Mathematical Problem Solving
AS/A Level example

Example 15

At the start of the course, the class are practising their skills with manipulating surds. As part of the exercise, the problem below is used.

Use and manipulate surds, including rationalising the denominator

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Without using a calculator, show that

$$\sqrt{3} - \sqrt{2} = \sqrt{5 - 2\sqrt{6}}$$

Find better ways to write

(i) $\sqrt{12 - 2\sqrt{35}}$

(ii) $\sqrt{13 + 2\sqrt{42}}$

(iii) $\sqrt{21 + 6\sqrt{10}}$

The students should be in no doubt that the problem will include some of the skills they have covered for manipulating surds.

The procedures from this guide can be applied:

- A question and answer session
  - How do we show the two expressions are equal?
  - How can we use what we've got in the initial problem to simplify the others?

- Engagement with the problem
  - The students try to work it out

- Student review
  - A check to see how and what they are doing
  - What is different about (iii)? How can we adapt our method?

- Reflection
  - ♦ A summary of the best approach