

Factorising harder quadratics: which step breaks?

ANSWERS

Name _____

These follow one question, Factorise fully $12x^2 + 10x - 8$, through the steps in order: common factor first, the first number times the last, the two numbers, split the middle term, the headings, the answer, then check by expanding.

- 1 Take out the biggest common factor of $12x^2 + 10x - 8$
STEP 1: COMMON FACTOR FIRST · FIX IT CARD 1

$$2(6x^2 + 5x - 4)$$

- 2 Factorise $6x^2 + 5x - 4$
Work out the first number times the last.
STEP 2: FIRST NUMBER TIMES THE LAST · FIX IT CARD 2

$$-24$$

- 3 Find two numbers that multiply to make -24 and add to make 5.
STEP 3: FIND THE TWO NUMBERS · FIX IT CARD 3

$$8 \text{ and } -3$$

- 4 Split the middle term of $6x^2 + 5x - 4$ in the grid.
The numbers are 8 and -3 .
STEP 4: SPLIT THE MIDDLE TERM · FIX IT CARD 4

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$6x^2$	
	-4

$$+8x \text{ and } -3x$$

- 5 Find the headings of the grid for $6x^2 + 5x - 4$.
STEP 5: FIND THE HEADINGS · FIX IT CARD 5

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$6x^2$	$+8x$
$-3x$	-4

$$2x, -1 \text{ down}; 3x, +4 \text{ across}$$

- 6 $12x^2 + 10x - 8 = 2(6x^2 + 5x - 4)$. The headings are $2x, -1$ down and $3x, +4$ across.
Factorise $12x^2 + 10x - 8$ fully.
STEP 6: WRITE THE ANSWER · FIX IT CARD 6

$$2(2x - 1)(3x + 4)$$

- 7 Expand $2(2x - 1)(3x + 4)$ to check it.
What do you get?
STEP 7: CHECK BY EXPANDING · FIX IT CARD 7

$$12x^2 + 10x - 8$$

The first question wrong is the step that breaks. Give that student the card it names.

The Maths Habit