

Problem Solving

Problem solving means engaging in a task for which the solution is not immediately obvious. Problem solving is integral to mathematical learning. In day-to-day life and in the workplace the ability to problem solve is a highly advantageous skill.

In the mathematics classroom problem solving should not be met in isolation, but should permeate all aspects of the teaching and learning experience.

Problems may concern purely mathematical matters or some applied context.

In a mathematics problem-solving environment it is recognised that there are three things learners need to do:

- make sense of the problem
- make sense of the mathematics they can learn and use when doing the problem
- arrive at a correct solution to the problem.

However, in the mathematics classroom, the focus is on the mathematical knowledge and skills that can be learned in the process of obtaining an answer, rather than on the answer itself. The emphasis, therefore, is on generating discussion and on the reasoning and sense-making opportunities the problem affords the learners as they engage with the mathematics involved. They learn to analyse the problem and break it down into manageable steps, to reflect on their strategies and those of others and to adjust their own approaches where necessary.

Teachers play an important role in helping students develop these kinds of skills. By encouraging learners to share, explain and justify their solution strategies, those that work as well as those that don't work, teachers can help learners to develop robust and deep mathematical understanding as well as confidence in their mathematical ability.

The quality of the tasks that learners engage with play an important role in a problem-solving environment. A task must engage learners and present them with a challenge that requires exploration. Problem-solving tasks activate creative mathematical thinking processes as opposed to imitative thinking processes activated by routine tasks. Reasoning mathematically about tasks empowers learners to make connections within mathematics and to develop deep conceptual understanding