



Factorising quadratics

About 50 minutes No calculator 43 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] **A2** From chapter 8 [2 marks]
Expand and simplify $(2x - 9)(4x + 9)$. Simplify $\frac{(2x^2)^3 \times 3x}{4x^3}$.

Answer

Answer

- A3** Key Stage 3 [2 marks] **A4** Key Stage 3 [2 marks]
Solve $\frac{7x-9}{6} = x - 1$. $x^2 = 100$ and $y^3 = 64$. Find the smallest possible value of $x + y$.

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Factorise $x^2 - x - 56$.**Hint** Two numbers that multiply to -56 and add to -1 . One of them is negative.

- B1** Factorise $x^2 + 6x - 40$. [2 marks]

Answer

EXAMPLE 2

Factorise $3x^2 - x - 10$.**Hint** Multiply $3 \times (-10) = -30$. Find two numbers that multiply to -30 and add to -1 , then split the middle term.

- B2** Factorise $2x^2 - 3x - 20$. [2 marks]

Answer

C Practice

C1 Factorise $x^2 - 18x + 77$. [2 marks] **C2** Solve $x^2 - 6x - 55 = 0$ by factorising. [2 marks]

Answer

Answer $x = \dots$ or $x = \dots$

C3 Factorise fully $5x^2 - 20x - 60$. [2 marks] **C4** Factorise $9x^2 - 49$. [2 marks]

Answer

C5 Factorise $16a^2 - 81b^2$. [2 marks] **C6** Factorise $x^2 + 5xy - 24y^2$. [2 marks]

Answer

C7 $x^2 + bx + 18$ factorises into two brackets with whole numbers in them. b is a positive whole number. Write down every possible value of b . [2 marks]

Answer

D Exam-style questions

D1 Ana says, " $x^2 + 9x - 36 = (x - 12)(x + 3)$." [2 marks]

Show that Ana is wrong, and write the correct factorisation.

D2 n is a whole number.

(a) Factorise $n^2 - 36$. [1 mark]

Answer

(b) n is greater than 7. Explain why $n^2 - 36$ is never a prime number. [2 marks]

(c) Use your answer to part (a) to work out $106^2 - 36$ without a calculator. [2 marks]

Answer

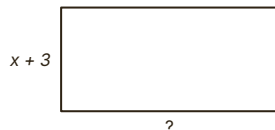
Total for D2: 5 marks

D3 Factorise fully $6x^2 + 3x - 45$.

[3 marks]

Answer

D4 A rectangle has an area of $(x^2 + 12x + 27)$ cm². One side is $(x + 3)$ cm long. The diagram is not drawn accurately.



(a) Find an expression for the length of the other side.

[2 marks]

Answer

(b) The perimeter of the rectangle is 44 cm. Work out the area of the rectangle.

[2 marks]

Answer

Total for D4: 4 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

E1 Factorise fully $x^4 - 29x^2 + 100$.

[3 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Treat x^2 as a single letter, y .
- Hint 2** $y^2 - 29y + 100 = (y - 4)(y - 25)$, so the expression is $(x^2 - 4)(x^2 - 25)$.
- Hint 3** Each bracket is a difference of two squares:
 $x^2 - 4 = (x + 2)(x - 2)$ and $x^2 - 25 = (x + 5)(x - 5)$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can factorise $x^2 + bx + c$, reading the signs first.



I can factorise a difference of two squares, with one letter or two.



I can factorise $ax^2 + bx + c$ by splitting the middle term.

