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tinyurl.com/makequadratics

Understanding quadratics, by working backwards

Finding quadratic expressions that satisfy a given constraint leads to useful exploration of factorisation, suggests **Colin Foster**

Quadratic expressions are considerably more complicated to work with than linear expressions, and students often find them hard to handle. Students may carry out factorising of quadratics by applying poorly-understood procedures that make little mathematical sense to them, and this can be especially so when it comes to non-monic quadratics (those where the coefficient of $x2$ is not 1). In this lesson, students approach factorising non-monic quadratics by trying to find factorisations which will expand and simplify to produce a quadratic expression of a specified form. This entails lots of useful practice at expanding pairs of brackets and collecting like terms, and also gives opportunity for students to unpick what is going on, so as to gain insight into how the inverse process of factorising works. By working backwards in this way to obtain the necessary factors, students build a deeper understanding of factorising quadratics.

WHY TEACH THIS?

+ Quadratic expressions are considerably more complicated to work with than linear expressions, and students often find them hard;
+ Students may sometimes factorise quadratics by applying poorly-understood procedures that make little mathematical sense to them;
+ This lesson unpicks the process of expanding and factorising quadratic expressions so that students see how it works.

ABOUT THE AUTHOR
Colin Foster is an assistant professor in mathematics education in the School of Education at the University of Nottingham. He has written many books and articles for mathematics teachers, including his latest, *Questions Pupils Ask* – available at members.m-a.org.uk/Shop/product/1114 (www.foster77.co.uk).

SNEAK PEEK

LOOK AT THIS QUADRATIC EXPRESSION, IN WHICH THE CONSTANT TERM IS MISSING:

$$6x^2 + 7x + \square$$

Can you make the expression factorisable by putting an integer in the box? How many possible solutions are there?

By working backwards, students build a deeper understanding of factorising non-monic quadratics