Factorisable quadratics

Teacher notes

Why use this resource?

Students are asked to think how many ways they can factorise quadratics such as $x^2 + bx + 10$ and $x^2 + 6x + c$. This can help them to develop a better understanding of the effect that the coefficients have on the factorised form as well as building up fluency with factorisation.

Possible approach

You could start with question 1(a) and ask students to find an appropriate b and the corresponding factorisation. Different students may come up with different examples, which could be shared and discussed. Alternatively, ask all students to find "another factorisation, and another...". This may prompt students to recognise how much flexibility the constant term gives them. Encourage students to compare the different parts of the question as well as working through the parts separately. Students may start to anticipate how the choice of coefficients could affect the factorised form, though they may also be surprised by the answers to the latter parts of the question.

Question 2 could be introduced in a similar way, or students could find their own way into the problem. Again, encourage them to compare the different parts of the question.

Key questions

- How much does the constant term tell you about the coefficient of x? How much does the coefficient of x tell you about the constant?
- What causes the different behaviour between questions 2 and 3?
- Choose two parts of question 1. Which will have more factorisations?

Possible support

The grid method illustrated in Quadratic grids could help students to start thinking about possibilities for factors of the constant term and how these choices affect b.

Possible extension

The generalisation part of the problem is significantly more stretching, and can lead into factorisation and number theory if this is desired.

A version of this resource has been featured on the NRICH website. You might like to look at some students' solutions that have been submitted there.