

Expanding expressions with more than two brackets

Year 8 About 75 minutes No calculator 55 marks



Hints online, answers free with an account:

mathswariz.uk/worksheets/ks3-year-8-expanding-expressions-with-more-than-two-brackets/

Date _____

A Do Now

Quick questions to start.

- A1** Last lesson [1 mark] **A2** Needed today [1 mark]
Expand and simplify $(x - 7)(x + 8)$.
Expand $3x(x^2 - 2)$.

Answer

Answer

- A3** Needed today [1 mark] **A4** Year 7 [1 mark]
Simplify $5x^2 - 2x + 3x^2 + 7x$.
Work out $(-3)^3$.

Answer

Answer

B Example, then your turn

Year 8

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

EXAMPLE 1

Expand and simplify $(x^2 + 3x - 5)(x + 2)$.

	x^2	$3x$	-5
x	x^3	$3x^2$	$-5x$
2	$2x^2$	$6x$	-10

Not drawn accurately

Hint Put the three terms along the top of a grid and x and 2 down the side. Fill all six boxes, then collect like terms.

- B1** Expand and simplify [2 marks]
 $(x^2 + 4x - 3)(x - 5)$.

Answer

EXAMPLE 2

Expand and simplify $(x + 1)(x + 4)(x - 3)$.

Hint Expand two of the brackets first. You can choose any two. Then multiply that answer by the third bracket.

B2 Expand and simplify $(x + 2)(x - 5)(x + 6)$. [3 marks]

Answer

EXAMPLE 3

Expand and simplify $(x + 3)^3$. Explain why the answer is not $x^3 + 27$.

Hint $(x + 3)^3$ means $(x + 3)(x + 3)(x + 3)$. Square the bracket first.

B3 Expand and simplify $(x - 4)^3$. [3 marks]

Answer

EXAMPLE 4

Expand and simplify $(2x + 1)(x - 3)(x + 2)$.

Hint $(2x + 1)(x - 3) = 2x^2 - 5x - 3$. Then multiply each term by x and by 2.

B4 Expand and simplify $(3x - 2)(x + 1)(x + 4)$. [3 marks]

Answer

EXAMPLE 5

Expand and simplify $(x + 5)^2(x - 2)$.

Hint Expand $(x + 5)^2$ first. Then multiply by $(x - 2)$.

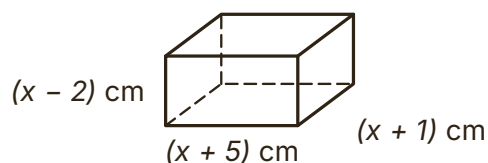
B5 Expand and simplify $(x - 3)^2(x + 7)$. [3 marks]

Answer

C Practice

Year 8

- C1** Write an expression for the volume of this cuboid. Expand the brackets and simplify. [3 marks]



Not drawn accurately

- C2** $(x + 6)(x - 1)(x - 4)$ can be written as $x^3 + ax^2 + bx + c$. [3 marks]
Work out the values of a , b and c .

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

Answer

- C3** Expand and simplify [2 marks]
 $(x + 2)(x - 2)(x + 7)$.

Answer

- C4** Expand and simplify [3 marks]
 $(x + 2)^3 - x^3$.

Answer

- C5** Work out the missing number. [2 marks]
 $(x + 4)(x - 2)(x + \square)$ is the same as $x^3 + 5x^2 - 2x - 24$.

Answer

D Exam-style questions

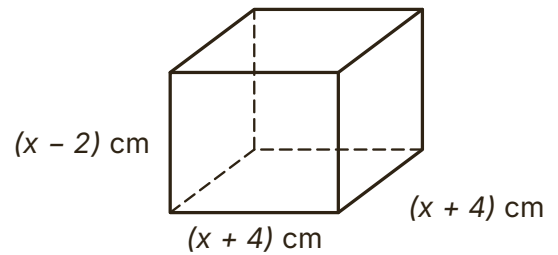
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- D1** Omar says: " $(x + 5)^3 = x^3 + 125$." [3 marks]
Omar is wrong. Show that he is wrong by expanding $(x + 5)^3$ correctly.

Answer $(x + 5)^3 = \dots\dots$

D2 A cuboid has a square base with sides $(x + 4)$ cm. Its height is $(x - 2)$ cm.

- (a) Show that the volume of the cuboid is $(x^3 + 6x^2 - 32) \text{ cm}^3$. [3 marks]



- (b) Work out the volume of the cuboid when $x = 6$. [2 marks]

Not drawn accurately

Answer

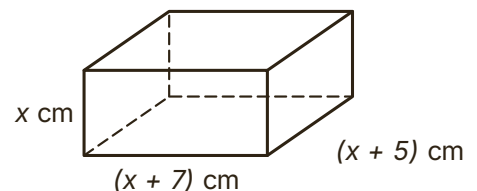
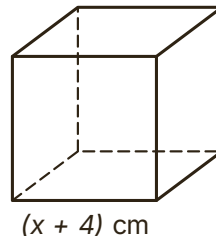
Total for D2: 5 marks

D3 Solve $(x + 4)(x + 5)(x - 1) = x^3 + 8x^2 + 7x + 4$.

[4 marks]

Answer

D4 A cube has edges of length $(x + 4)$ cm. A cuboid measures x cm by $(x + 5)$ cm by $(x + 7)$ cm. Show that the volume of the cube is $(13x + 64) \text{ cm}^3$ more than the volume of the cuboid. [5 marks]



Not drawn accurately

D5 Here is an expression: $(x + 2)(x + 3)(x + 4)$.

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

Answer

- (b) Use your answer with $x = 10$ to work out $12 \times 13 \times 14$. Show your working. [1 mark]

Answer

Total for D5: 3 marks

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

E1 $(x + a)(x + b)(x + c) = x^3 + 11x^2 + 34x + 24$, where a , b and c are positive whole numbers. Work out a , b and c . [4 marks]

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

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Expand $(x + a)(x + b)(x + c)$ with letters. The number term is abc and the x^2 term is $(a + b + c)x^2$.
- Hint 2** So $abc = 24$ and $a + b + c = 11$. List three whole numbers that multiply to 24.
- Hint 3** Check your three numbers by expanding the brackets. The x term must be $34x$.

How did it go?

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

- I can multiply a bracket with three terms by a bracket with two terms. ☐ ☐ ☐
- I can expand three brackets by expanding two and then multiplying by the third. ☐ ☐ ☐
- I can cube a bracket without leaving out the middle terms. ☐ ☐ ☐
- I can use expanding to compare volumes and solve equations. ☐ ☐ ☐