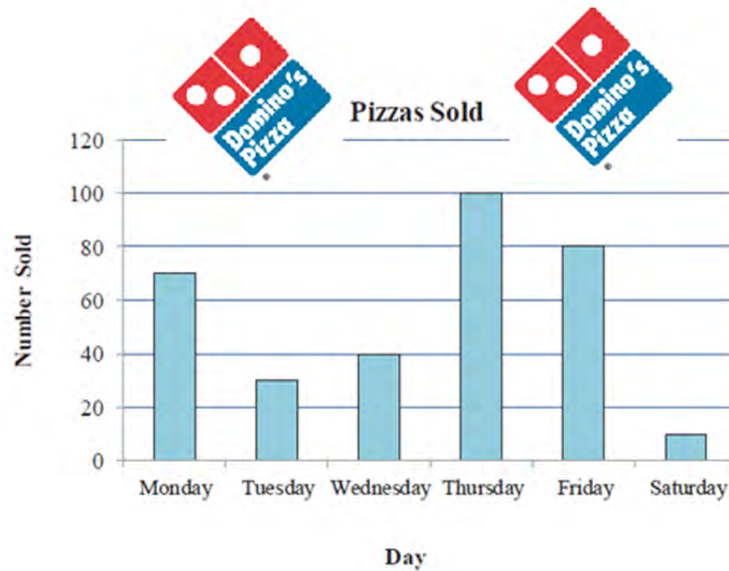
- Bearing in mind what differences you discussed in the previous question what would stop you from representing a large amount of data on a line plot? The line plot has x's to represent each one so a line plot would become too large and be impractical for large amounts of data.

a) With your tutor look at the features of all the graphs given in this task.

b) Look at the graphs and data and explain why you think each type of graph best represents the data given.

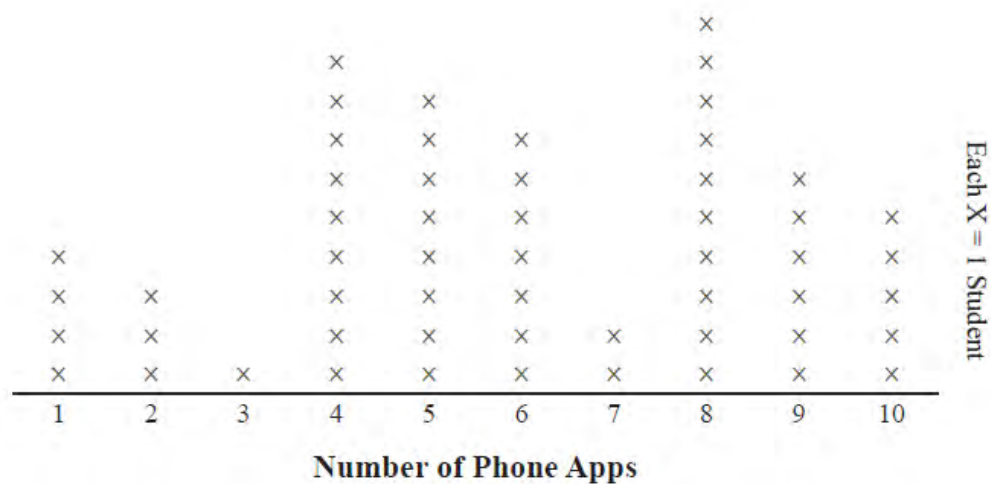
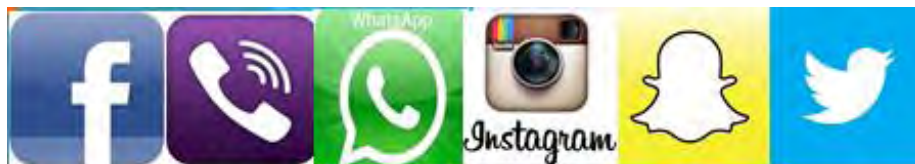
Bar chart

Domino's Pizza decided to see how many pizzas they sold in 6 days. They recorded their results in the bar chart below



Line plot

A school sent out a survey asking their 1st year students how many apps they have on their mobile phones. They published their results in this line plot. Answer the questions on the line plot.



Stem and Leaf

A group of young people were asked the question, "From the time you woke this morning, how many minutes did it take you to get to school?" Their answers are displayed in the stem and leaf plot shown.

| Stem | Leaf |
|------|-------------------|
| 6 | 1 1 4 6 7 8 |
| 7 | 2 3 5 7 9 |
| 8 | 1 3 5 6 6 7 7 8 9 |
| 9 | 0 0 3 4 6 8 9 9 |
| 10 | 0 0 |

Key

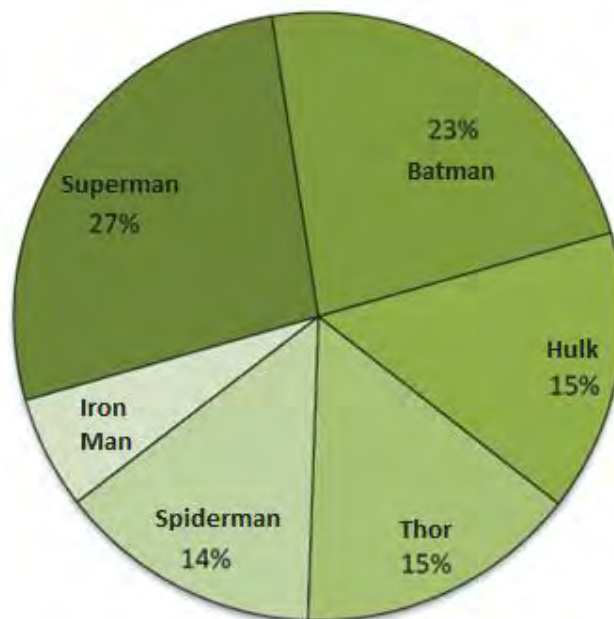
8 | 3 = 83 min.



Pie chart

500 people were asked the question "Who is your favourite superhero?" The results are displayed on the pie chart below.

Favourite Super Hero



c) What type of data is represented in each of the charts?

| | Numerical | Categorical |
|---------------|-----------|-------------|
| Bar chart | | |
| Line plot | | |
| Stem and Leaf | | |
| Pie chart | | |

d) Can you represent both numerical and categorical data in a bar chart? Explain your answer.

e) Can you represent both numerical and categorical data on a line plot? Explain your answer.

f) Can you represent both numerical and categorical data in a stem and leaf? Explain your answer.

g) Can you represent both numerical and categorical data in a pie chart? Explain your answer.

h) Look at the bar chart and the line plot. In what way are they different?

i) What would stop you from representing the data that is on the bar chart on a line plot?

Lesson 6 - Probability

Learning Objectives

At the end of this lesson your student should be able to;

- ☐ List outcomes and identify the number of outcomes
- ☐ Calculate the probability of an event occurring

Outcomes

Task 1

Tutor Guidelines

The aim of this task is to develop your student's ability to see the difference between listing outcomes and knowing the number of outcomes.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task

a) This task can become confusing so it is a good idea that your student develops a strategy to tackle questions like this with ease. You could help your student to draw a two-way table so as to allow them to put some structure to their answer.

| | Cornflakes | Weetabix | Special K | Cheerios | Coco ops |
|------------------|------------|----------|-----------|----------|----------|
| Orange juice | | | | | |
| Apple juice | | | | | |
| Grapefruit juice | | | | | |

From drawing a table like this it is easy to list off the different breakfast options.

b)

- What does how many options mean?
- What will your answer to this question be? A number.
- How many number of options for breakfast is there? 15.

At the end of this task highlight the difference between listing options and stating the number of options.

Jack has cereal and a glass of fruit juice every morning before school. He has the choice of Cornflakes, Weetabix, Special K, Cheerios and Coco Pops for cereal and orange juice, apple juice and grapefruit juice. He can only have one bowl of cereal and one glass of juice for breakfast.

a) List all the breakfast options that Jack can have?



b) How many options does he have for breakfast?

Probability

Task 2

Tutor Guidelines

The aim of this task is to develop your student's ability to calculate the probability of an event occurring.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task

They are given a packet of skittles which they must count to see how many of each colour is in each packet and then note the total number of skittles in their own packet.

a) Count the number of skittles in total in the packet.

b)

- Which colour skittle is most common in your packet?
- Do you think this colour skittle is most likely to be picked at random from the packet? Yes it is more likely that it would be picked as there are more of them than any other colour in the packet.

c)

- Do you remember how to write probability? As a fraction.
- So how many skittles are there in total? This will be your denominator of your fraction.
- How many yellow skittles are there in a packet? This will be your numerator of your fraction.

d)

- How many red skittles are there? This is the numerator of your fraction.
- How many skittles are there in total? This is the denominator of your fraction.

e)

- How many pink skittles are there? This is the numerator of your fraction.
- How many skittles are there in total? This is the denominator of your fraction.

Open your packet of skittles. Count how many of each colour is in the packet and fill these numbers in to the table below.

| Yellow | Green | Red | Purple | Orange |
|--------|-------|-----|--------|--------|
| | | | | |

f) How many skittles are in the packet in total?

g) Looking at your table can you decide which skittle is most likely to be randomly selected from the pack? Can you give a reason for your answer?

h) What is the probability of putting your hand in the packet and getting a yellow skittle?

i) What is the probability of putting your hand in the packet and getting a red skittle?

j) What is the probability of putting your hand in the packet and getting a pink skittle?



Task 3

You can eat your skittles!!!



Week 4

Lesson 7 - Geometry

Learning Objectives

At the end of this lesson you student should be able to;

- ☐ Identify vertical, horizontal and oblique lines
- ☐ Distinguish between parallel and perpendicular lines.
- ☐ Measure angles

Vertical, Horizontal and Oblique lines

Challenge 1

a) Horizontal, Oblique and Vertical.

b) A vertical line is a line that goes straight up and down and is at a 90° angle to the ground.

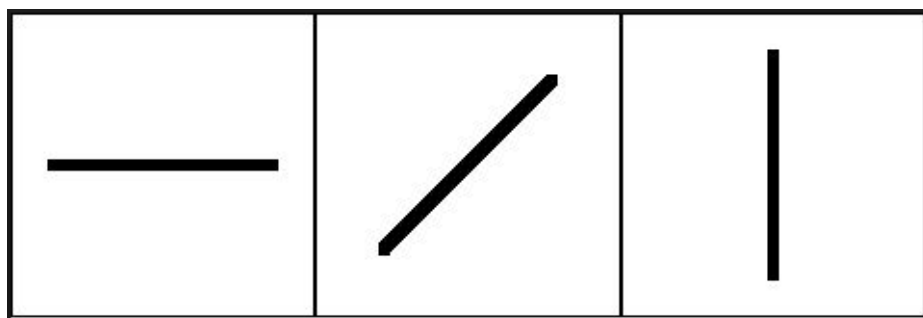
A Horizontal line is a straight flat line that goes from left to right.

An Oblique line is a line that is neither parallel nor perpendicular.

If this challenge is completed correctly then please move to the next challenge.

Below we have one vertical, one horizontal and one oblique line.

a) Can you identify which line is which?



b) Can you come up with a definition of each type of line?

Vertical:

Horizontal:

Oblique:

Task 1

Tutor Guidelines

The aim of this task is to develop students understanding of the differences between vertical, horizontal and oblique lines. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Get your student to explain any time where they may have heard the words vertical and horizontal and discuss their meaning in this context.

- You may have been told in primary school to draw a vertical line at the left hand side of your copy page. What type of line was this?
- You may have heard the word horizontal being used in PE where you would have been told to lie horizontal to the ground while doing some exercises. What does this mean?

Then discuss the definitions of vertical and horizontal lines in relation to the examples above.

A vertical line is a line that goes straight up and down and is at a 90° angle to the ground.

A horizontal line is a straight flat line that goes from left to right.

b) For each image you can ask the question;

- Do the lines go up and down or left to right?

c)

- Are these lines vertical? No.
- Are these lines horizontal? No.
- Based on your two previous answers can you come up with a definition of oblique lines?
Oblique lines are lines that are neither vertical nor horizontal

d) Ask your student what they are planning to draw. Ensure that it is fairly easy to draw and has all 3 types of lines. A house is an easy one to do if they are stuck.

a) Have you ever used the words vertical and horizontal? What do they mean?

b) Which word best describes a feature of each picture, vertical or horizontal?



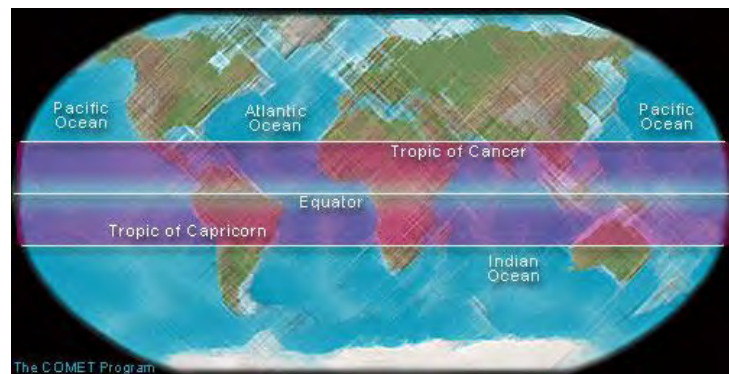
Are these books stacked vertically or horizontally?



Are the stripes on Pinks dress vertical or horizontal?



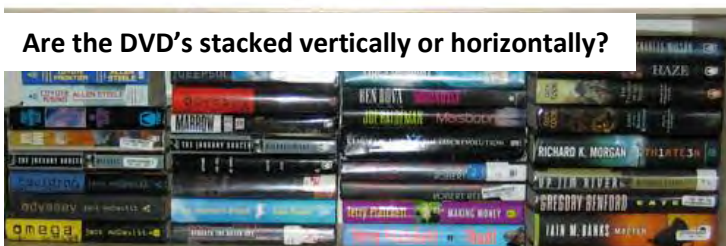
Is the equator vertical or horizontal?



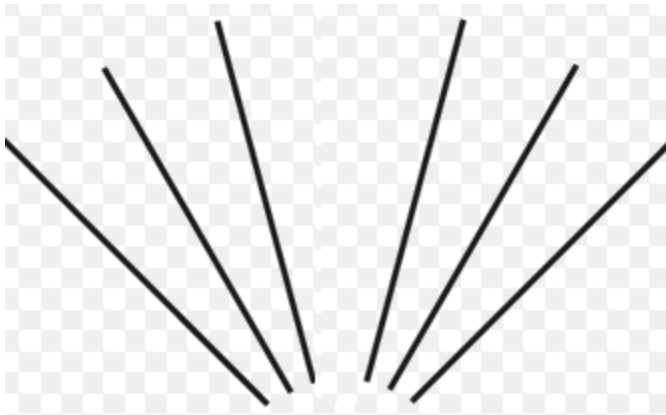
Are the stripes on Cameron Diaz top vertical or horizontal?



Are the DVD's stacked vertically or horizontally?



c) The lines in the image below are all Oblique lines. From looking at the image describe what you think oblique lines are.

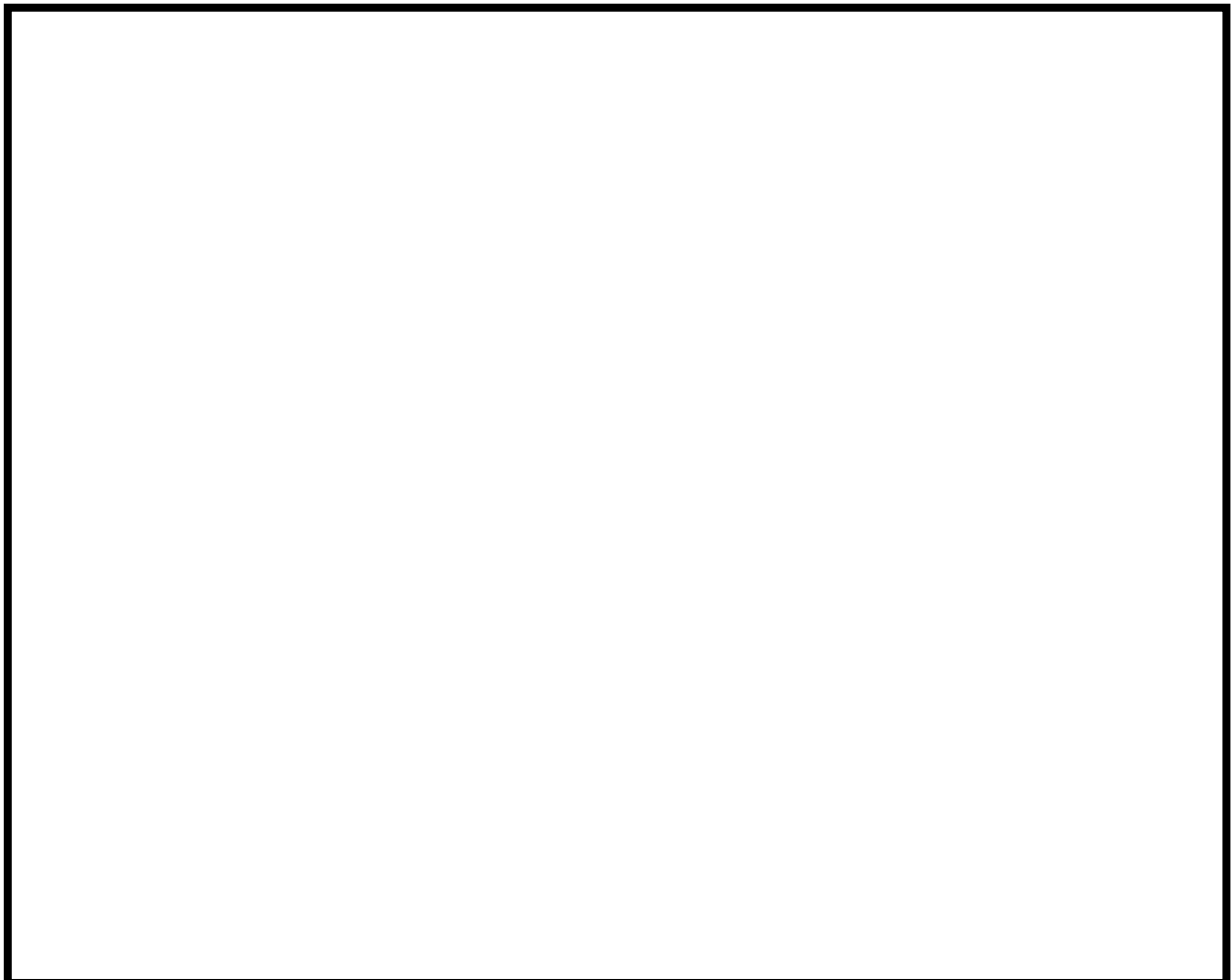


d) Draw a simple picture using vertical, horizontal and oblique lines.

Vertical lines must be red.

Horizontal lines must be black.

Oblique lines must be blue.



Challenge 2

a) Parallel, Perpendicular

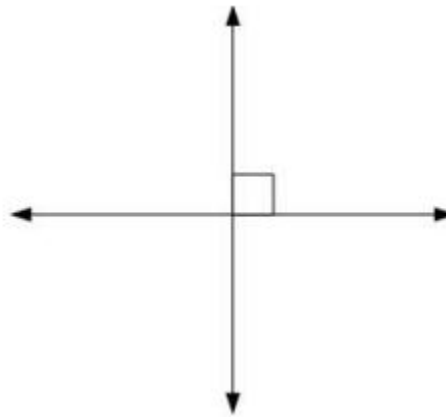
b) Parallel Lines are distinct lines lying in the same plane and they never intersect each other.

Perpendicular lines are lines that intersect at right angles.

If your student answers this question correctly, then please go directly to the next Challenge.

a) Which of the following are parallel and perpendicular lines?





b) Describe the terms parallel and perpendicular.

Parallel:

Perpendicular:

Task 2

Tutor Guidelines

The aim of this task is to develop students understanding of parallel and perpendicular lines. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Ask students have they ever heard of the terms parallel and perpendicular before.

- If I said to you that corridor one and two are parallel to each other, what would that mean?
- If I told you that the floor is perpendicular to the wall, what would that mean?
- If I said that Denny Street is perpendicular to the Mall what would that mean?

Parallel Lines are distinct lines lying in the same plane and they never intersect each other.
Perpendicular lines are lines that intersect at right angles.

b) From their descriptions of parallel and perpendicular lines in part a) students will be able to attempt this question. For each question you can ask;

- Do the lines intersect?
- Are the lines at right angles to one another?

c)

- Do they ever meet? No
- How far apart are they? The same distance apart all the time.

d)

- Do they ever meet? Yes.
- What do you notice about the angle that they meet at? They meet at right angles to each other.

a) Have you ever come across the terms parallel and perpendicular? If yes, when?

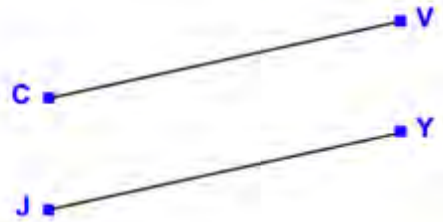
b) Can you tell which of these lines are parallel, perpendicular or neither?

1)



Answer: _____

2)



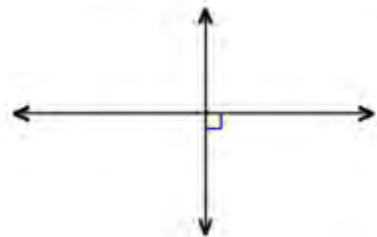
Answer: _____

3)



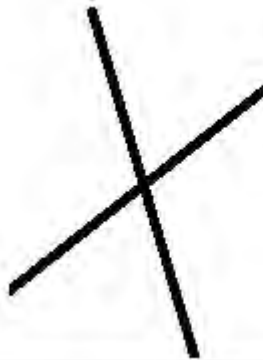
Answer: _____

4)



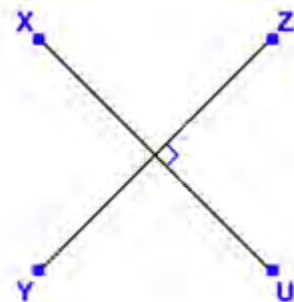
Answer: _____

5)



Answer: _____

6)



Answer: _____

c) Name one feature of parallel lines.

d) Name one feature of perpendicular lines.

Task 3

Tutor Guidelines

The aim of this task is to deepen students understanding of parallel and perpendicular lines by putting them in a context. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

In this task you want students to be able to describe streets as parallel or perpendicular.

a)

- Do they ever meet? No
- How far apart are they? The same distance apart all the time.
- Are these streets parallel or perpendicular to each other? Parallel to each other.

b)

- Do they ever meet? Yes.
- What do you notice about the angle that they meet at? They meet at right angles to each other.
- Are these streets parallel or perpendicular to each other? Perpendicular to each other.

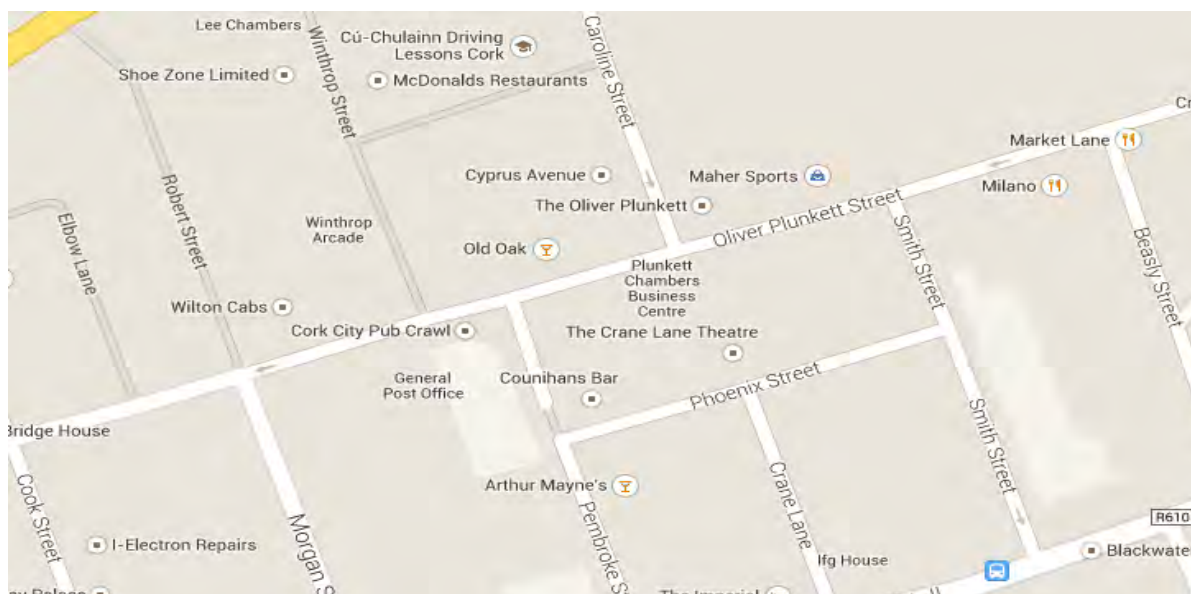
c) Let them pick two streets and then ask them the questions;

- Do they ever meet? Yes.
- What do you notice about the angle that they meet at? They meet at right angles to each other.

d) Let them pick two streets and then ask them the questions;

- Do they ever meet? No
- How far apart are they? The same distance apart all the time.

Look at the map of Cork city.



- a) Which word best describes the relationship between Oliver Plunkett Street and Phoenix Street?
- b) Which word best describes the relationship between Phoenix Street and Crane Lane?
- c) Can you name two more streets that are perpendicular?
- d) Can you name two more streets that are parallel?

Measuring Angles

Challenge 3

a) Two rays joined together.

B) Angle CAB=18° Angle DAB=77° Angle EAB=133° Angle CAF=162°

Angle DAF=103° Angle EAF=47°

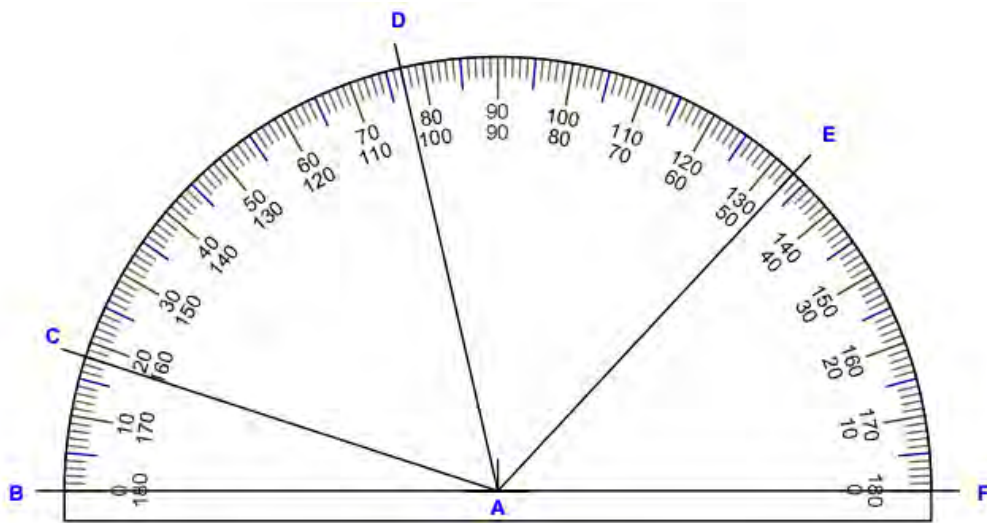
Angle CAB=55° Angle DAB=113° Angle EAB=158° Angle CAF=125°

Angle DAF=67° Angle EAF=22°

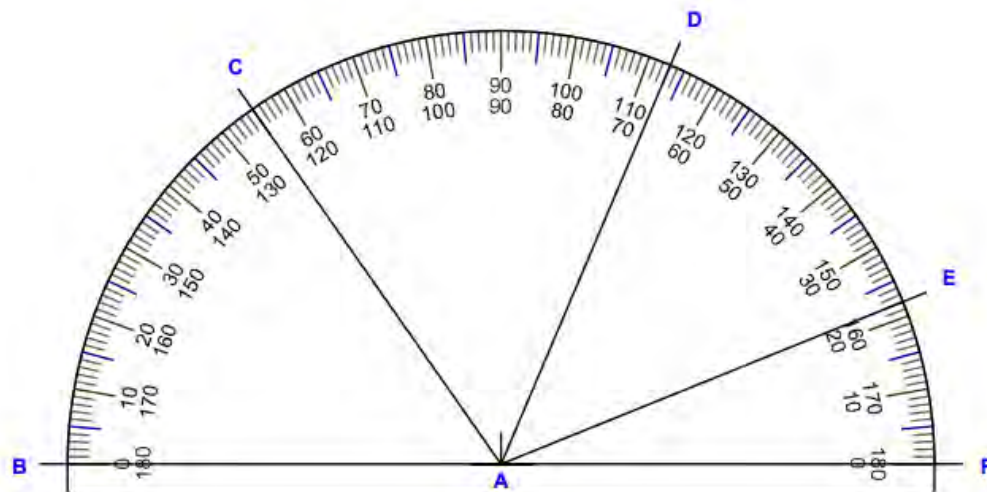
If your student answers this question correctly, then please go directly to the next Challenge.

- a) What two lines join together to create an angle?

b) With the help of the protractors, meaasure the following angles.



\angle CAB _____ \angle DAB _____ \angle EAB _____ \angle CAF _____ \angle DAF _____ \angle EAF _____



\angle CAB _____ \angle DAB _____ \angle EAB _____ \angle CAF _____ \angle DAF _____ \angle EAF _____

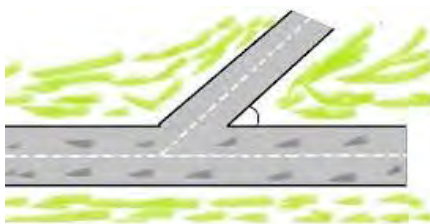
Task 4

Tutor Guidelines

The aim of this task is to develop your student's skill at measuring angles in a context. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

From each image you the tutor should identify clearly an angle that you want your student to measure. Before measuring you should get them to guess the size of each angle. Also before measuring the angles you should get your student to use their protractor on the questions in the challenge to ensure they are using their protractor correctly.

a) Your tutor will highlight an angle they want you to measure in the following images. Before you measure the angle estimate the size you think the angle is going to be.



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____



Estimate: _____

Accurate: _____

b) What angle is the floor to the wall in this room? Why do you think this is?

Lesson 8 - Geometry

Learning Objectives

At the end of this lesson you student will be able to;

- ☐ Understand what vertically opposite angles are
- ☐ Identify the size of the angles in a triangle
- ☐ Plot co-ordinates on a Cartesian graph and be able to read co-ordinates from a Cartesian graph.

Vertically Opposite Angles

Challenge 1

A=50°

B=130°

C=60°

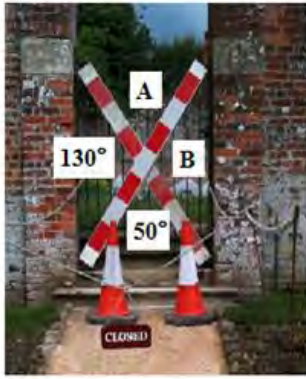
D=95°

E=108°

F=72°

If your student answers this question correctly, then please go to Task 2.

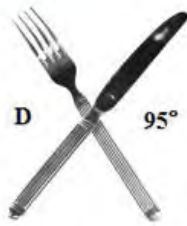
Find the missing angles in each of the following images;



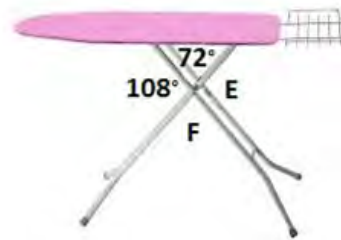
A=

B=

C=



A =



D =

D=

E=

F=

Task 1

Tutor Guidelines

The aim of this task is to develop your student's ability to identify that vertically opposite angles are equal and understand that angles around a point add up to 360° .

The mini whiteboards, makers, duster and geo-strips will be handed out to each student by the class teacher.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Your student needs to intersect two geo-strips to make vertically opposite angles.



b) For part b students need to trace an outline of their angles on their mini whiteboard and measure these angles, noting their size in the table in part c). Each intersecting geo-strip will create two pairs of vertically opposite angles. Get your student to repeat this process of creating angles using geo-strips, tracing their outline and measuring the angle sizes four times. Ensure they record the angle size each time.

c) Your student needs to have measured all their angles and added all the angles to get the total value of angles around a point.

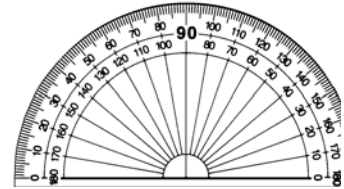
d) At this point your student needs to have made some observations.

- In each group of angles what do all the angles add up to? 360° .
- What do angles around a point add up to? All the angles should add up to 360° .

e)

- What do you notice about all the vertically opposite angles? They are equal.

a) Using geo-strips create 4 different vertically opposite angles, one at a time.



b) Using a mini whiteboard, show the vertically opposite angles and label them 1, 2, 3, 4.

c) Using a protractor measure the size of each angle and record this data in the following table;

| Angle 1 | Angle 2 | Angle 3 | Angle 4 | Total |
|---------|---------|---------|---------|-------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

d) What do you notice that all the angles add up to?

e) What do you notice about angles that are vertically opposite from one another?

Angles in a Triangle

Challenge 2

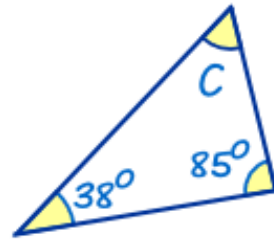
a) 57°

b) All angles in a triangle add up to 180°

If your student answers this question correctly, then please go to Task 3.

a) In this triangle what is the value of angle C?

b) How do you know your answer is correct?



Task 2

Tutor Guidelines

The aim of this task is to develop your students understanding of angles in a triangle always being equal to 180° .

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

In this task you want students to be able to identify that the angles in a triangle always add up to 180° .

a) Get your student to create 3 triangles of different side length and trace each triangle on their mini whiteboard.



b) Get your student to use their protractor to measure each angle in all of their triangles and record their results. Get them to complete the table.

c) Ask your student about a statement that they could come up with about angles in a triangle.

- What do the all the angles in each triangle add up to?

Using geo-strips, create 4 different size triangles, one at a time.

a) Using a mini whiteboard, show the 3 angles in each triangle.









b) Measure each angle, fill them in on the table below and add you answers together to fill the total column.









| | Angle 1 | Angle 2 | Angle 3 | Total |
|------------|---------|---------|---------|-------|
| Triangle 1 | | | | |
| Triangle 2 | | | | |
| Triangle 3 | | | | |









c) Can you make a statement about the 3 angles in a triangle?

Co-ordinates

Challenge 3

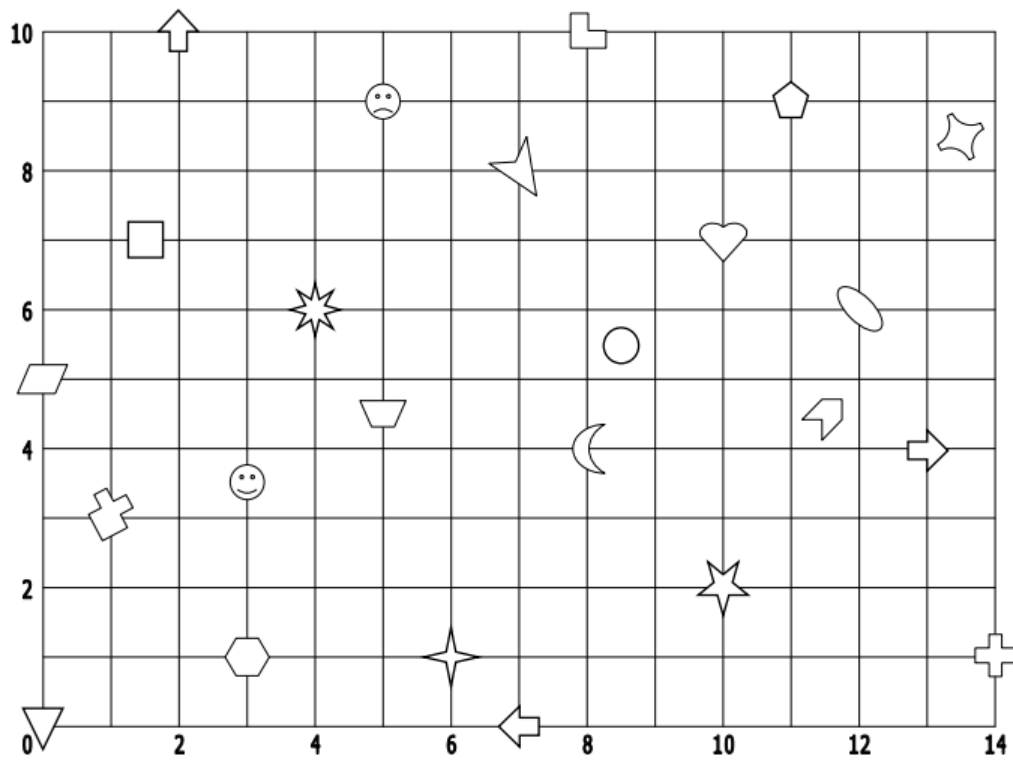
| | |
|---|---------|
|  | (4, 6) |
|  | (7, 8) |
|  | (3, 1) |
|  | (10, 7) |
|  | (10, 2) |
|  | (8, 4) |
|  | (13, 4) |
|  | (6, 1) |





| | |
|---|---------|
|  | (5, 9) |
|  | (11, 9) |
|  | (8, 10) |
|  | (12, 6) |
|  | (0, 5) |
|  | (7, 0) |
|  | (0, 0) |
|  | (14, 1) |





| | |
|---|-------------|
|  | (5, 4.5) |
|  | (2, 10) |
|  | (13.5, 8.5) |
|  | (3, 3½) |
|  | (11½, 4½) |
|  | (1, 3) |
|  | (8½, 5½) |
|  | (1½, 7) |




If your student answers this question correctly, then please go directly to the next Challenge.

Write down the co-ordinates to match the symbols or fill in the symbol that matches the co-ordinate.



| | |
|---|---------|
|  | (4, 6) |
| | (7, 8) |
|  | |
| | (10, 7) |
|  | |
| | (8, 4) |
|  | |
| | (6, 1) |

| | |
|---|---------|
| | (5, 9) |
|  | |
|  | |
| | (12, 6) |
| | (0, 5) |
|  | |
| | (0, 0) |
|  | |

| | |
|---|-----------|
|  | |
| | (2, 10) |
|  | |
| | (3, 3½) |
| | (11½, 4½) |
|  | |
| | (8½, 5½) |
| | (1½, 7) |

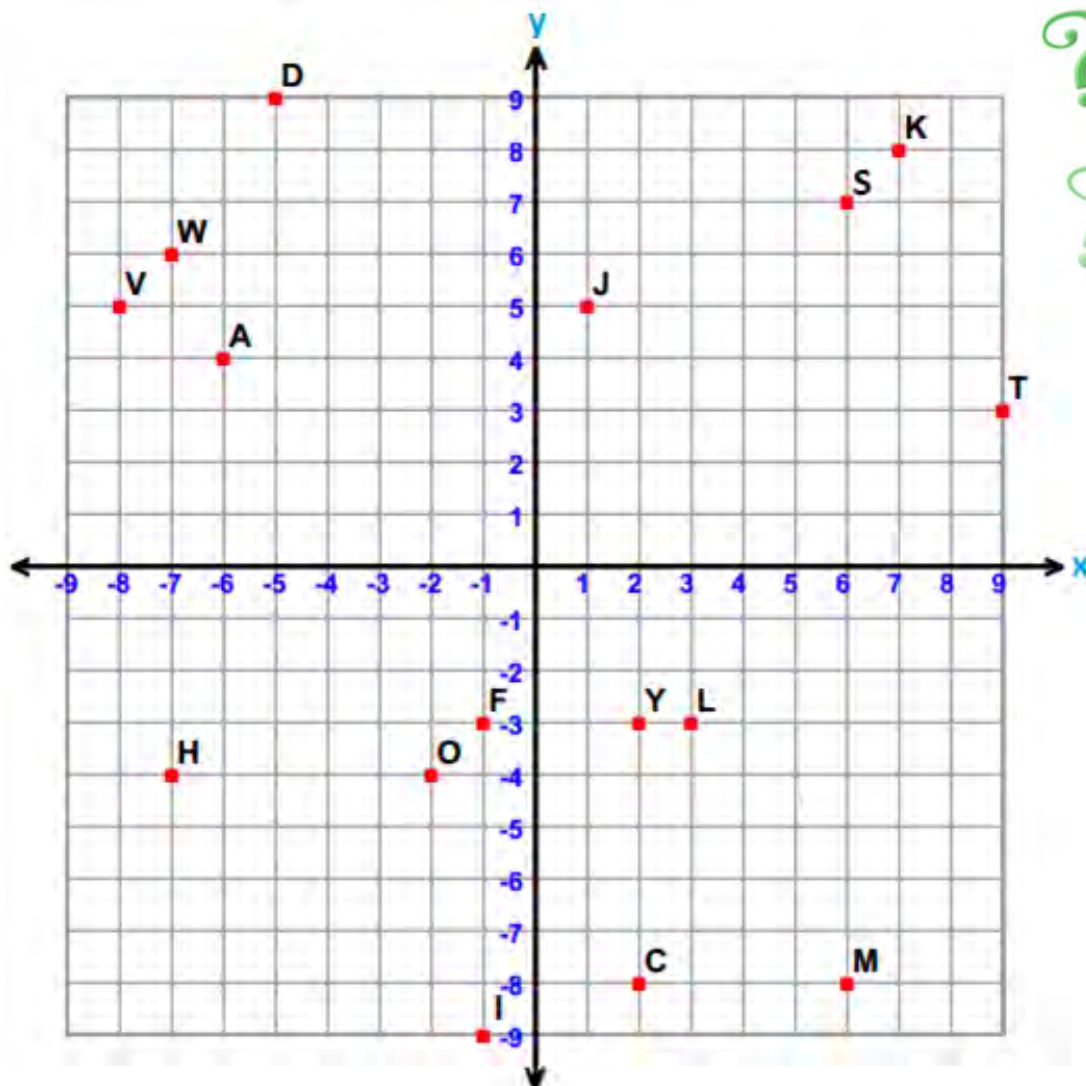
Task 3

Tutor Guidelines

The aim of this task is to develop your student's ability to read co-ordinates that have been plotted on a Cartesian graph.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

Outline the main features of a Cartesian graph, x axis which is horizontal and y axis which is the vertical axis. Explain to the student that each point has an x and a y co-ordinate. From the point you are reading you go up/down to meet the x axis first and this will give you your x co-ordinate and then from your point you go left/right to meet the y axis and this is your y co-ordinate. The x and y value together is your co-ordinate pair.



At each letter you have a co-ordinate. Write down the co-ordinate of each letter.

A = C = D = F = H =

I = J = K = L = M =

O = S = T = V = W =

Y =

Task 4

Tutor Guidelines

The aim of this task is to develop your student's ability to plot co-ordinates on a Cartesian graph.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

Explain to your student that where they plot their co-ordinate point is where the x and y value meet. Perhaps plot the first co-ordinate as an example.

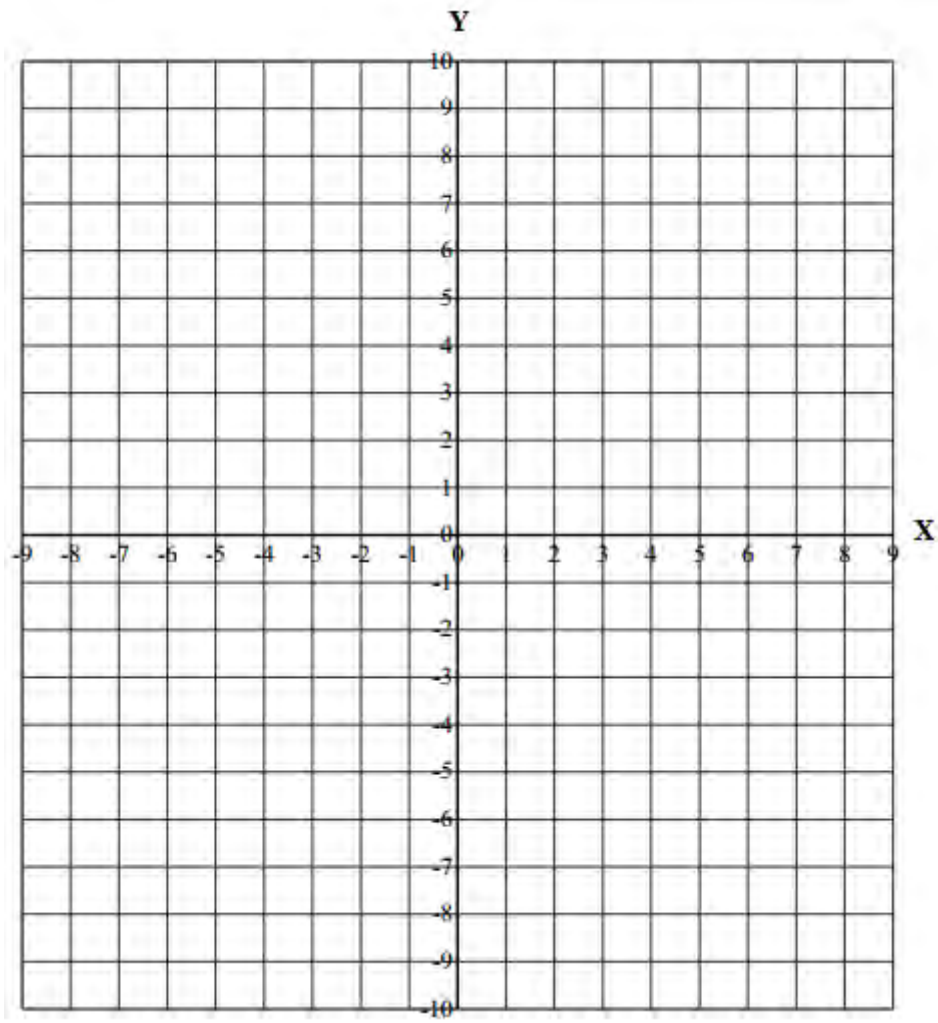
- What is the x-value of your first co-ordinate? 1, so go to 1 on your x axis.
- What is the y-value of your first co-ordinate? -3, so go to -3 on your y axis.

Go down from 1 and right from -3 and where the two lines meet is you co-ordinate point (1, -3).

Ensure that your student joins up each point as they plot it as this will reveal the image (maple leaf).

a) Plot the co-ordinates on the graph.

(1, -3), (5, -4), (4, -3), (9, 1), (7, 2), (8, 5), (5, 4), (5, 5), (3, 4), (4, 9), (2, 7),
 (0,10), (-2, 7), (-4, 8), (-3, 3), (-5, 6), (-5, 4), (-8, 5), (-7, 2), (-9, 1), (-4, -3),
 (-5,-4), (0, -3), (2, -7), (2, -6), (1, -3)



b) Join the points in the order that they are given to you in part a) and identify the picture that is revealed.



Week 5

Lesson 9 - Algebra

Learning Objectives

At the end of this lesson your student will be able to;

- ☐ Identify complete and compose visual patterns
- ☐ Describe what is happening in a sequence in your own words – given a sequence in word form and writing down the first few terms
- ☐ Substitution
- ☐ Simplify an expression

Number Patterns

Challenge 1

- a) 3, 6, 9 b) 6, 9, 10 c) 9, 6, 5 d) 1, -2
e) 8, 14, 16, 20, f) 12, 21, 24, 27

If your student answers this question correctly, then please go directly to the Task 2.

Complete the following lists of numbers and describe what is happening in each pattern;

g) 1, 2, __, 4, 5, __, 7, 8, __ Pattern: _____

h) 4, 5, __, 7, 8, __, __ Pattern: _____

i) 12, 11, 10, __, 8, 7, __, __ Pattern: _____

j) 3, 2, __, 0, -1, __, -3, -4 Pattern: _____

k) 2, 4, 6, __, 10, 12, __, __, 18, __ Pattern: _____

l) 3, 6, 9, __, 15, 18, __, __, __ Pattern: _____

Task 1

Tutor Guidelines

The aim of this task is to develop your student's ability to see a pattern in images.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Your student must first understand what a pattern is – a set of numbers or images in which all the members are related to each other by a specific rule. Every day examples of patterns they may come up with are a check pattern or a number pattern like 2, 4, 6 etc.

b) Your student firstly needs to identify how many different parts to the pattern there is. When they have done this they need to see how often each part of the pattern appears. Once they have done this they then should be able to identify what comes next.

c)

- Do you notice any patterns on your school uniform?

Look at your school tie. Look at your school trousers.

d) Your student must come up with their own pattern. If they are having trouble with this then ask them;

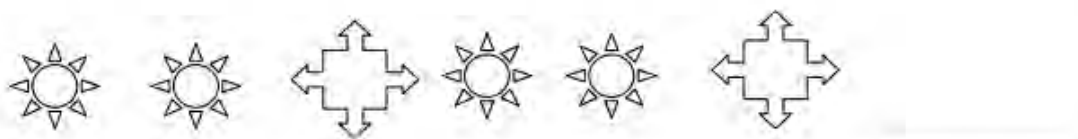
- How many images do you want in your pattern (try and keep the number small so that the pattern does not get too complex)?

If they are struggling with what images to use maybe encourage them to use a few simple shapes like a rectangle and a circle. Then to create their pattern they have to decide how the pattern will go.

- How many times will we see the first image before we see the second image? Etc.

a) Do you understand what the term pattern means? Can you give an example of a pattern you have come across?

b) Draw the next picture in each of the following patterns.



c) Can you describe any pattern that you have ever seen?

d) Create a visual pattern of your choice below. Swap your pattern with the nearest first year to you and get them to fill in the next two terms in the pattern.

Task 2

Tutor Guidelines

The aim of this task is to develop your student's understanding of number patterns in a real life context.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) Your student needs to identify where the pattern begins (so the first term).

- What number does the pattern begin at? 12cm.
- How much does the plant grow every week? 10cm.
- What is the height of the plant the second week? Third week? Etc.

Write down what the height of the plant is each week up to week 5. Explain to your student that this is a number pattern.

b) Your student is given the pattern in this question. In this question your student needs to understand what the pattern means, i.e. Running total of the number of a particular toy they produce in 4 days.

- What is the difference between each number (term) in the pattern? 8.
- What does this number represent? They make 8 toys each day.

a) You buy your Mum a plant that is 12cm in height. Each week after that the plant grows 10cm.

Note: The plant is 12cm high at the beginning of the first week. What will be the height of the plant at the beginning of the 1st, 2nd, 3rd, 4th and 5th weeks, if it follows the same pattern?



b) Toy makers generally make the same toy the same number of times per day. They keep a running total of the number of Rubik cubes they make every day.

On day 1 they started with 2 Rubik cubes in stock.

Continue the pattern to show the next three days totals.

2, 10, 18, 26, ____, ____, ____.

Number of toys produced per day: ____



Task 3

Tutor Guidelines

The aim of this task is to that your student to develop a deeper understanding of number patterns. The key concept here is that your student will be able to come up with a formula to find any term in the pattern.

The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a)

- If another table is added how many tables do you have now?

Draw four tables and draw in the chairs at the table.

b) Your student can now count the number of chairs at the four tables in part a).

c) If students do not respond prompt them by asking them to look at the number of people sitting at the table.

- How many people can sit at just one table? 4.
- How many people can sit down when there are two tables? 6.
- How many people can sit down when there are three tables? 8.
- How many people can sit down when there are four tables? 10.
- Can you see a pattern between these numbers? They are going up in two's.
- What is the difference between each number? 2.

Now they have identified a pattern.

d) From completing part c) your student will now be able to fill in the table in part d).

e)

- What number does the pattern begin with? 4.
- What does this number mean? The number of people that can sit at one table.
- When you add a table how many more people can sit down at the tables? 2.
- If you add another table how many more people can sit down? 2

f) We will call the number of tables n , and this number will change each time we add a table.

- How many more people can sit down each time you add a table? 2
- If n stands for the number table and I have $2n$ and sub 1 in for n , then how many people do I have? 2
- What do I need to add to 2 to get 4, the number of people who can sit at 1 table? 2
- So I now get the rule $2n + 2$. Check you answer for 2 and 3 tables.

g) Get your student to look at their rule and remember what n stands for.

- In this question what does 12 represent? 12 tables
- So how will we use 12 with our rule? Sub 12 in instead of n .

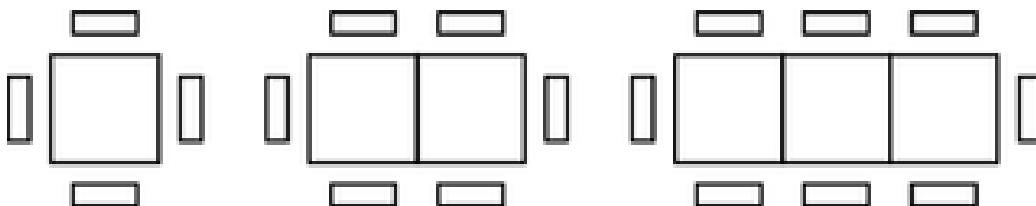
h) Get your student to look at the rule and see that we are now looking for n .

- What will we do with our rule? Make it equal to 20.

So then we now must find out what n is by solving the equation. Check to see that your answer makes sense in the context of the question.

You and 3 friends decide to study for Maths and are sitting together at a square table. A few minutes later, 2 other friends arrive and would like to sit at your table. You move another table next to yours so that 6 people can sit at the table.

Another 2 friends also want to join your group, so you take a third table and add it to the existing tables. Now 8 people can sit together.



a) If another table was added draw the seating arrangement like the diagram above.

b) How many people can sit at the tables when four tables are pushed together?

c) Complete the table below to see if you can identify a pattern.

| Number of tables | Number of people seated |
|------------------|-------------------------|
| 1 | 4 |
| 2 | $4+2=6$ |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |

d) Describe in words what is happening in this pattern?

e) Find the expression for the number of people seated at n tables.

f) Use the formula you have just derived to determine how many people can sit around 12 tables.

g) How many tables are needed to seat 20 people?

Substitution

Challenge 2

- a) i) 0 ii) 14 iii) 5
b) i) 60 ii) 36 iii) 3
c) i) 112 ii) 6 iii) 112

If your student answers this question correctly, then please go directly to the next Challenge.

a) If $m = 5$ and $n = 2$ find the value of

i) $2m - 5n$

ii) $mn + 4$

iii) $2mn - 15$

b) If $a = 3$ and $b = 6$ find the value of

i) $2b^2 - 4a$

ii) $2ab$

iii) $a^2 - b$

c) If $g = 4$ and $h = 7$ find the value of

i) $4gh$

ii) $5g - 2h$

iii) g^2h

Task 4

Tutor Guidelines

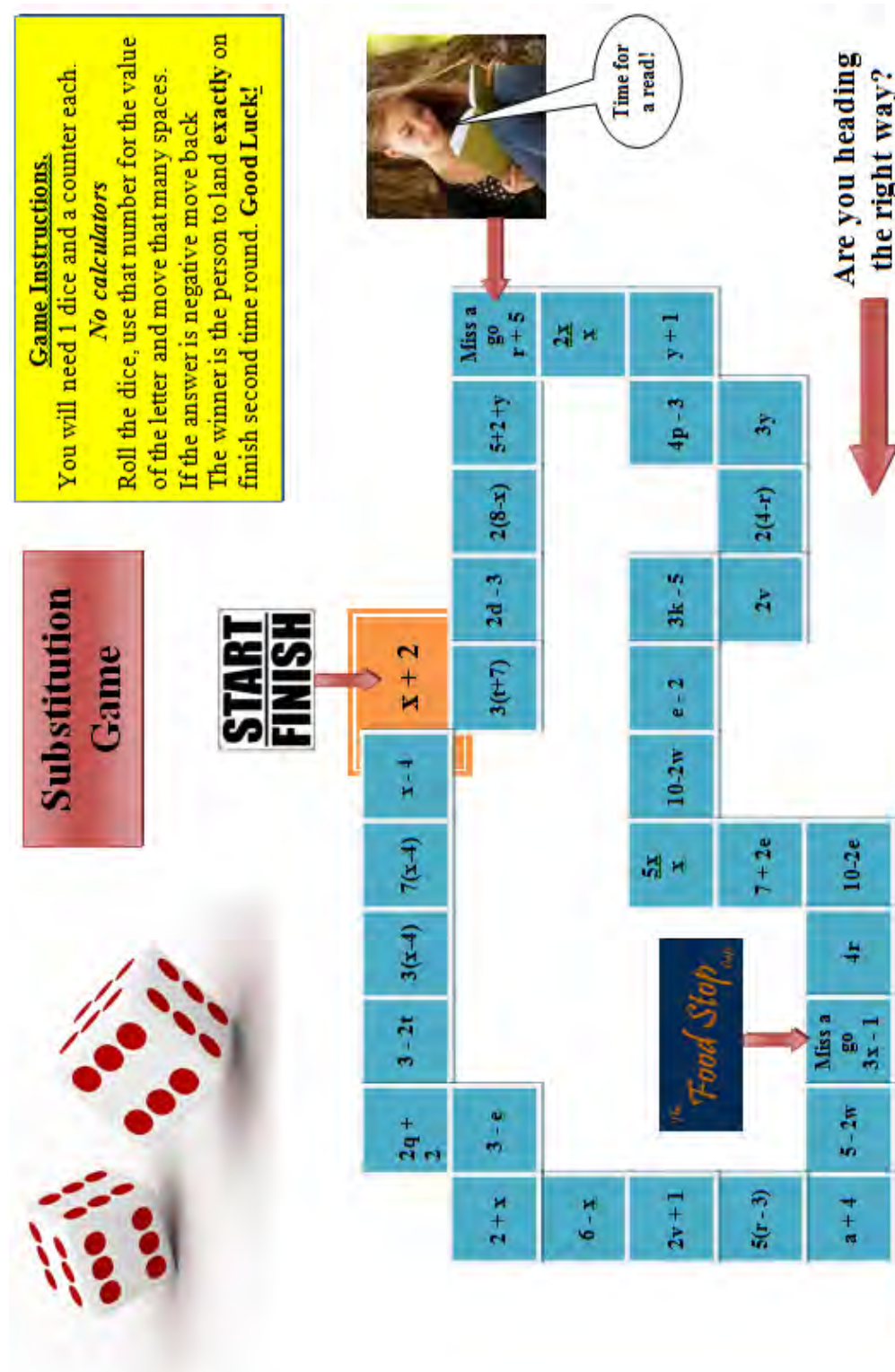
The aim of this task is for student to develop an understanding of substitution. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

The class teacher will hand out a board game, die and counters to play the game with to each student pair. Get your student to work with the first year student next to them. When they roll the dice they substitute the number they rolled into the expression that they are on. They move the number of spaces that the answer to the substitution gives. If the answer is a negative number they move back that number of spaces. The student who reaches the end of the board first wins.

Your student starts at $x+2$. They roll the dice and get 4.

- What do you think you will do with the number 4? You substitute it in instead of the letter x.
- What is $4 + 2$? 6, so you can move 6 spaces.

Board Game.



Task 5

Tutor Guidelines

The aim of this task is to further develop your students understanding of substitution in a real life context. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a)

i) Erin potted 4 red balls and 2 green balls.

- What is the value of a red ball? 1.
- So she potted 4 of them so what score does that come to? 4.
- What is the value of a green ball? 3. She potted 2 of them so what does that come to? 6.
- So what is Erin's total score? $4 + 6 = 10$.

ii) Joe potted 1 blue, 1 yellow and 2 red.

- What is the value of a blue ball? 5, he potted one of them so that is 5 points.
- What is the value of a yellow ball? 2. He potted one of them so that is 2.
- What is the value of a red ball? 1. He potted 2 of them so what does that come to? 2.
- So what is Joe's score in total? $5 + 2 + 2 = 9$

iii)

- Who is winning? Erin by 1 point.

b) So we need to calculate both Ireland and France total score in points.

Ireland scored 2 tries.

- What is the value of a try? 5 points.
- That comes to how many points? 10 points.

Ireland scored 2 conversions.

- What is the value of a conversion? 2 points.
- How many points does that come to? 4 points.

Ireland scored 2 penalties.

- What is the value of a penalty? 3 points.
- How many points does that come to? 6 points.
- What was Irelands total score? $10 + 4 + 6 = 20$ points

France scored 3 tries.

- What is the value of a try? 5 points.
- How many points does that come to? 15 points.

France scored 3 conversions.

- What is the value of a conversion? 2 points.
- How many points does that come to? 6 points.

France scored 1 penalty.

- What is the value of a penalty? 3 points.
- How many points does that come to? 3 points.
- What was France's total score? $15 + 6 + 3 = 24$ points

The final score in the game was Ireland 20, France 24.

a) The balls in Snooker have the following point values;

red=1 yellow=2 green=3 brown=4 blue=5 pink=6 black=7



Joe and Erin played a game of pool.

After 10 minutes of playing Erin potted 4 red balls and 2 green balls.

Joe had potted 1 blue ball, a yellow and 2 reds.

i) What was Erin's score after 10 minutes of playing?

ii) What was Joe's score after 10 minutes of playing?

iii) Who was winning the game after 10 minutes of playing?

b) In rugby a try is worth 5 points, a conversion is worth 2 points and a penalty/drop goal is worth 3 points.

Ireland played France recently in the third place play off in the Women's Rugby World Cup. Ireland scored 2 try's 2 conversions and 2 penalties. France scored 3 trys 3 conversions and 1 penalty.



What was the score in the game?

Simplifying expressions

Challenge 3

a) $-3x + 1$

b) $11w^2 - 2w - 6$

c) $3x + 5y + 2$

d) $3t + 8ts$

If your student answers this question correctly, then please go directly to Task 7.

Simplify the following expressions;

a) $4 - 3x - 7x - 3 + 7x$

b) $9w^2 - 2w - 7 + 2w^2 + 1$

c) $4x + 5y - x + 2$

d) $3t + 7ts + ts$

Task 6

Tutor Guidelines

The aim of this task is to further develop your student's ability at simplifying expressions as well as understand the correct algebraic terms to use. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) It is important that students can identify what each of the words mean. The variable is your letters (unknowns), your coefficient is the number in front of your variable, the terms are what are separated by your plus or minus signs and your expression are all the terms together.

b) it is important to discuss that like terms are terms with the same variable to the same power. You must also highlight that you can only add and subtract like terms.

c) There is an example done for the student. Explain what is happening in this example. That you add the two blocks beside each other to get the one below it. Highlight again that you can only add and subtract like terms.

We begin by adding n and 16.

- Are they like terms? No, so the answer I write in the box below is $n + 16$

I then add 16 and 14.

- Are they like terms? Yes as they are both constants so I will write 30 in the box below it.

I then add $n + 16$ and 30.

- Are there any like terms that I can add to n ? No, so I write n in the box below.
- Can I add 16 and 30? Yes because they are both constants so I can write 46 in the box below beside n .

d) This question requires the same strategy as part c).

a) You should have come across the words coefficient, variable, constant, term and expression when you have studied algebra. In relation to the following;

$$4x + 3y + 2x - 3$$

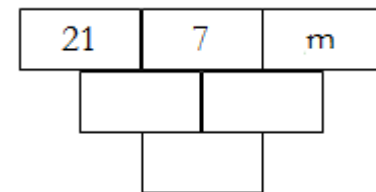
can you identify the coefficients, variables, constant, terms and expression?

b) From your study of algebra can you remember what like terms are?

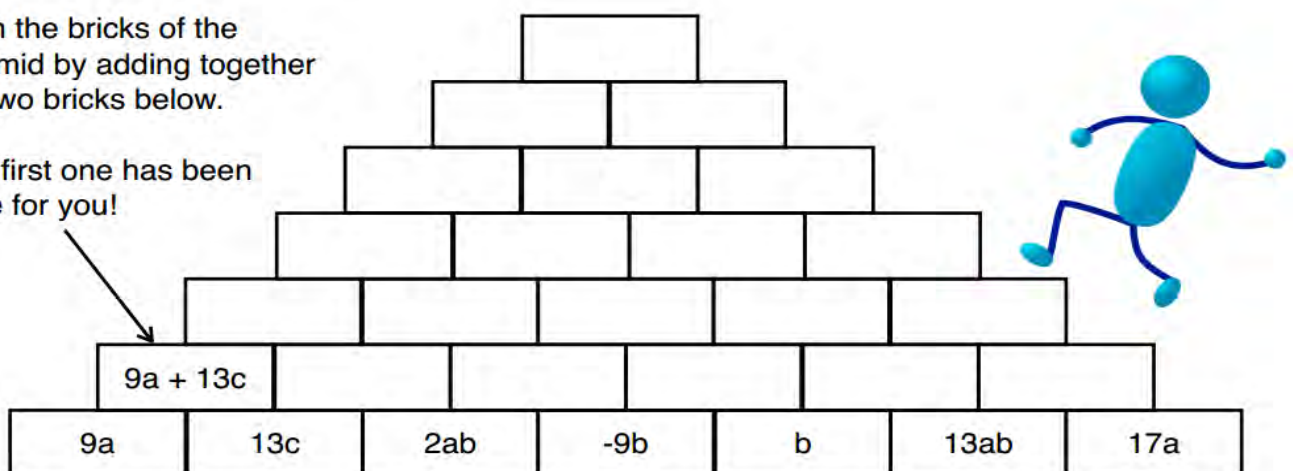
i)



iv)



This first one has been done for you!



Task 7

Tutor Guidelines

The aim of this task is to further develop your student's ability at simplifying expressions in a real life context. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) You must first discuss with your student what the perimeter of the court means. Drawing a quick sketch of a court and filling in the length of each side will help. Ask you student to writing down everything they are adding together and from this get them to simplify their expression.

b)

- What shape is a basketball court? A rectangle.
- How do you find the area of a rectangle? Length times width.
- In the case of this question what it the length and width of the court?
- So what do I multiply?

At this point you may have to multiply this out for them as this may be a step too far for the student at this stage.

a) Find and expression for the perimeter of the basketball court if its length is $4x + 2$ and its width is $3x$. Drawing a diagram of the pitch may help you. Please simplify this expression.



b) If we look at the previous question we found an expression for the perimeter of the basketball court. Can you now find an expression for the area of the basketball court? Please simplify the expression.

Week 6

Lesson 10 - Algebra

Learning Objectives

At the end of this lesson you student should be able to;

- ☐ Solve an equation
- ☐ Create an equation and solve it.

Solving equations

Challenge 1

a) $h = 2$

b) $s = 21$

If your student answers this question correctly, then please go directly to Task 2.

Solve the following;

a) $7(4h + 5) = 79 + 6h$

b) $2s - 3s = -21$

Task 1

Tutor Guidelines

The aim of this task is to develop your student's skills at solving equations. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a)

- Do you notice any difference between the two calculations? The equal to sign.

b) You came across expressions in an earlier task.

- What do you think the calculation with the equal to sign might be called? An equation.

c) Your student is going to solve the equations. Ensure that they understand that by solving an equation they are finding the value of the variable (i.e. the letter). The variable is there instead of a number and we want to find out what that number is. Please highlight to your student that in an equation if you take or add something to one side of the equals sign that you must do the same to the other side. The objective is to get the letter on its own on either the left hand side or the right hand side. For part i);

- What do I want to find the value of? X.
- What is the first thing that needs to be taken from the left hand side? 1.
- If you take 1 from the left hand side what have you left? $3x$.
- Whatever you do to one side of the equation you have to do to the other side of the equation so if you take one from the right hand side of the equation what have you got left? 12.

Now I have $3x = 12$.

- What does $3x$ mean? 3 times x.
- How do you get rid of a times 3? Divide by 3.
- So if I divide $3x$ by 3 what do I have left? X.
- Whatever you do to one side of the equation you have to do to the other side of the equation so if divide the right hand side of the equation by 3, you have 12 divided by 3 which give you what? 4.

So $x = 4$.

Follow the same strategy for all these questions.

a) Look at the following;

$$3x + 2y$$

$$3x + 2y = 0$$

What is the biggest difference you see between the two calculations above?

b) From last weeks session we learned that $3x + 2y$ is called an
After stating the difference in part a what do you think $3x + 2y = 0$ might be called?

c) Solve the following equations.



| | |
|--------------------|---------------------|
| i) $3x + 1 = 13$ | ii) $12x - 4 = 56$ |
| iii) $2x - 9 = 17$ | iv) $5x - 3 = 27$ |
| v) $6f + 12 = 48$ | vi) $4r + 20 = 16$ |
| vii) $3 = 6p + 21$ | viii) $2 = 3e + 17$ |

Task 2

Tutor Guidelines

The aim of this task is to further develop your student's skills at solving equations. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

In this task you will solve each equations using the same strategy in the previous task. Explain to your student that whatever value they get for each variable they write this variable above the number below. At the end of the task you student should be able to read the sentence.

Using the equations below, find out the value of each letter and fill in the gaps to make a sentence.

1 2 3 4 5 6 7 8 9

9 10 11 3 12 1 6 4 5

$$2o = 12 \qquad l + 4 = 11 \qquad q - 3 = 7 \qquad 2a + 1 = 7$$

$$3s = 15 \qquad e - 5 = 4 \qquad 2i + 6 = 8 \qquad 3n + 1 = 13$$

$$2v - 1 = 15 \qquad 5c = 10 \qquad 3u = 33 \qquad \frac{t}{4} = 3$$



Task 3

Tutor Guidelines

The aim of this task is to develop your student's skills at solving equations in a fun context. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

The class teacher will give each student a loop card. All students are relying on each other to complete the loop. You must ensure that your student stays on task during this activity so that the loop runs efficiently.

For example, if the first loop card says "I am $4x = 8$ " you all must solve the equation as fast as possible. $x = 2$ is the answer so the person who has that written on their card says "I am $x = 2$ " and they then read the equation on their card. This continues in a loop.

Loop cards.

You will each be given a card with an equation. The person who goes first reads out an equation. You have to solve this equation and if you have that answer on your card you shout out the answer and then read out your equation.

Task 4

Tutor Guidelines

The aim of this task is to develop your student's skills at creating and solving equations. The following guiding questions and prompts may be of some use when you are trying to guide students through this task.

a) So John weighed x kg on his last birthday. We don't know what that weight is but we want to find it out. So he weighs x kg so write down his weight as x .

- What does he lose? 3kg.
- What will you do with your 3kg? You will take it from x .
- What is his weight equal to now? 65 kg.
- What is your equation? $x - 3 = 65$.

Now it is very easy to solve this equation.

- Does your answer make sense?

b)

- What exactly we are looking for? The number of dvds she owns with is represented by the letter p.
- When 9 dvds are taken she now has 12 dvds, can you make this into an equation?

Solve your equation to find p.

c) Draw a rough sketch of a pitch. We must give the width of the pitch a value so we can call it a variable. Let's say d.

- If the width of the pitch is d and the length is twice the width, what value will we give the length of the pitch? 2d.

Fill in the lengths of the sketch of the pitch.

- How do you find an expression for the perimeter of the pitch? Add all the sides together.
- In this question they give you the perimeter of the pitch so what is your expression equal to? 150.

Now solve your equation.

d)

- What is a consecutive number? Numbers which follow after each other.
- What will the difference between each consecutive number be? 1.

Let's call the first number n.

- What will the first consecutive number be? $n + 1$.
- What will the second consecutive number be? $x + 2$.

So I now have my three consecutive numbers.

- Added together they equal 72 so what is my equation? $n + n + 1 + n + 2 = 72$.

Solve the equation to find n.

- What are my 3 consecutive numbers?

e) What James and Megan eat are both given in terms of what Marcus eats. Lets call what Marcus eats as t.

- In relation to t, what does James eat? 2t.
- In relation to t what does Megan eat? 3t.
- Write an expression for what they all eat. $t + 2t + 3t$.
- How many maltesers are in the packet? 60, so I make the expression equal to 60.

Now I can solve my equation to find how many maltesers they all ate.

f)

- What variable will we call Linda's age? Let's say c .
- If Linda's age is c and Mark is 4 years older what expression represents Mark's age? $c + 4$.

There ages added together is equal to their mothers age of 50.

- What is our equation? $c + c + 4 = 50$.

Solve the equation to find Linda and Marks ages.

Solve the following word problems by using algebra to create an equation;

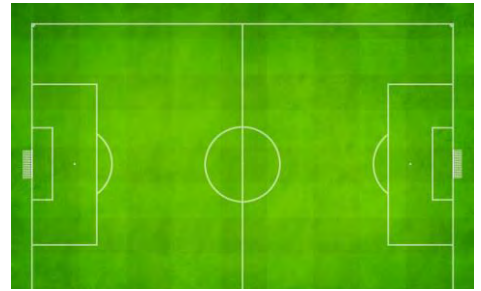
a) On Johns last birthday he weighed x kg. He lost 3kg since then and now weighs 65kg. How much did John weigh on his last birthday? Justify your answer.



b) Let p be the number of DVD's Victoria has. When her friend Lisa borrows 9 DVD's Victoria has 12 left. How many DVDs does Victoria own? Justify your answer.



c) The length of a pitch is twice the size of its width. The perimeter of the pitch is 150m. How long is the width of the pitch? Justify your answer.



d) If the sum of three consecutive numbers is 72, what is the largest number? Justify your answer.

e) Marcus, James and Megan are sharing a share pack of Maltesers. James eats twice as many Maltesers as Marcus and Megan eats three time as many Maltesers as Marcus. There are 60 Maltesers in the packet. Between them they eat all 60 Maltesers. How many Maltesers does James eat? Justify your answer.



f) Linda and Mark are brother and sister. Their ages added together equal their mother's age. Their mother is 50 and Mark is 4 years older than Linda. How old is Linda and Mark?
Justify your answer.



Appendix D: Answer Booklet

Peer Tutoring Programme

Challenge and Task Answers



Week 1

Lesson 1 –Time & Timetables

Challenge 1

a) 00:35 b) 23:50 c) 11:30

Task 1

1. a) 06:20 b) 18:20 2. a) 05:25 b) 17:25 3. a) 03:10 b) 15:10

4. a) 05:05 b) 17:05 5. a) 10:20 b) 22:20 6. a) 09:25 b) 21:25

7. a) 09:50 b) 21: 50 8. a) 10:10 b) 22:10

Task 2

a) 5:40pm b) 15:50 c) 23:00 d) 18:09 e) 6:09pm

Task 3

a) 1 hour 15 minutes b) 1 hour 24 minutes c) 3 hours 46 minutes

d) The 12:44 train

Lesson 2 –Number

Order of Operations

Challenge 1

a) 15 b) 5

Task 1

a) €11 b) 11

c) Yes your answers should be the same if you are using the order of operations correctly which requires you to multiply before you add.

d) The Order of Operations is a rule used to clarify which procedures should be performed first in a given mathematical expression. If this rule was not in place, there could potentially be several answers to certain mathematical expressions instead of just one.

Task 2

a) They solved the question from left to right without considering whether to multiply, add or subtract first.

b) You need to solve the question in this order, Brackets, Indices, Multiplication, Division, Addition, and Subtraction (BIMDAS).

c) Brackets, Indices, Multiplication, Division, Addition, Subtraction (BIMDAS)

d) 20

Task 3

a) 21

b) -14

c) 20

d) 51

e) 16

f) 7

Task 4

a) $(2 \times 2) + (60 - 11)$

b) $(27 \times 2) + (18 \times 2)$

53

90

Task 5

Solutions will be given by the class teacher on the board.

Week 2

Lesson 3 – Number

Multiples

Challenge 1

- a) 20 b) 120

Task 1

- a) 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
- b) The numbers are all multiples of 5
- c) Multiples of 3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 49, 42
- Multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56
- d) Yes. The lowest common multiple is 12

Factors

Challenge 2

- a) 6 b) 5

Task 2

- a) A factor of a number is a number that divides evenly into that number.
- b) 1, 2, 5, 10, 25, 50 c) 1, 2, 5, 10 d) 10

Task 3

Factors game

Sets

Challenge 3

- a) 28 b) 9 c) 4 d) 10 e) 22 f) 18 g) 14 h) 100

Task 4

- a) A Venn diagram
- b) Some of the numbers have gone red because they are in the incorrect position
- c) The space in the middle of the two sets represents what the two sets have in common
- d) 1, 3 e) 3

Task 5

Solutions will be given to you on the board by the class teacher.

Prime Numbers

Challenge 4

2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Task 6

- a) Prime numbers are numbers greater than 1 that have only 2 factors, themselves and 1.
- b) 2, 3, 5, 7, 11, 13, 17, 19, 23, 29
- c) 2 is the only even prime number

Task 7

Prime numbers game.

Lesson 4 – Number

Fractions

Challenge 1

- | | | |
|--|---|------|
| a) 1 | b) 1 | c) 1 |
| d) Examples are $\frac{2}{4}$ or $\frac{3}{6}$ | e) Examples are $\frac{1}{4}$ or $\frac{3}{12}$ | |
| f) Examples are $\frac{9}{15}$ or $\frac{6}{10}$ | | |

Task 1

- d) Two halves e) Four quarters f) Eight eighths

h) $\frac{1}{4}$ is bigger than $\frac{1}{8}$

Challenge 2

d) 88%

d) The line underneath some of the numbers signifies that the number is recurring. $1/7$ is rounded correct to 2 decimal places.

[illegible]

e)

| 1 | | | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 50% | | | | | | 50% | | | | | |
| 33.3% | | | | 33.3% | | | | 33.3% | | | |
| 25% | | | 25% | | | 25% | | | 25% | | |
| 20% | | 20% | | 20% | | 20% | | 20% | | 20% | |
| 16.6% | | 16.6% | | 16.6% | | 16.6% | | 16.6% | | 16.6% | |
| 14.2% | 14.2% | 14.2% | 14.2% | 14.2% | 14.2% | 14.2% | 14.2% | 14.2% | 14.2% | 14.2% | 14.2% |
| 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% |
| 11.1% | 11.1% | 11.1% | 11.1% | 11.1% | 11.1% | 11.1% | 11.1% | 11.1% | 11.1% | 11.1% | 11.1% |
| 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% |
| 9.09% | 9.09% | 9.09% | 9.09% | 9.09% | 9.09% | 9.09% | 9.09% | 9.09% | 9.09% | 9.09% | 9.09% |
| 8.3% | 8.3% | 8.3% | 8.3% | 8.3% | 8.3% | 8.3% | 8.3% | 8.3% | 8.3% | 8.3% | 8.3% |

Task 3

Equivalent squares game. Please ask the class teacher if you require support.

Task 4

- a) Yes they are now €56 b) €164.30 c) €56 d) €72 e) €42

Week 3

Lesson 5 – Statistics

Tally & Frequency Tables

Task 1

The class teacher will give the solutions to this task on the board.

Types of Data

Challenge 1

Numerical data: Height, arm span, weight

Categorical data: Sex, eye colour, favourite colour

Task 2

- a) Data is facts and statistics collected which can then be analysed.
- c) Some of the data is numbers (numerical data) and some of the data is words (categorical data).
- d) Refer to part c for solutions to this question.

Task 3

Categorical data

Task 4

- a) It is a leading question. A leading question prompts you to answer a question in a certain way. You should not use them in a survey as then the survey is biased or not fair.
- b – d) Ask your teacher if you are unsure of the answers here

Graphical Representation

Challenge 2

- a) Pie Chart as you can clearly see what the entire €50 was spent on. The full circle of the pie chart is one whole so each segment shows how much of the whole €50 was spent on what.

b) A bar chart. It would be too difficult to represent 200 people on a line plot as you have to plot a dot or x for each person. A line plot is better used for small amounts of data.

Task 5

a) Ask your teacher if you are unsure.

b) Bar chart – The bar chart is best at representing this numerical data as there is quite a lot of data and this is easily represented on a bar chart. On the vertical axis you can extend this to as large a value as you need to.

Line plot - This is good for representing a small amount of data. Here it is representing a small amount of numerical data. It is very easy to read the data from this graph.

Stem and leaf – A stem and leaf is used to represent numerical data. It is used for graphing the data represented here as there is not too much data and the data doesn't vary greatly.

Pie chart – A pie chart is excellent for representing this type of categorical data. It is very easy to see which superhero is most popular from this chart.

c)

| | Numerical | Categorical |
|---------------|-----------|-------------|
| Bar chart | ✓ | |
| Line plot | ✓ | |
| Stem and Leaf | ✓ | |
| Pie chart | | ✓ |

d) Yes. To represent categorical data on a bar chart put the category on the horizontal axis.

e) Yes. To represent categorical data on a line plot put the category on the vertical axis.

f) No. You can only represent numerical data on a stem and leaf.

g) Yes. Both types of data can be represented on a pie chart. If you have a lot of numerical data it may not be the most suitable graph to use.

h) The bar chart has an axis that represents the numbers whereas a line plot uses and x or a dot to represent each 1. Therefore you should not use line plots for a large amount of data. A bar chart would be more suitable.

i) You would have too many dots to plot so it would take way to long and would look far too big.

Lesson 6 – Probability

Outcomes

Task 1

a) Orange juice and cornflakes, orange juice and Weetabix, orange juice and special k, orange juice and cheerios, orange juice and coco pops, apple juice and cornflakes, apple juice and Weetabix, apple juice and special k, apple juice and cheerios, apple juice and coco pops, grapefruit juice and cornflakes, grapefruit juice and Weetabix, grapefruit juice and special k, grapefruit juice and cheerios and grapefruit juice and coco pops.

b) 15

Probability

Task 2 & 3

Ask the teacher of the class for help with this task if you need it.

Week 4

Lesson 7 – Geometry

Vertical, Horizontal & Oblique lines

Challenge 1

- a) Horizontal, Oblique and Vertical in that order.
- b) A vertical line is a line that goes straight up and down and is at a 90° angle to the ground.
A Horizontal line is a straight flat line that goes from left to right.
An Oblique line is a line that is neither vertical nor horizontal.

Task 1

- a) A vertical line is a line that goes straight up and down and is at a 90° angle to the ground.
A Horizontal line is a straight flat line that goes from left to right.
- b) The books are stacked vertically, Pinks dress stripes are vertical, the Equator is horizontal, the DVDs are stacked horizontally and Cameron Diaz stripes are horizontal.
- c) An Oblique line is a line that is neither vertical nor horizontal.
- d) Ask the class teacher if you have a problem with this task.

Parallel & Perpendicular lines

Challenge 2

- a) Parallel and perpendicular in that order.
- b) Parallel Lines are distinct lines lying in the same plane and they never intersect each other.
Perpendicular lines are lines that intersect at right angles.

Task 2

- a) Ask the class teacher if you have a problem with this task.
- b) 1) Parallel 2) Neither 3) Perpendicular 4) Perpendicular
 5) Neither 6) Perpendicular
- c) They will never meet.
- d) They are always at 90° angle to each other.

Task 3

a) Parallel b) Perpendicular

c – d) Ask the class teacher if you have a problem with this task.

Measuring Angles

Challenge 3

a) Two rays joined together.

b) Angle CAB=18° Angle DAB=77° Angle EAB=133 ° Angle CAF=162°

Angle DAF=103° Angle EAF=47°

Angle CAB=55° Angle DAB=113° Angle EAB=158° Angle CAF=125°

Angle DAF=67° Angle EAF=22°

Task 4

a) For this task you have to identify the angle you want them to measure and have it pre-measured so you know its size. Ask your teacher for help with this task if you are unsure.

b) 90°. In order for a building to be structurally sound the walls have to be at a 90° angle to the floor.

Lesson 8 – Geometry

Vertically Opposite Angles

Challenge 1

A=50° B=130° C=60° D=95° E=108° F=72°

Task 1

a-c) Ask your teacher for help with this task if you are unsure.

d) 360°

e) They are equal

Angles in a Triangle

Challenge 2

a) 57°

b) All angles in a triangle add up to 180°









Task 2









a-b) Ask your teacher for help with this task if you are unsure.









c) The 3 angles in a triangle add up to 180° .

Co-ordinates

Challenge 3

| | |
|---|---------|
|  | (4, 6) |
|  | (7, 8) |
|  | (3, 1) |
|  | (10, 7) |
|  | (10, 2) |
|  | (8, 4) |
|  | (13, 4) |
|  | (6, 1) |

| | |
|---|---------|
|  | (5, 9) |
|  | (11, 9) |
|  | (8, 10) |
|  | (12, 6) |
|  | (0, 5) |
|  | (7, 0) |
|  | (0, 0) |
|  | (14, 1) |

| | |
|---|--------------------------------------|
|  | (5, 4.5) |
|  | (2, 10) |
|  | (13.5, 8.5) |
|  | (3, $3\frac{1}{2}$) |
|  | ($11\frac{1}{2}$, $4\frac{1}{2}$) |
|  | (1, 3) |
|  | ($8\frac{1}{2}$, $5\frac{1}{2}$) |
|  | ($1\frac{1}{2}$, 7) |

Task 3

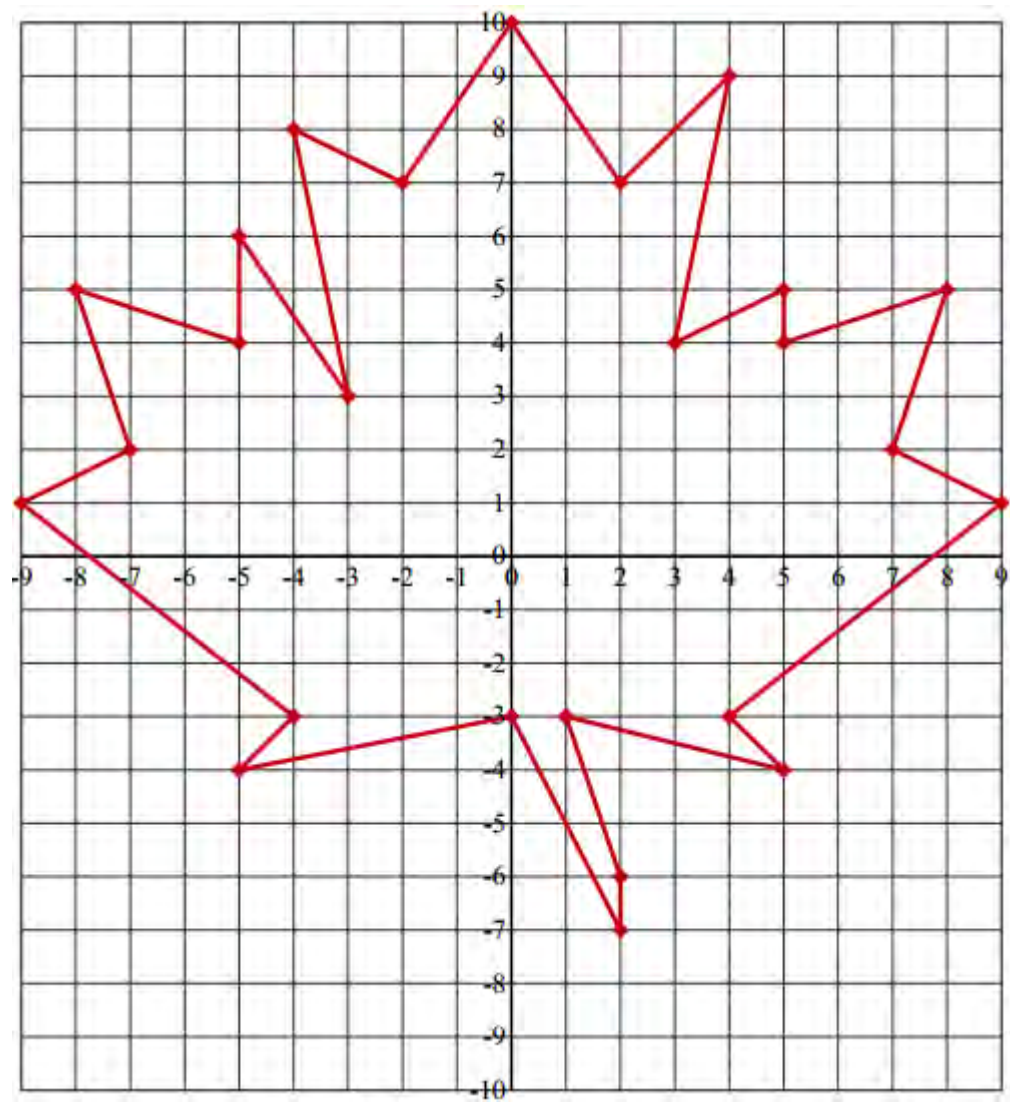
A = (-6, 4) C = (2, -8) D = (-5, 9) F = (-1, -3) H = (-7, -4) I = (-1, -9)

J = (1, 5) K = (7, 8) L = (3, -3) M = (6, -8) O = (-2, -4) S = (6, 7)

T = (9, 3) V = (-8, 5) W = (-7, 6) Y = (2, -3)

Task 4

a)



b) A maple leaf.

Week 5

Lesson 9 –Algebra

Number Patterns

Challenge 1

- a) 3, 6, 9 Starting at 1 and going up in 3's
- b) 6, 9, 10 Starting at 4 and going up in 1's
- c) 9, 6, 5 Starting at 12 and going down in 1's
- d) 1, -2 Starting at 3 and going down in 1's
- e) 8, 14, 16, 20 Starting 2 and going up in 2's
- f) 12, 21, 24, 27 Starting at 3 and going up in 3's

Task 1

a) A pattern is a set of numbers or images in which all the members are related with each other by a specific rule e.g. 2, 4, 6, 8 is a pattern that is going up in 2's.

b) In order,



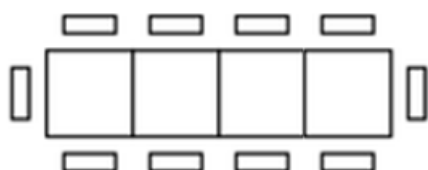
c-d) If you are unsure of your students answer then please ask the class teacher for support.

Task 2

- a) 12cm, 22cm, 32cm, 42cm, 52cm
- b) 34, 42, 50 8 toys produced per day.

Task 3

a)



b) 10 people

c)

| Number of tables | Number of people seated |
|------------------|-------------------------|
| 1 | 4 |
| 2 | $4+2=6$ |
| 3 | 8 |
| 4 | 10 |
| 5 | 12 |
| 6 | 14 |
| 7 | 16 |

d) For each extra table added, 2 more people can sit down at the tables.

e) $2 + 2n$

f) 26 people

g) 9 tables

Substitution

Challenge 2

- a) i) 0 ii) 14 iii) 5
b) i) 60 ii) 36 iii) 3
c) i) 112 ii) 6 iii) 56

Task 4

Substitution game. Please ask the class teacher for support if required.

Task 5

- a) i) 10 ii) 9 iii) Erin
b) Ireland 20, France 24.

Simplifying Expressions

Challenge 3

- a) $-3x + 1$ b) $11w^2 - 2w - 6$ c) $3x + 5y + 2$ d) $3t + 8ts$

Task 6

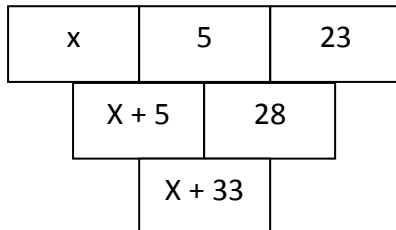
a) Coefficients are 4, 3 and 2 Variables are x and y Constant is -3

The terms are $4x$, $3y$, $2x$, -3

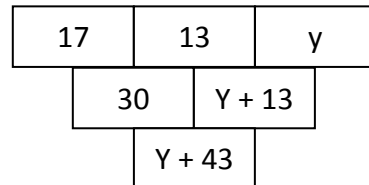
The expression is $4x + 3y + 2x - 3$

b) Like terms are the same variable to the same power.

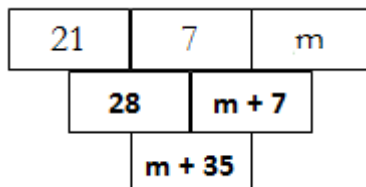
c) ii)



iii)



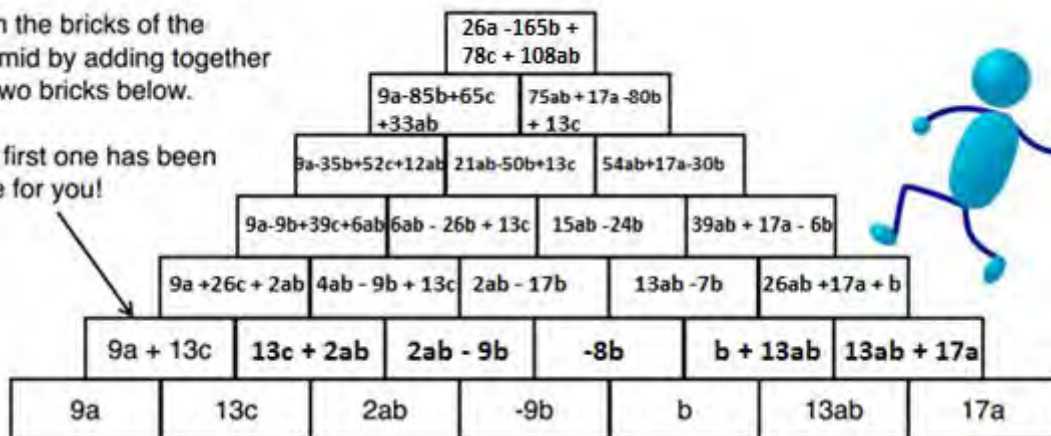
iv)



d)

Fill in the bricks of the pyramid by adding together the two bricks below.

This first one has been done for you!



Task 7

a) $14x + 4$

b) $12x^2 + 6x$

Week 6

Lesson 10 – Algebra

Solving Equations

Challenge 1

a) $h = 2$

b) $s = 21$

Task 1

a) The equals sign

b) Expression.

Equation

c) i) 4 ii) 5 iii) 13 iv) 6 v) 6 vi) -1 vii) -3 viii) -5

Task 2

$o=6$ $l=7$ $q=10$ $a=3$ $s=5$ $e=9$ $i=1$ $n=4$ $v=8$ $c=2$ $u=11$ $t=12$

I can solve equations

Task 3

Loop Card Solve the Equation game.

Task 4

a) 68kg

b) 21

c) 25m

d) 25

e) 20

f) Linda=23 years old

Mark = 27 years old

Appendix E: Attitudinal Survey

Name: _____

Date: _____

Mathematics Attitudinal Survey

Please circle the one answer that best applies to you.

Self-belief in Mathematics

| | Strongly disagree | Disagree | Neither agree or disagree | Agree | Strongly agree |
|---|-------------------|----------|---------------------------|-------|----------------|
| 1. I have a good mind for mathematics. | 1 | 2 | 3 | 4 | 5 |
| 2. I have always felt I have ability to learn mathematics. | 1 | 2 | 3 | 4 | 5 |
| 3. I have a mental block when it comes to mathematics. | 1 | 2 | 3 | 4 | 5 |
| 4. It takes me much longer to understand mathematical concepts than the average person. | 1 | 2 | 3 | 4 | 5 |
| 5. If I can understand a mathematics problem, then it must be an easy one. | 1 | 2 | 3 | 4 | 5 |
| 6. It has always seemed as if mathematics requires brain cells that I don't have. | 1 | 2 | 3 | 4 | 5 |
| 7. I can understand mathematics better than most people. | 1 | 2 | 3 | 4 | 5 |
| 8. Whenever I am exposed to mathematics, I feel that it is beyond me. | 1 | 2 | 3 | 4 | 5 |
| 9. I don't ask questions in mathematics classes because my questions sound stupid. | 1 | 2 | 3 | 4 | 5 |
| 10. I have no more trouble understanding mathematics than any other subject. | 1 | 2 | 3 | 4 | 5 |
| 11. I just don't have a mathematical mind. | 1 | 2 | 3 | 4 | 5 |
| 12. When I have difficulties with mathematics, I know I can handle them if I try. | 1 | 2 | 3 | 4 | 5 |
| 13. My mathematical ability is above average. | 1 | 2 | 3 | 4 | 5 |
| 14. I have never been able to think mathematically. | 1 | 2 | 3 | 4 | 5 |
| 15. I always feel like a dummy in my mathematics classes. | 1 | 2 | 3 | 4 | 5 |

| | Strongly disagree | Disagree | Neither agree or disagree | Agree | Strongly agree |
|---|-------------------|----------|---------------------------|-------|----------------|
| 16. I don't have a good enough memory to learn mathematics. | 1 | 2 | 3 | 4 | 5 |
| 17. I get very tense when I see a mathematics problem because I know I will not be able to do it. | 1 | 2 | 3 | 4 | 5 |
| 18. I always feel competent at mathematics. | 1 | 2 | 3 | 4 | 5 |
| 19. Whenever I do a mathematics problem, I am sure that I have made a mistake. | 1 | 2 | 3 | 4 | 5 |
| 20. I feel secure in my ability to do mathematics. | 1 | 2 | 3 | 4 | 5 |
| 21. Whenever I have to take a mathematics test, I worry about whether I can pass it. | 1 | 2 | 3 | 4 | 5 |
| 22. When I have to do mathematics problems, I do not worry about whether I will be able to do them. | 1 | 2 | 3 | 4 | 5 |
| 23. I never worry about failing mathematics. | 1 | 2 | 3 | 4 | 5 |
| 24. When I do mathematics, I feel confident that I have done it correctly | 1 | 2 | 3 | 4 | 5 |
| 25. I will always have difficulty with learning mathematics. | 1 | 2 | 3 | 4 | 5 |
| 26. I'm one of those people who were not born to learn mathematics. | 1 | 2 | 3 | 4 | 5 |

Mathematics & Pedagogy

| | | | | | |
|--|---|---|---|---|---|
| 27. Mathematics is useful and necessary in all areas of life. | 1 | 2 | 3 | 4 | 5 |
| 28. Some people are good at maths and some just aren't. | 1 | 2 | 3 | 4 | 5 |
| 29. Mathematics is dull and boring because it leaves no room for personal opinion. | 1 | 2 | 3 | 4 | 5 |
| 30. Mathematics can be related to real life situations. | 1 | 2 | 3 | 4 | 5 |
| 31. Mathematics is an important life skill. | 1 | 2 | 3 | 4 | 5 |

| | Strongly disagree | Disagree | Neither agree or disagree | Agree | Strongly agree |
|---|-------------------|----------|---------------------------|-------|----------------|
| 32. In mathematics something is either right or it's wrong. | 1 | 2 | 3 | 4 | 5 |
| 33. Good mathematics teachers show students lots of different ways to look at the same question. | 1 | 2 | 3 | 4 | 5 |
| 34. Good mathematics teachers show you the exact way to answer the mathematics questions you'll be tested on. | 1 | 2 | 3 | 4 | 5 |
| 35. Everything important about mathematics is already known by mathematicians. | 1 | 2 | 3 | 4 | 5 |
| 36. In mathematics you can be creative and discover things by yourself. | 1 | 2 | 3 | 4 | 5 |
| 37. Mathematics problems can be solved correctly with only one method. | 1 | 2 | 3 | 4 | 5 |
| 38. Real mathematics problems can be solved by common sense instead of the mathematics rules you learn in school. | 1 | 2 | 3 | 4 | 5 |
| 39. To solve mathematics problems you have to be taught the right procedure or else you can't do anything. | 1 | 2 | 3 | 4 | 5 |
| 40. The best way to do well in mathematics is to memorise all the formulae. | 1 | 2 | 3 | 4 | 5 |
| 41. My mathematics teacher often uses group work in class to help us gain understanding of concepts. | 1 | 2 | 3 | 4 | 5 |

Interest in Mathematics

| | | | | | |
|---|---|---|---|---|---|
| 42. The content taught in mathematics classes is very interesting. | 1 | 2 | 3 | 4 | 5 |
| 43. I enjoy going beyond the assigned work and trying to solve new problems in mathematics. | 1 | 2 | 3 | 4 | 5 |
| 44. Mathematics is enjoyable and stimulating to me. | 1 | 2 | 3 | 4 | 5 |
| 45. Mathematics makes me feel uneasy and confused. | 1 | 2 | 3 | 4 | 5 |
| 46. I am interested and willing to use mathematics outside of school. | 1 | 2 | 3 | 4 | 5 |
| 47. I have never liked mathematics and it is my most dreaded subject. | 1 | 2 | 3 | 4 | 5 |

| | Strongly disagree | Disagree | Neither agree or disagree | Agree | Strongly agree |
|--|-------------------|----------|---------------------------|-------|----------------|
| 48. I have always enjoyed studying mathematics in school. | 1 | 2 | 3 | 4 | 5 |
| 49. I would like to develop my mathematical skills and study this subject more. | 1 | 2 | 3 | 4 | 5 |
| 50. Mathematics makes me feel uncomfortable and nervous. | 1 | 2 | 3 | 4 | 5 |
| 51. I am interested and willing to acquire further knowledge of mathematics. | 1 | 2 | 3 | 4 | 5 |
| 52. I like mathematics because there is always a correct answer. | 1 | 2 | 3 | 4 | 5 |
| 53. Mathematics is very interesting and I have usually enjoyed studying this subject. | 1 | 2 | 3 | 4 | 5 |
| 54. When I study mathematics, I feel more uncomfortable than I do studying other subjects. | 1 | 2 | 3 | 4 | 5 |
| 55. I enjoy studying mathematics. | 1 | 2 | 3 | 4 | 5 |
| 56. Mathematics is one of the most boring subjects. | 1 | 2 | 3 | 4 | 5 |
| 57. When I have to do mathematics homework I do it with some joy. | 1 | 2 | 3 | 4 | 5 |
| 58. I hate studying mathematics, even the easiest parts. | 1 | 2 | 3 | 4 | 5 |
| 59. I want to learn mathematics. | 1 | 2 | 3 | 4 | 5 |
| 60. For my future career, mathematics is one of the most important subjects. | 1 | 2 | 3 | 4 | 5 |

Mathematics Achievement

| | | | | | |
|--|---|---|---|---|---|
| 61. It is important to do well in mathematics. | 1 | 2 | 3 | 4 | 5 |
| 62. In mathematics it's hard for me to decide what I have to do. | 1 | 2 | 3 | 4 | 5 |
| 63. Usually I feel unable to solve mathematical problems. | 1 | 2 | 3 | 4 | 5 |
| 64. Usually I have difficulty with mathematics. | 1 | 2 | 3 | 4 | 5 |
| 65. I feel more awkward in mathematics class than the rest of my classmates. | 1 | 2 | 3 | 4 | 5 |
| 66. Mathematics confuses me. | 1 | 2 | 3 | 4 | 5 |

| | Strongly disagree | Disagree | Neither agree or disagree | Agree | Strongly agree |
|--|-------------------|----------|---------------------------|-------|----------------|
| 67. I have always had trouble with mathematics. | 1 | 2 | 3 | 4 | 5 |
| 68. No matter what I do I always get low grades in mathematics. | 1 | 2 | 3 | 4 | 5 |
| 69. In mathematics my mind often goes blank. | 1 | 2 | 3 | 4 | 5 |
| 70. I do not know how to study mathematics. | 1 | 2 | 3 | 4 | 5 |
| 71. No matter how much effort I put in, I cannot understand mathematics. | 1 | 2 | 3 | 4 | 5 |
| 72. I can spend hours studying and doing mathematics problems, the time goes by so fast. | 1 | 2 | 3 | 4 | 5 |
| 73. I feel comfortable doing mathematics problems. | 1 | 2 | 3 | 4 | 5 |
| 74. Mathematics is easy. | 1 | 2 | 3 | 4 | 5 |
| 75. I am good at mental calculation. | 1 | 2 | 3 | 4 | 5 |
| 76. I am good at mathematics. | 1 | 2 | 3 | 4 | 5 |

Thank you for taking part in this survey.

Appendix F: Focus Group Transcript for Test Group

Test Group

Focus group 1

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6, S7)

Peer tutoring

Interviewer: So, did you all enjoy peer tutoring?

All: Yes (in unison)

Interviewer: Great, so can you tell me what did you like about peer tutoring?

S1: It was fun.

S3: Ya.

Interviewer: Can you explain what was fun about it?

S3: Well it was better working with a 4th year than a teacher.

S1: And we got to play games and stuff.

Interviewer: Cool, so what about the rest of you? What did you like about it?

S6: I liked my tutor. She was funny.

S7: Me too.

Interviewer: Did you get much work done with your tutor?

S6: Ya, we got through the entire book. We did loads!

Interviewer: Was there anything you disliked about peer tutoring?

S2: Well sometimes we couldn't do some questions and my tutor just skipped it.

Interviewer: And they did not ask the class teacher for help?

S2: Sometimes, but we skipped them as well.

Interviewer: Anything anybody else disliked about peer tutoring?

S4: My tutor was strict. He gave out to me if I ever spoke to any of the other 1st years.

Interviewer: Did you like your tutors?

S1, S2, S3, S5, S6: Yes.

Interviewer: What did you like about them?

S5: She was very good at explaining things, better than my teacher.

S2: She was very funny.

Interviewer: Is there anything you didn't like about your tutor?

S4: Mine was strict and kinda bossy.

S7: My tutor was so smart, she knew everything.

Interviewer: Did you get a lot of work done with them?

S4: Ya, we were one of the first groups to finish the book.

Interest

Interviewer: Good, so did peer tutoring make maths fun?

S5: Yes.

Interviewer: How?

S5: Well it wasn't just working from our book. We played games and got to work with other students.

Interviewer: Good. Did you all think it made maths fun?

S1: Ya sometimes. I loved the games and I loved the craic with the Transition years.

Interviewer: Do you like maths more after peer tutoring?

S1, S2 S4: Yes.

S3: Do you mean maths class?

Interviewer: No, I mean maths in general. Does it interest you more after peer tutoring?

S3: A bit more. Some parts of maths can be fun.

Interviewer: What was your favourite activity?

S6: I liked the Venn diagrams.

S1: I liked the board games with dice.

S2: Skittles.

S3: Ya the skittles!

Interviewer: What was your least favourite activity?

S4: Fractions, I always find them confusing.

S6: I didn't like the number patterns.

Achievement

Interviewer: Do you think your maths ability has improved because of peer tutoring?

All: Yes.

S5: I am better at algebra, I didn't understand it before.

S2: I couldn't do equations before peer tutoring.

S7: Ya equations make sense now.

S1: When we did the activity on venn diagrams, you know the one on blonde hair and blue eyes, I got venn diagrams better.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S1, S4: Yes.

S4: Sometimes in class the teacher goes through stuff too fast. Some things I did not get in class I learned in peer tutoring.

Interviewer: Was the test easier the second time around?

S2: That test was a different test.

S3: That test was easier.

Interviewer: It was a different test.

S1: It wasn't.

Interviewer: Lads it was. Which did ye think was easier?

S2: That test was easier, a lot easier.

Interviewer: Do you all think that?

S1, S2, S3, S4: Ya

S6: It was about the same I'd say.

Interviewer: Last question so lads, would you recommend peer tutoring to your friends?

S5: I would ya.

Interviewer: What about the rest of you?

All: Yes.

What did you like about it?

S4: It was loads of fun.

S3: And we got to miss class.

S2: I loved Ciara, she was so smart and funny.

S5: It made maths easier.

Focus group 2

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6, S7)

Peer tutoring

Interviewer: Well, did you all enjoy peer tutoring?

All: Yes.

Interviewer: Super! What did you like about peer tutoring?

S1: I loved my tutor.

S6: Ya me too, Diarmuid was really good fun. So was David.

Interviewer: Other than the two boys being fun, did ye actually get any work done?

S6: Ya we got it all done. They did do work with us, but we had fun doing it.

Interviewer: Ok so, what did the rest of you like about peer tutoring?

S2: We got to know way more 1st year students. Before this I only knew the ones in my base class.

Interviewer: Was there anything you disliked about peer tutoring?

S2: No.

S3: My class teacher gave out to me a few times for missing her class and going to peer tutoring. I didn't like that.

S7: I missed one week and my tutor made me catch up on the work one lunchtime.

Interviewer: Would you have preferred to be in your regular class?

S3: No, I wanted to do peer tutoring and my mom wanted me to do it too.

Interviewer: Right so, did you all like your tutor?

All: Yes

S5: He was a good teacher. I enjoyed chatting with him.

S1: So was mine. We got lots of work done and the time went very fast as we had fun doing the work.

Interest

Interviewer: Did peer tutoring make maths fun?

S2, S4, S5, S6: Yes.

Interviewer: What about you two (S1, S3)?

S1: A bit.

S3: Ya some parts.

Interviewer: How do you think it made maths fun?

S4: Well we played bored games and played a game with skittles. We never do that in our normal maths class.

S2: Ya we got to work in groups sometimes too which was fun.

S6: Our normal maths class is quiet, this was noisy, a good noisy.

Interviewer: Do you like maths more after peer tutoring?

S2: Yes, I see that maths can be interesting but we need to do this kinda stuff in our maths class now too.

S5: I do too, I'd like to do peer tutoring again though so I can keep liking maths more. I don't like my maths class at all.

Interviewer: What was your favourite activity?

S1: I liked using the mini white boards. They were class.

S6: Oh ya, they were cool! I liked the skittles activity too.

S2: Ya both of those and the board games. I won both board games!

Interviewer: Well done. What was your least favourite activity?

S3: Fractions, I always find them confusing. I hated filling in those tables.

S4: I didn't like the number patterns question, on the tables and chairs. I didn't know what was going on in that question and my tutor didn't either.

Achievement

Interviewer: Anything else? Ok, so do you think your maths ability has improved because of peer tutoring?

All: Ya.

Interviewer: In what way?

S6: I find algebra easier now.

S2: I didn't get some parts of venn diagrams before but I do now.

S3: I find algebra easier too. And I now know how to put points on a graph.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S1: Ya a bit. But we have moved on to different maths now.

S2: We are doing statistics in class now and I know it better than the others in the class.

Interviewer: That is brilliant. Right so ya know the test you did? Dya think it was easier the second time around?

S4:Easier. Definitely easier the second time.

S2: I think so too.

S3: Ya me too.

S1. I think it was the same. The questions weren't harder I don't think.

S7: I couldn't do it the first time really but I could try all the questions the second time.

Interviewer: Would you recommend peer tutoring to your friends?

S6: I would as ya get to miss class!

S1: And ya get skittles!

S2. You make friends with the older students too, I talk to them on the corridor now.

Focus group 3

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6)

Peer tutoring

Interviewer: Did you all enjoy peer tutoring?

S4: Ya I did.

S3: I did too.

Interviewer: Did the rest of you enjoy it?

S1 & S5: Ya.

S6: Era I did.

Interviewer: What did you like about peer tutoring?

S4: It was fun, something different to our other classes.

Interviewer: In what way?

S4: Well we got to work with someone else all the time and it was fun doing it with TY'S.

S5: And we got sweets and got to play games.

Interviewer: Great. Was there anything you disliked about it?

S6: My TY was kinda boring, everyone else seemed to have more fun with their tutor.

S1: Some weeks the double class was too long.

Interest

Interviewer: Did peer tutoring make maths fun?

S2: Ya. My maths class is boring but we got to do fun maths here.

S3: Ya the board games and the skittles were fun and the card games too.

S2: It was good to see the Kerry's All Ireland win again too!

Interviewer: It was for sure! Right, so do you like maths more after peer tutoring?

S1: Yes a little. Can we do peer tutoring again?

Interviewer: No, it is a different group of first years next term. Anybody else have an answer to do you like maths more after peer tutoring?

S4: Ya but I will stop liking it when I don't get to do peer tutoring.

Interviewer: What was your favourite activity?

S6: I liked getting to use the mini whiteboards.

S1: I liked the board games and the skittles.

S2: I liked the algebra game. It was funny because we were all so slow answering the questions.

Interviewer: What was your least favourite activity?

S5: Probably the stuff with fractions and decimals, I don't like doing them.

S1: I didn't like that either.

S2: Some of the algebra stuff was hard.

Achievement

Interviewer: Do you think your maths ability has improved because of peer tutoring?

S4: Ya I found the test way easier the second time we did it.

S6: Me too.

Interviewer: Any questions in particular that you found easier?

S4: The algebra ones and the geometry ones. I didn't properly understand the points on the graph before.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S1: Ya, I get some other stuff now that I didn't before.

S5: The algebra makes more sense now. The equations thingy, making them smaller.

S2: The geometry made more sense too.

Interviewer: Did you find the test easier the second time around?

S1: It was way easier.

S2: Ya it was easier, I didn't think it was the same test until someone else said it.

Interviewer: Right, last question. Would you recommend peer tutoring to your friends?

S3 & S5: Yes

Interviewer: Why?

S6: It was fun and we got to miss class.

S2: I learned things I didn't get in class. I found it easier to listen to my TY teacher.

S5: We got to play games and had fun with the TY'S.

Focus group 4

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6)

Peer tutoring

Interviewer: Did you all enjoy peer tutoring?

All: Yes.

Interviewer: That's good. What was it that you liked about peer tutoring?

S5: We gotta miss class, I missed Irish and History.

Interviewer: Other than missing class what did you like about it.

S1: I really liked my tutor, she was funny and really nice. She was good at explaining stuff too.

S2: Me too. I love Katelynn, she always talks to me in the canteen too.

S3: I got better at maths, my tutor really helped me.

Interviewer: Was there anything you disliked about it?

S1: Sometimes it was a bit long, 2 classes. Depending on what we were doing.

S4: I didn't like missing Irish class. I didn't know what they were doing the next day in class.

Interviewer: Did you like your tutor?

S6: No. He was mean to me. Kept on getting me to do the questions but didn't explain them and ignored me.

Interviewer: Oh god, that's awful.

S6: Ya he said he didn't want to be a tutor.

Interviewer: Sorry to hear that. What about the rest of you? Did you like your tutor?

S1: Ya she was really nice. She was good at teaching too. I learned from her.

Interviewer: That's great. Any other comments on your tutors?

S5: My tutor was good at explaining stuff. I really learned from her. She made it fun too.

Interest

Interviewer: Brilliant, so you said it was fun, do the rest of you think that peer tutoring made maths fun?

S2: Ya we got to play games and stuff like that. It didn't even feel like we were doing maths. But we were.

S1: And we got sweets.. skittles!

S4: The questions were good, the football one and the one about blonde hair and blue eyes.

S3: The best was having the TY's as our teachers.

Interviewer: Would you say you like maths more after peer tutoring?

S4: Yes, it showed that maths can be fun and not always boring.

S5: Ya in class all we do is use the book. I like how maths can be fun too.

S3: Ya I like maths in peer tutoring but not in my maths class. We just use the book.

Interviewer: What was your favourite activity?

S1: Skittles.

S2: I like the board and card games.

S6: I liked the board games and I liked using the whiteboards.

S3: Me too.

Interviewer: So what was your least favourite activity?

S6: Am, not sure.

S5: I didn't like some of the algebra questions, you know the pyramids. Thought they were hard.

S3: Ya same.

S4: It took me ages to put the points on the graph, dunno why. I found that hard.

Achievement

Interviewer: Do you think your maths ability has improved because of peer tutoring?

S6: Ya. I get things now that I didn't before.

S3: Ya it has made things easier. In class we go very fast and I didn't get some stuff. I get them now.

Interviewer: What stuff?

S3: Like the algebra and percentages.

Interviewer: Do the rest of you think your maths ability has improved since peer tutoring?

S6: Ya a bit.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S1: Ya some bits.

S2: Not really, it's the same.

S3: I find it easier. Going through things in peer tutoring made things make more sense.

Interviewer: Do you think that the test you did was easier the second time around?

S1: Ya I couldn't do it at all the first time, well bits of it.

S2: I thought it was a harder test. I didn't think it was the same test.

S4: It was way easier as we did all that type of questions in peer tutoring.

Interviewer: Finally, would you recommend peer tutoring to your friends?

S2: No, because I didn't like my tutor. If I did then I might.

S4: I would. It was fun and we did work as well.

S3: And my tutor and the other TY's were really nice.

S6: And we got to miss class.

Appendix G: Focus Group Transcript for Transition Year Group

Transition Year

Focus group 1

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6, S7)

Peer tutoring

Interviewer: Well did you enjoy peer tutoring?

S4: Ya most of the time.

S2: Ya it was different.

S7: I did aswell.

Interviewer: Did the rest of you enjoy it?

S1, S3, S5, S6: Ya.

S3: Suppose I did.

Interviewer: Ok so what did you like about peer tutoring?

S6: The 1st years were sound. I thought they would be more annoying than they were.

Interviewer: Right ok. Anything else?

S2: It was good to know that you were helping 1st years. My first year couldn't do any of the challenges but when I went through questions with her she was able to do them which was great.

Interviewer: Great, well done! Was there anything you disliked about it?

S3: Sometimes I found it boring, two classes of maths was sometimes too long.

S2: I hated having to set up the room beforehand.

S1: Oh ya, and the room was way too hot too.

S7: I had to open the partition every week. I was so bad for remembering to do it.

Interviewer: Did you like your tutee?

S1, S2, S4, S5: Yes.

S5: They were all very funny. They were really cute.

S1: I think my first year was good at maths already.

S2: Mine definitely wasn't, he really struggled.

S3: Well I didn't like my first year, he was too cheeky! It was hard to get him to do any work.

Interest

Interviewer: Did peer tutoring make maths fun?

S4: Yes, some parts. The questions had some interesting topics, like sports and music and stuff like that.

S3: Ya and I think everyone loved playing the games.

S2: We all got to do things that we wouldn't get to do in maths class. If only we got skittles in every maths class!

Interviewer: Do you like maths more after peer tutoring?

S1: A little bit.

S5: We are still doing boring stuff in our maths classes so that hasn't changed.

S2: I like maths more now that I know you can have some real fun with it.

Interviewer: What was your favourite activity?

S2: The board games were hilarious, everyone was so competitive playing them.

S4: It's got to be the skittles activity, delish!

Interviewer: What was your least favourite activity?

S3: Probably converting fractions decimals and percentages, I never like doing that. I hated having to fill out those tables.

S2: The task on simplifying equations was hard. Some of them were long.

Achievement

Interviewer: Do you think your maths ability has improved because of peer tutoring?

All: Yes

S1: I learned some basic stuff that I missed out on in the junior cycle.

S5: Ya me too.

S4: I don't ever remember being taught how to find percentages in your head without using a calculator before. I liked learning that.

S7: I knew all that stuff but it did refresh my memory I suppose.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S2: No. We are doing way harder maths now.

Interviewer: Anyone find maths easier in class now?

S3: No, I agree, what we are doing in class now is different. It's harder algebra.

Interviewer: Ok so. Do you think your tutee's maths ability improved because of peer tutoring?

S6: Yes he has to have. He was often not able to do the challenge but then we worked through the task questions he could answer them.

S2: Same.

Interviewer: Does anyone think their tutee's ability did not improve?

S3: No, mine learned loads.

Interviewer: Right, great! So do you think the test was easier the second time around?

S5: Was it the same test?

Interviewer: Yes.

S5: Oh, ok. It was easier the second time so I suppose.

S4: A bit easier the second time.

Interviewer: Finally so, would you recommend becoming a peer tutor to your friends?

S2: Yes, well depending on the person. Some of my friends would not be good at it as they would not be patient enough to work with the first years.

S6: If they have an interest in teaching then yes. It is good practice. I want to be a teacher and it proved to me that I am good at working with younger ones.

S3: No, not to some of the lads, they wouldn't have enough cop on to take it seriously.

Focus group 2

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6)

Peer tutoring

Interviewer: Did you enjoy peer tutoring?

S2, S3, S5, S6: Yes.

Interviewer: What about you two (S1, S4)?

S1: It wasn't really my thing.

S4: It was grand.

Interviewer: Right, so for those of you who liked it what did you like about it?

S5: I liked the buzz of it. There was a really good atmosphere in the room.

S6: Ya the first years were so funny, they came in so quiet on the first day and once they got to know us they came running in to the room and you couldn't shut them up.

Interviewer: So true! Anything else you liked about it?

S5: I liked being able to help my first year improve her maths. I think she finds maths really hard but she said I really helped her understand. That made me feel brilliant.

Interviewer: That's fantastic! So what were the things that you disliked about peer tutoring?

S1: I just didn't enjoy teaching at all. If there was ever a doubt in my mind I now know I am sure that I do not want to be a teacher. I just didn't enjoy trying to get my student to work through the questions. He was lovely though in fairness to him.

Interviewer: Fair enough! Anything else you didn't like?

S4: I didn't like the fact that the class teacher expected us all to take it so seriously. She got very cross if anyone was ever late.

Interviewer: Ok, so did you like your tutee?

S3: Yes, she was brill for filling me in on all the first year gossip.

S2: My first year was very funny. He was so enthusiastic.

S1: To be honest I found them all very funny. You could see that most of them loved coming to peer tutoring. They were such eager beavers.

S3: I often meet my first year on the corridor during break, we sometimes chat.

Interest

Interviewer: Very good. So did peer tutoring make maths fun?

S6: I liked the activities, like the board games and card matching activities, you don't do those things in your maths class.

S5: I agree. I think it is a novelty for first years getting to work with us. It wasn't boring.

S2: Ya all the games and working in pairs made it fun.

Interviewer: Perfect. Do you like maths more after peer tutoring?

S5: A bit. I can see how maths can be made fun now. Using games, whiteboards and stuff like that kept us all entertained.

S3: Same.

S1: Didn't make any difference to me.

Interviewer: What was your favourite activity?

S6: I loved the follow me cards. The way everyone was under pressure each time a question was called out was so funny. Everyone had to stay focused.

S3: That was funny alright. We didn't cop our card for ages!

S1: The skittles activity was good too.

Interviewer: What was your least favourite activity?

S4: I didn't like any of the algebra activities. I just don't like algebra.

S1: I hated working on the timetables and time. I confused myself when reading the train timetables.

Achievement

Interviewer: Do you think your maths ability has improved because of peer tutoring?

S3: Ya well I had forgotten some things since 3rd year and it made me revise them.

Interviewer: Did anyone learn anything new?

S5: I am gonna be honest, I couldn't make sense of train timetables before peer tutoring.

S4: I understand number patterns better now.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S2: Not really, we are doing way harder stuff in class at the moment.

S3: Ya we are doing cubic equations in maths now. Nothing we did in peer tutoring can help us with this.

Interviewer: Fair enough. Do you think your tutee's maths ability improved because of peer tutoring?

S6: Yes. They couldn't do the challenges at first but then could do harder questions afterwards.

S2: I agree. My first year told me I help a lot and they are doing way better in class now.

Interviewer: That is good. So did you find the test easier the second time around?

S3: Yes. The first time we did the test we had not done any of this stuff in a long time.

S1: Ya, the second test was easier as we revised all the stuff during peer tutoring.

Interviewer: Good. Now finally, would you recommend peer tutoring to your friends?

S2: Yes. You feel good after helping a younger student. Even if you are not good at maths the tutor handbook guides you through what to do so you don't have to worry about not being able to teach the first year properly.

S3: It is something different so I will tell my friends they should do it.

Focus group 3

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6)

Peer tutoring

Interviewer: Did you enjoy peer tutoring?

All: Yes.

Interviewer: Well tell me what did you like about peer tutoring?

S4: 'Twas a great experience being responsible for teaching someone else.

S3: I liked the sweets!

S2: Me too. Ah no, the first years were a laugh, I liked them, they are not half as nerdy as you think they are gonna be when you see them on the corridor.

Interviewer: I see. So was there anything you disliked about it?

S1: The weeks we spent going through the book was head wrecking.

S5: God ya, if teachers have to do that before all their classes then I really don't wanna be a teacher.

S2: Some of the tasks were good but some of them were hard to explain. I know I had the handbook and that helped but I'm not sure if I helped the 1st year. I think they were nearly better at maths than me.

Interviewer: I am sure that's not the case. Anything anyone else disliked about peer tutoring?

S1: After the 5th week, I started to get a little bored. I like the stuff we did but I just got sick of teaching.

Interviewer: Did you all like your 1st year student?

S6: Ya, mine was lovely. He was very quiet though. I think he is just very shy.

S2: My 1st year girl was lovely, so nice. She actually lives in the same estate as me and I never even saw her before.

S4: My 1st year was very bad at maths, she really needed help. I do think I helped her.

Interest

Interviewer: Good! So do you think that peer tutoring made maths fun?

S5: Ya in fairness some of the tasks and activities were good. The board games and the card games were fun.

S6: Ya I liked them too and I also liked some of the questions in the book. It was good the way it had pictures of celebrities and things like that.

S2: Especially the pictures of Channing Tatum!!

Interviewer: Do you like maths more after peer tutoring?

S1: Well I suppose that peer tutoring proved to me that maths can be fun. But it can be boring too. What we are doing in maths at the minute is not at all interesting. If it was games and stuff like peer tutoring all the time then I would like maths more.

S2: Well it made me think I'd like to teach maths. I've always been good at maths but still found it boring. But I see that it can be made fun now as well.

S3: Well I wouldn't want to teach it but I suppose it did make maths a bit more fun. I think the 1st years liked it.

Interviewer: Good, so what was your least favourite activity?

S6: I didn't like the algebra game.

Interviewer: Why?

S6: Well we didn't realise it was our card for ages. It was embarrassing. Stressful!

S1: I didn't like the prime numbers board game. I found it really hard. So did my 1st year.

Achievement

Interviewer: Do you think your maths ability has improved because of peer tutoring?

S4: There was definitely some things that It helped me understand. Some basic stuff that I don't remember doing before now.

S3: It helped me revise some stuff that I had forgotten.

S2: Having to explain stuff made me understand it a bit better. You have to think about things more when you have to explain it to someone else.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S6: Not really no. We are doing harder stuff.

S1: Ya it all algebra we are doing in class at the minute. Way harder than this suff.

Interviewer: Do you think your tutee's maths ability improved because of peer tutoring?

S2: Yes. They said they found the test easier the second time they did it.

S1: Ya and my 1st year wasn't able to do any of the challenge questions but could do the other questions when I went through it with him.

S5: Same as.

Interviewer: Was the test easier the second time around?

S2: It was easy both times.

S5: Ya it was easy both times but I'd say I might have made on or two small mistakes in the first one.

S3: Both were easy.

Interviewer: Last question so lads, would you recommend peer tutoring to your friends?

S4: Ya I enjoyed it. It was done in a good way. If you are good at maths it would be good for you to do.

S3: Ya if you are good at maths and good at English as you need to be able to explain things well.

S2: It's a good experience for any TY to do. But you have to take it serious. It's not for students who mess.

S1: Ya they wouldn't be good with the 1st years.

Focus group 4

1 interviewer and 6 students (S1, S2, S3, S4, S5, S6, S7)

Peer tutoring

Interviewer: Did you enjoy peer tutoring?

S7: Yes. It was good to be able to switch roles and be a teacher for a while.

S2: Ya it was something different I suppose.

Interviewer: And the rest of you? Did you like it?

S3: Ya I liked some things about it but not others.

Interviewer: What did you like about peer tutoring?

S3: I liked the 1st years, they were funny. A load of them started following me on Instagram after it.

Interviewer: Was there anything else you liked about peer tutoring.

S4: I liked some of the activities, you know like the board games and the card games. We had a bit of a laugh with them. The first years seemed to like them too.

S5: I liked the way the book had challenges. It was good they didn't have to do all of the questions if they knew how to do it.

S7: It made me think I am good at maths. I would never had said I was good at maths before but I was good at this.

Interviewer: Good, so was there anything you disliked about peer tutoring?

S5: I didn't like how long it took us to go through the booklet at the start.

S2: Ya that was a bit painful, I know we had to do it though but it took so long. We should have been allowed bring the books home and go through it ourselves.

Interviewer: Ok, so did you like your tutee?

S7: I loved mine, he was hilarious. He used to ask me random questions like all the time in the middle of the work we were doing.

S4: My 1st year was really quiet. Very shy I'd say. We didn't really talk about anything other than the work we were doing.

S1: Ah they were all nice in fairness, it was good to help them.

Interest

Interviewer: Did peer tutoring make maths fun?

S5: Well there was definitely some good banter in the room over the few weeks. It was a nice two classes after lunch.

S7: Well it wasn't like maths class so it was different. The games made it fun. It was still doing maths though.

S6: The 1st years did have fun.

Interviewer: Do you like maths more after doing peer tutoring?

S6: No. Well it didn't change what we are doing in class. But I suppose I can see that maths can be made fun. Lots of the activities in peer tutoring were fun.

S2: I like maths more now. I think we should do more games and group work in class and then everyone might like it more.

Interviewer: What about everyone else?

S1: I always liked maths anyway but I did think this was fun. It was a different way of learning.

Interviewer: That's good. So what was your favourite activity?

S3: The one where we got the skittles. That was the probability one I think. Any activity that you get food in is good.

S1: I really liked that one too. And the board games, they were good.

S2: A lot of the activities were good. The card ones and even some of the ones in the book were good.

Interviewer: What was your least favourite activity?

S7: I didn't like the loop card thing. I felt thick cause we missed our go both times and everyone was laughing at us.

S4: That was hard alright. You had to keep listening or you could easily miss your go.

S2: I didn't like some of the algebra ones, I thought they were hard. Or the question on the chairs and tables.

Achievement

Interviewer: Do you think your maths ability has improved because of peer tutoring?

S4: We had done all that stuff before but I had forgotten it. I never could remember what a prime number was before though, after doing the game on it I don't think I'll forget it again.

S2: Ya all that stuff was work we did for the junior cert. It helped me revise it though. All we have done in maths this year is algebra and a bit of statistics.

S3: I didn't know the fast way of finding percentages before so I learned that.

Interviewer: Do you find maths easier in class now that you have done peer tutoring?

S7: It doesn't make any difference now as we are doing algebra that is way harder.

S6: It might help for stuff we do later on.

Interviewer: Do you think your tutee's maths ability improved because of peer tutoring?

S7: Oh ya. My 1st year wasn't able to do the challenges at all. But they finished the task questions afterwards and I think they understood it.

S2: Mine too.

S5: I dunno if I did a great job but I did try. They must have learned something from it. She did the questions when I helped her.

S3: My 1st year said that he learned maths in peer tutoring.

Interviewer: Super. So did you find the test easier the second time around?

S2: A little bit. There were some things I might have forgotten in the first test cause I hadn't done them in ages.

S1: I think I got most of it right the first time anyway.

S3: Ya but I still probably did a bit better in the second test. They were both easy enough though.

Interviewer: Would you recommend peer tutoring to your friends?

S2: Ya I would anyway. You get to see if you are suited to teaching so it's kinda like work experience.

S6: I would too, it would be better if it was shorter though.

S3: Ya but I don't think all my friends would like it. Some would only be messing.

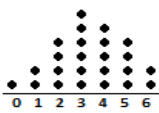
S4: If you have an interest in working with younger people it would be a good idea to do it.

Interviewer: Great, so anyone have anything else to add to this, or any other comments?

S2: Ah, nope.

Appendix H: Academic Test Marking Scheme

SECTION A: CONCEPTS & SKILLS:

| QUESTION 1: Probability | |
|---|--|
| Answer: | Marks: |
| (a) 1,2,3,4,5,6 | 2 marks |
| (b) 12 | 2 marks |
| Total Marks: | 4 Marks |
| QUESTION 2: Statistics | |
| Answer: | Marks: |
| (a) categorical, numerical, categorical, numerical, categorical | 5 correct – 2 marks 3 or more – 1 mark |
| (b) Tally – IIII, IIII, IIII, IIII Frequency – 10, 8, 5, 1 | 3 out of 4 – 1 mark 3 out of 4 – 1 mark |
| (c)  | 2 marks 1 mark (1 error) |
| (d) (i) 0 (ii) 9 (iii) 36 | 3 correct – 2 marks 2 correct – 1 mark |
| Total Marks: | 8 Marks |
| QUESTION 3: Synthetic Geometry | |
| Answer: | Marks: |
| (a) (i) 10.1cm ± 0.1cm (ii) 78mm ± 1mm | 1 mark 1 mark |
| (b) (i) Circle vertical line (ii) Circle horizontal line | 1 mark 1 mark |
| (c) Angle A = 50° Reason = Opposite angles are equal | 1 mark 1 mark |
| (d) (i) A = 95, B = 50 (ii) 3 angles in triangle add up to 180, isosceles triangle the base angles are the same | 1 mark 1 mark |
| (e) N = (6, 5), E = (-3, 2), W = (-3, 0), S = (-2, -3), A = (3, -6) | 5 correct - 2 marks 4 correct - 1 mark |
| Total Marks: | 10 Marks |

| QUESTION 4: Number | |
|--|---|
| Answer: | Marks: |
| (a) 13, 17, 9, 3 | 4 correct - 2 marks 2 correct - 1 mark |
| (b) (i) €12 (ii) 66kg | 1 mark 1 mark |
| (c) (i) $\frac{4}{5}$, 0.8 (ii) 25%, 0.25 | 1 mark 1 mark |
| (d) 49, 51, 53, 55, 57, 59 | 6 correct - 2 marks 5 correct - 1 mark |
| (e) (i) 6, 12, 18, 24, 30 (and 36) (ii) 4, 8, 12, 16, 20 (and 24) (iii) 12 | 1 mark between them - allow for one error 1 mark |
| (f) (i) 1, 2, 4, 8, 16 (ii) 1, 2, 3, 4, 6 (iii) 8 | 1 mark between them - allow for one error 1 mark |
| (g) Reason – It is divisible by more than itself and one | 2 marks |
| (h) (i) B = {O, E, A} (ii) A = {Tues, Thurs} (iii) No | 1 mark between (i) and (ii) 1 mark |
| Total Marks: | 16 Marks |
| QUESTION 5: Algebra | |
| Answer: | Marks: |
| (a) (i) 8, 14, 16, 20 (ii) 28, 42, 63, 70 | 1 mark 1 mark |
| (b) 4 is added on each time/goes up in 4's | 2 marks |
| (c) $2(1) + 1(2) = 4$ | 1 mark 1 mark |
| (d) $3((-2) + 4) = 6$ | 1 mark 1 mark |
| (e) (i) $9x + 3y - 5$ (ii) $5x^2 + 9x - 12$ (iii) $6x + 3 + 5x + 10 + 711x + 20$ | 1 mark 1 mark 1 mark 1 mark |
| (f) $x^2 + 3x + 2$ | 2 marks |
| (g) $x = 2$ | 2 marks |
| Total Marks: | 16 Marks |

SECTION B: CONTEXTS & APPLICATIONS:

QUESTION 1: Probability

| Answer: | Marks: |
|---|---|
| (a) (i) W,N,M,B,5,9 (ii) W,N,M,B (iii) 4,4,3,6,8,7 (iv) No outcomes/0 (v) 4,4,6,8 | 3 or more correct - 1 mark 5 correct - 2 marks |
| (b) (i) $\frac{6}{10}$ or $\frac{3}{5}$ or 0.6 AND $\frac{4}{10}$ or $\frac{2}{5}$ or 0.4 (ii) 0.4 and 0.6 marked on scale | 1 mark 1 mark |
| Total Marks: | 4 Marks |

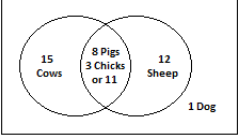
QUESTION 2: Statistics

| Answer: | Marks: |
|---|--|
| (a) (i) Types of jumpers/ shirts/pants/ties (ii) Colours of jumpers shirts/pants/ties | 1 example - 1 mark 2 examples - 2 marks |
| (b) Which sport do you find more exciting? Soccer <input type="checkbox"/> Rugby <input type="checkbox"/> or Other <input type="checkbox"/> (or similar) | 2 marks |
| (c) Graph -Bar Chart/ Stem and Leaf/ Lineplot Any valid reason (Easily read.. etc) | 1 mark 1 mark |
| Total Marks: | 6 Marks |

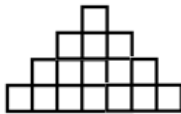
QUESTION 3: Synthetic Geometry

| Answer: | Marks: |
|--|------------------|
| (a) (i) Parallel (ii) Perpendicular | 1 mark 1 mark |
| (b) (i) [G,U] or [E,W] or [I,A] or [N,R] or [D,O] (ii) [S,R] or [C,I] or [E,G] or [D,U] or [T,A] | 1 mark 1 mark |
| Total Marks: | 4 Marks |

QUESTION 4: The Number

| Answer: | Marks: |
|--|-----------------------------|
| (a) 6500 | 2 marks |
| (b) 27m | 2 marks |
| (c) $10\% = 35$ $350 - 35 = €315$ | 1 mark 1 mark |
| (d) $\frac{2}{3} = 66.6\%$ | 1 mark 2 marks |
| (e) 30% 12 | 1 mark 2 marks |
| (f)  | 2 marks 1 error - 1 mark |
| (g) (i) A union B / in A or B (ii) A complement / everything outside of A | 1 mark 1 mark |
| Total Marks: | 14 Marks |

QUESTION 5: Algebra

| Answer: | Marks: | | | | | | | | | | | | | | | |
|---|-------------------|---|----|---|---|---|---|---|---|---|---|----|----|----|-----|--------|
| <p>(a)(i)</p>  | 1 mark | | | | | | | | | | | | | | | |
| <p>(ii)</p> <table border="1" data-bbox="952 1460 1131 1554"><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>1</td><td>3</td><td>5</td><td>7</td></tr><tr><td>1</td><td>4</td><td>9</td><td>16</td></tr></table> → <table border="1" data-bbox="1184 1460 1248 1554"><tr><td>10</td></tr><tr><td>19</td></tr><tr><td>100</td></tr></table> | 1 | 2 | 3 | 4 | 1 | 3 | 5 | 7 | 1 | 4 | 9 | 16 | 10 | 19 | 100 | 1 mark |
| 1 | 2 | 3 | 4 | | | | | | | | | | | | | |
| 1 | 3 | 5 | 7 | | | | | | | | | | | | | |
| 1 | 4 | 9 | 16 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | |
| 100 | | | | | | | | | | | | | | | | |
| <p>(b)</p> <p>15, 18, 21, 24, 27 or 18, 21, 24, 27, 30</p> | 2 marks 1 mark | | | | | | | | | | | | | | | |
| <p>(c) $x = 6$</p> | 2 marks | | | | | | | | | | | | | | | |
| <p>(d) $x = 12$</p> | 2 marks | | | | | | | | | | | | | | | |
| <p>(e) $2x - 2 = x + 2$ $x = 4$</p> | 1 mark 1 mark | | | | | | | | | | | | | | | |
| Total Marks: | 10 Marks | | | | | | | | | | | | | | | |

Appendix I: Principal Information Sheet



Principal Information

Title of Project:

Developing Strategies to Improve Interest and Achievement In Numeracy Among Post Primary Students: A Case Study

The Study:

This project aims to improve basic Numeracy skills of students and improve their interest towards Numeracy.

Their basic numeracy skills and deficits will be made apparent from our Numeracy Profiling Test.

Their attitude towards Numeracy will be established through a questionnaire and interview.

Peer tutoring and a Numeracy resource pack will be the strategies used to attempt to improve students interest and achievement in Numeracy.

Post intervention analysis will take place. The qualitative and quantitative data collected will be analysed using NVivo and SPSS.to see will the strategies implemented improve students' interest and attainment in Numeracy.

Participation Information:

Students may participate in the following should they wish to take part in the study:

- Complete a questionnaire.
- Interview
- Numeracy Profiling Test

There are no risks involved in this study. All information gathered will remain confidential and used only for the purpose of this study. No information re. subjects will be identified in the final report. It will be stored safely with access only available to the investigator.

The participants are under no obligation to participate in this study. Should you/they have any questions or do not understand something just ask the investigator to clarify the issue.

Contact Details:

Eileen Flanagan
Mercy Secondary School Mounthawk
Tralee,
Co. Kerry

Dr. Niamh O' Meara (Principal Investigator)
Lecturer in Education (Mathematics Education)
NCE-MSTL
University of Limerick

If you have concerns about this study and wish to contact someone independent, you may contact

*Dr. Thomas Waldmann,
Chairman,
Faculty of Science & Engineering Research Ethics Committee,
Department of Design and Manufacturing Engineering,
University of Limerick,
Tel: 061 – 202802.*

Appendix J: Principal Consent Form



Principal Consent

Title of Project.

Developing Strategies to Improve Interest and Achievement In Numeracy Among Post Primary Students: A Case Study

Your students are under **no** obligation to participate in this study. If you agree to allow them to participate, but at a later stage feel the need to withdraw them, you are free to do so. It will not affect you in any way.

Please answer all of the following (tick the appropriate box).

Yes **No**

I have read and understood the subject information sheet.

☐ ☐

I understand what the project is about, and what the results will be used for.

☐ ☐

I know that participation is voluntary and that subjects can withdraw from the project at any stage without giving any reason.

☐ ☐

I am aware that results will be kept confidential.

☐ ☐

I agree to participate in the above study

Signature of Participant

Date

Signature of Investigator

Date

Appendix K: Student Information Sheet



Student Information

Title of Project:

Developing Strategies to Improve Interest and Achievement In Mathematics Among Post Primary Students: A Case Study

The Study:

This project aims to improve basic Numeracy skills of students and improve their interest towards Numeracy.

Their basic numeracy skills and deficits will be made apparent from our Numeracy Profiling Test.

Their attitude towards Numeracy will be established through a questionnaire and interview.

Peer tutoring and a Numeracy resource pack will be the strategies used to attempt to improve students' interest and attainment in Numeracy.

Post intervention analysis will take place. The qualitative and quantitative data collected will be analysed using NVivo and SPSS to see will the strategies implemented improve students' interest and attainment in Numeracy.

Participation Information:

You may participate in one or both of the following should you wish to take part in the study:

- Complete a questionnaire.
- Interview
- Numeracy Profiling Test

There are no risks involved in this study. All information gathered will remain confidential and used only for the purpose of this study. No information re. Subjects will be identified in the final report. It will be stored safely with access only available to the investigator.

You are under no obligation to participate in this study. Should you have any questions or do not understand something just ask the investigator to clarify the issue.

Contact Details:

Eileen Flanagan
Mercy Secondary School Mounthawk
Tralee
Co. Kerry

Dr. Niamh O' Meara (Principal Investigator)
Lecturer in Education (Mathematics Education)
NCE-MSTL
University of Limerick

If you have concerns about this study and wish to contact someone independent, you may contact

*Dr. Thomas Waldmann,
Chairman,
Faculty of Science & Engineering Research Ethics Committee,
Department of Design and Manufacturing Engineering,
University of Limerick.
Tel. 061 – 202802.*

Appendix L: Student Consent Form



Consent Form

Title of Project.

Developing Strategies to Improve Interest and Achievement in Numeracy Among Post Primary Students: A Case Study

Your child is under no obligation to participate in this study. If they agree to participate, but at a later stage feel the need to withdraw, they are free to do so. It will not affect them in any way.

Please answer all of the following (tick the appropriate box).

Yes

No

I have read and understood the subject information sheet.

☐☐

I understand what the project is about, and what the results will be used for.

☐☐

I know that my child's participation is voluntary and that they can withdraw from the project at any stage without giving any reason.

☐☐

I am aware that my child's results will be kept confidential.

☐☐

I agree to participate in the above study

Signature of Participant

Date

Signature of Investigator

Date

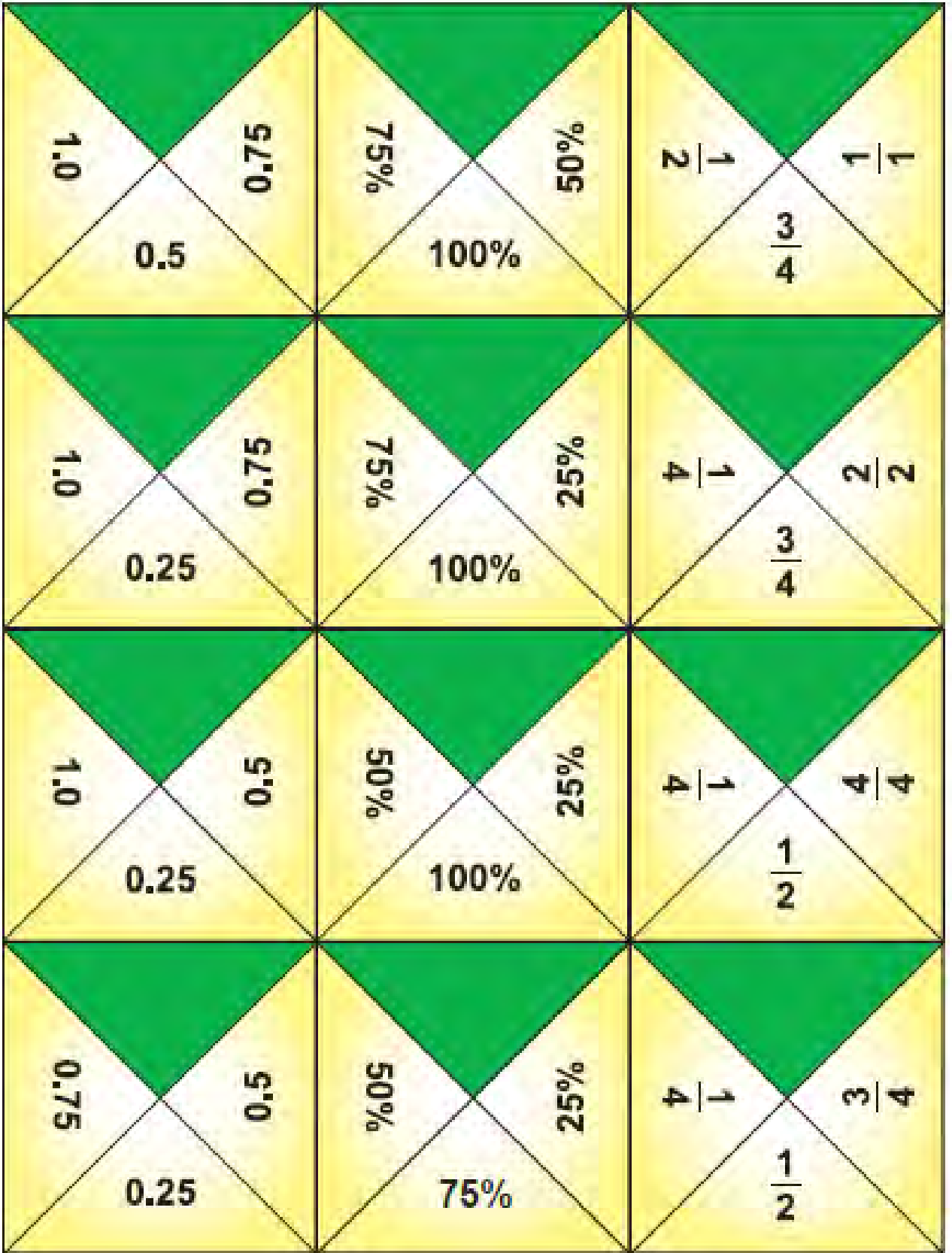
Signature of Parent/Guardian

Date

*Appendix M: Who wants to be a
Millionaire? PowerPoint*

See PowerPoint File Attached.

Appendix N: Equivalent Dominoes



Appendix O: Loop Cards

I am:

$$2x + y$$

Who is:

2y more than this?

I am:

$$2x + 3y$$

Who is:

4x more than this?

I am:

$$6x + 3y$$

Who is:

3y less than this?

I am:

$$6x$$

Who is:

2 times this?

I am:

$$12x$$

Who is:

5x less than this?

I am:

$$7x$$

Who is:

2y more than this?

I am:

$$7x + 2y$$

Who is:

5y more than this?

I am:

$$7x + 7y$$

Who is:

this divided by 7?

I am:

$$x + y$$

Who is:

2x more than this?

I am:

$$3x + y$$

Who is:

3 times this?

I am:

$$9x + 3y$$

Who is:

5x less than this?

I am:

$$4x + 3y$$

Who is:

2z more than this?

I am:

$$4x + 3y + 2z$$

Who is:

$2x + 2y$ more
than this?

I am:

$$6x + 5y + 2z$$

Who is:

$3x$ less than this?

I am:

$$3x + 5y + 2z$$

Who is:

$2x + y$ more than
this?

I am:

$$5x + 6y + 2z$$

Who is:

$5x$ less than this?

I am:

$$6y + 2z$$

Who is:

2 times this?

I am:

$$12y + 4z$$

Who is:

$5y$ less than this?

I am:

$$7y + 4z$$

Who is:

$y + z$ more than
this?

I am:

$$8y + 5z$$

Who is:

$3z$ less than this?

I am:

$$8y + 2z$$

Who is:

this divided by 2?

I am:

$$4y + z$$

Who is:

$3z$ less than this?

I am:

$$4y - 2z$$

Who is:

$x + y$ more than
this?

I am:

$$x + 5y - 2z$$

Who is:

$5y$ less than this?

I am:

$$x - 2z$$

Who is:

2 times this?

I am:

$$2x - 4z$$

Who is:

5z more than
this?

I am:

$$2x + z$$

Who is:

z less than this?

I am:

$$2x$$

Who is:

5 times this?

I am:

$$10x$$

Who is:

2x less and 4y
more than this?

I am:

$$8x + 4y$$

Who is:

this divided by
4?

