

# Working mathematically: Learning to work like a mathematician

First give me an interesting problem.

When mathematicians become interested in a problem they:

- Play with the problem to collect and organise data about it
- Discuss and record notes and diagrams
- Seek and see patterns or connections in the organised data
- Make and test hypotheses based on the patterns or connections
- Look in their strategy toolbox for problem solving strategies which could help
- Look in their skill toolbox for mathematical skills which could help
- Check their answer and think about what else they can learn from it
- Publish their results

Questions which help mathematicians learn more are:

- Can I check this another way?
- What happens if...?
- How many solutions are there?
- How will I know when I have found them all?

When mathematicians have a problem they:

- Read and understand the problem
- Plan a strategy to start the problem
- Carry out their plan
- Check the result

A mathematician's strategy toolbox includes:

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| <ul style="list-style-type: none"> <li>• Do I know a similar problem?</li> <li>• Guess, check and improve</li> <li>• Try a simpler problem</li> <li>• Write an equation</li> <li>• Make a list or table</li> <li>• Work backwards</li> <li>• Break the problem into smaller parts</li> </ul> | <ul style="list-style-type: none"> <li>• Act it out</li> <li>• Draw a picture or graph</li> <li>• Make a model</li> <li>• Look for a pattern</li> <li>• Try all possibilities</li> <li>• Seek an exception</li> <li>• ...</li> </ul> |
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If one way does not work, I just start again another way.