



Expanding brackets and squares

About 50 minutes No calculator 46 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** Last lesson [2 marks]
Expand $5xy(6x + 4y)$. Factorise fully $6x^2y - 12xy^2$.

Answer

Answer

- A3** From chapter 3 [2 marks] **A4** From chapter 6 [2 marks]
The mean point of some data is (20, 98). A line of best fit passes through the mean point and has gradient 4. Find the equation of the line.
A map has a scale of 1 : 250000. A forest covers 11 cm^2 on the map. Work out the real area of the forest in km^2 .

Answer

Answer

B Example, then your turn

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

EXAMPLE 1

Expand and simplify $(x + 6)(x - 9)$.**Hint** There are four products. Watch the sign of each one.

- B1** Expand and simplify [2 marks]
 $(x - 4)(x + 11)$.

Answer

EXAMPLE 2

Expand and simplify $(3x - 5)^2$.**Hint** Write it as $(3x - 5)(3x - 5)$. A square has a middle term.

- B2** Expand and simplify $(2x + 7)^2$. [2 marks]

Answer

C Practice

C1 Expand and simplify [2 marks]
 $(2x + 3)(x - 5)$.

Answer

C2 Expand and simplify [3 marks]
 $(x + 3)(x + 1)(x - 2)$.

Answer

C3 $(x + a)^2 = x^2 + 18x + b$ for every [2 marks]
value of x . Work out a and b .

Answer $a = \dots\dots$ $b = \dots\dots$

C4 Expand and simplify [2 marks]
 $(5x - 4)(5x + 4)$.

Answer

C5 Expand and simplify [2 marks]
 $(3x - 2y)(x + 4y)$.

Answer

C6 Expand and simplify [3 marks]
 $(x + 3)(x - 5) - (x - 2)^2$.

Answer

C7 Expand and simplify $(x - 3)^3$. [3 marks]

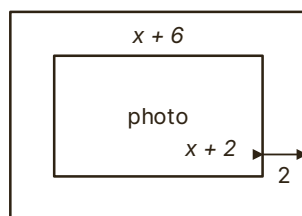
Answer

D Exam-style questions

D1 Leo says, " $(x - 5)^2 = x^2 + 25$." [2 marks]

Explain why Leo is wrong, and expand $(x - 5)^2$ correctly.

D2 A photo is $(x + 6)$ cm wide and $(x + 2)$ cm high. It sits in a frame that is 2 cm wide all the way round. The diagram is not drawn accurately; lengths are in cm.



(a) Show that the area of the frame alone is $(8x + 48)$ cm². [4 marks]

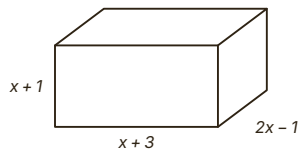
(b) The frame has an area of 104 cm^2 . Work out the value of x .

[2 marks]

Answer

Total for D2: 6 marks

- D3** A cuboid measures $(x + 3)$ cm by $(x + 1)$ cm by $(2x - 1)$ cm. The diagram is not drawn accurately. Show that its volume is $(2x^3 + 7x^2 + 2x - 3) \text{ cm}^3$. [3 marks]



- D4** n is a whole number. Show that $(n + 7)^2 - (n - 1)^2$ is always a multiple of 16. [3 marks]

E Extension

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

- E1** When $(x + 2)(x + k)(x - 3)$ is expanded, the coefficient of x is -13 . Work out the value of k . [3 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Expand two of the brackets first.
Hint 2 $(x + 2)(x - 3) = x^2 - x - 6$.
Hint 3 Multiply by $(x + k)$. The x terms are $-kx - 6x$, so $-k - 6 = -13$ and $k = 7$.

How did it go?

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

I can expand two brackets, including when a number is negative. ☐ ☐ ☒

I can square a bracket and remember its middle term. ☐ ☐ ☒

I can expand three brackets, two at a time. ☐ ☐ ☒