



Multiplying out brackets

Year 8 About 70 minutes No calculator 50 marks

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] **A2** Needed today [1 mark]
Expand $4(2y - 5)$. Simplify $x^2 \times x$.

Answer

Answer

- A3** Last lesson [1 mark] **A4** Year 7 [1 mark]
A price of £200 goes up by 10%, and then by a further 10%. Work out the new price. Simplify $7a + 3b - 2a + b$.

Answer

Answer

B Example, then your turn

Year 8

Multiply the term outside by EVERY term inside the bracket. Multiply the numbers, then the letters: $x \times x = x^2$ and $x^2 \times x = x^3$. Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Simplify (i) $3x \times 5x$ (ii) $2a \times 4a^2$ (iii) $3m \times 2m \times m$.

Hint Multiply the numbers together. Then count how many of each letter are multiplied together.

- B1** Simplify (i) $4y \times 7y$ (ii) $5k^2 \times 2k$ [3 marks]
(iii) $2p \times 3p \times 2p$.

Answer (i) ... (ii) ... (iii) ...

EXAMPLE 2

Expand $3x(2x - 7)$.

Hint $3x \times 2x$ and $3x \times (-7)$.

- B2** Expand (i) $5a(3a + 4)$ (ii) $-4n(2 - 3n)$. [2 marks]

Answer (i) (ii)

EXAMPLE 3

Expand $2t^2(5t - 3)$.

Hint $t^2 \times t = t^3$.

- B3** Expand (i) $y^2(6y + 1)$ (ii) $3m^2(4 - 2m)$. [2 marks]

Answer (i) (ii)

EXAMPLE 4

Expand and simplify $2x(x + 5) - 3(x - 4)$.

Hint The -3 multiplies both terms: $-3 \times x = -3x$ and $-3 \times (-4) = +12$.

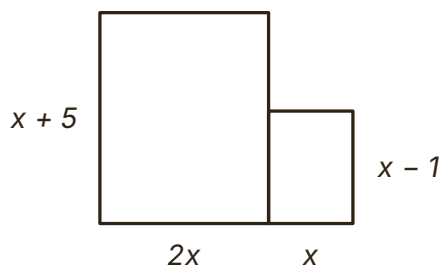
B4 Expand and simplify
 $4y(y - 2) - 5(y - 3)$.

[2 marks]

Answer

EXAMPLE 5

The shape is made from two rectangles. Write an expression for its area. Simplify it as much as possible.

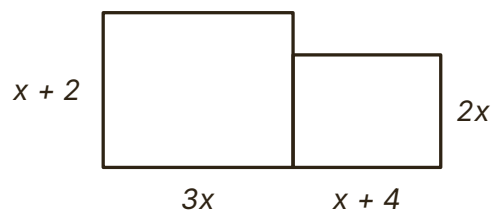


Not drawn accurately

Hint Find the area of each rectangle (width $\times$ height), then add.

B5 The shape is made from two rectangles. Write an expression for its area. Simplify it as much as possible.

[2 marks]



Not drawn accurately

Answer

c Practice

Year 8

C1 Expand $x(x^2 - 3x + 5)$.

[2 marks]

C2 Simplify $6a^2 - 2a(3a - 4)$.

[2 marks]

Answer

C3 Expand and simplify
 $2p(3p + 1) + p(p - 6) - 4(p + 2)$.

[3 marks]

Answer

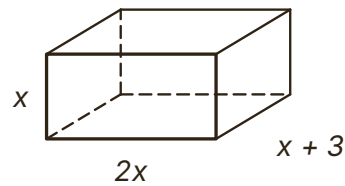
C4 Ola expands and simplifies
 $3n(n - 4) + 2n$ and gets
 $3n^2 - 10n$. Check her answer by
putting $n = 5$ into both
expressions.

[2 marks]

C5 Find the missing number: [2 marks]
 $x(x + \square) - 2(x - 3) = x^2 + 3x + 6.$

Answer

C6 A cuboid is x cm by $2x$ cm by $(x + 3)$ cm. Write an expression for its volume, without brackets. [2 marks]



Not drawn accurately

Answer

D Exam-style questions

GCSE Foundation

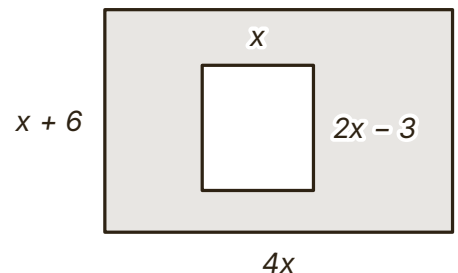
D1 Ella says, " $3x(x - 2) - x(x + 4)$ simplifies to $2x^2 - 2x$." [3 marks]

Ella is wrong. Explain her mistake, and simplify the expression correctly.

Answer Correct answer

D2 The diagram shows a small rectangle inside a large rectangle. The large rectangle is $4x$ cm by $(x + 6)$ cm. The small rectangle is x cm by $(2x - 3)$ cm.

- (a) Write an expression for the shaded area. [3 marks]
 Simplify it as much as possible.



Answer

Not drawn accurately

- (b) Work out the shaded area when $x = 5$. [2 marks]

Answer

Total for D2: 5 marks

D3 n is a whole number. Show that $2n(n + 3) - 2n(n - 3)$ simplifies to $12n$. Explain why its value is always a multiple of 12. [3 marks]

D4 Simplify $2y(y^2 - 4y + 3) - y^2(y - 5)$. [3 marks]

Answer

D5 $3x(2x + a) + 2(x - b)$ simplifies to $6x^2 + 11x - 8$. Work out the values of a and b . [4 marks]

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

E Extension

Stretch

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

E1 Rectangle A is x cm by $(x + 10)$ cm. Rectangle B is x cm by $(2x - 3)$ cm. The area of B is 30 cm^2 more than the area of A . x is a whole number. Find x . [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

E1 **Hint 1** Write an expression for (area of B) – (area of A) and simplify it.

Hint 2 $2x^2 - 3x - (x^2 + 10x) = x^2 - 13x$, so you need $x^2 - 13x = 30$, which is $x(x - 13) = 30$.

Hint 3 $x - 13$ must be positive. Try $x = 14$, then $x = 15$.

How did it go?

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

I can expand a bracket with a letter or a power outside. ☐ ☐ ☐

I can expand several brackets and collect like terms. ☐ ☐ ☐

I can write an area or a volume as an expression without brackets. ☐ ☐ ☐

I can find a mistake in an expansion and check by substituting. ☐ ☐ ☐