



Equations with brackets

Year 7 About 60 minutes No calculator 56 marks

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] **A2** Needed today [1 mark]
Expand $4(2x - 5)$. Solve $3x + 7 = 34$.

Answer

Answer

- A3** Last lesson [1 mark] **A4** From chapter 13 [1 mark]
A circle has radius 10 cm. Work out its area. Give your answer in terms of π . 5 pens cost £3.50. Work out the cost of 8 pens.

Answer

Answer

B Example, then your turn

Year 7

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

EXAMPLE 1

Solve $6(x - 3) = 42$. Use two different methods.**Hint** Method 1: divide both sides by 6 first. Method 2: expand the bracket first.

- B1** Solve $4(x - 9) = 28$. [2 marks]

Answer

EXAMPLE 2

Solve $5(11 - x) = 20$.**Hint** Divide by 5. Then add x to both sides so that the x term is positive.

- B2** Solve $4(13 - x) = 30$. [2 marks]

Answer

EXAMPLE 3

Solve $4(2x + 7) = 6$. Give your answer as a mixed number.

Hint Expand the bracket. The answer will be negative, and it is not a whole number.

B3 Solve $2(3x + 10) = 7$. Give your answer as a mixed number. [3 marks]

Answer

EXAMPLE 4

Solve $\frac{2}{3}(x - 4) = 10$.

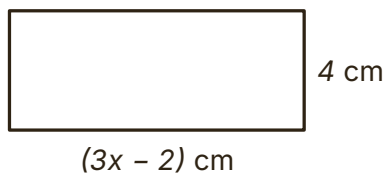
Hint Multiply both sides by 3 first, so there is no fraction.

B4 Solve $\frac{3}{4}(x + 2) = 15$. [3 marks]

Answer

EXAMPLE 5

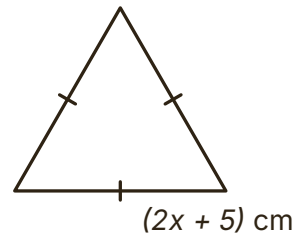
The perimeter of this rectangle is 46 cm. Write an equation with a bracket. Solve it to find x and the length of the rectangle.



Not drawn accurately

Hint Perimeter = $2 \times (\text{length} + \text{width})$.

B5 The triangle is equilateral. Its perimeter is 51 cm. Write an equation with a bracket. Solve it to find x and the length of one side. [3 marks]



Not drawn accurately

Answer $x = \dots\dots$ side $\dots\dots$ cm

c Practice

Year 7

C1 Work out the value of $\frac{3}{4}(x + 6)$ when $x = 14$. [1 mark]

Answer

C2 Solve $54 = 6(x + 5)$. [2 marks]

Answer

C3 Solve $5x + 32 = 7$.

[2 marks]

C4 Solve $2(9 - 4x) = 50$.

[3 marks]

Answer

Answer

C5 Solve $3(x - 1.4) = 7.9$. Give your answer correct to 2 decimal places. [3 marks]

C6 Solve $\frac{1}{2}(4x - 7) = 9$. Give your answer as a mixed number. [3 marks]

Answer

Answer

D Exam-style questions

GCSE Foundation

D1 Ben solves $3(x + 4) = 27$. He writes: $3x + 4 = 27$, so $3x = 23$ and $x = 7\frac{2}{3}$. [3 marks]

Ben's answer is wrong. Explain what Ben did wrong, and solve the equation correctly.

Answer

D2 Solve each equation. You must show your working.

(a) $2(5x + 3) = 41$ [3 marks]

Answer

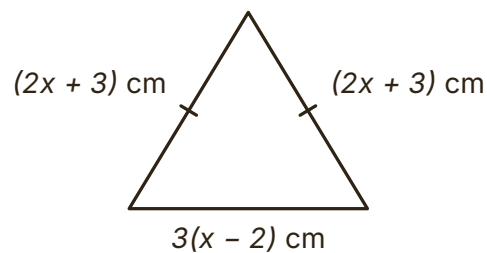
(b) $\frac{x - 7}{4} = -3$ [2 marks]

Answer

Total for D2: 5 marks

D3 The diagram shows an isosceles triangle. The perimeter of the triangle is 49 cm.

- (a) Show that $7x = 49$. [2 marks]



Not drawn accurately

- (b) Work out the length of the base of the triangle. [2 marks]

Answer

Total for D3: 4 marks

D4 A school buys 6 boxes of pencils. Each box holds x pencils. The art teacher takes 4 pencils out of each box. There are now 150 pencils left in the boxes.

- (a) Write down an equation in x . Use a bracket. [2 marks]

Answer

- (b) Solve your equation to find the number of pencils that were in each box. [2 marks]

Answer

- (c) How many pencils were in the 6 boxes before the art teacher took any? [1 mark]

Answer

Total for D4: 5 marks

D5 Here are four equations. [4 marks]

A $3(x - 2) = 15$ **B** $2(10 - x) = 6$ **C** $\frac{x + 5}{3} = 4$ **D** $4(2x - 9) = 24$

Three of the equations have the same solution. Which equation is the odd one out?
You must show your working.

Answer Equation

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

E1 The mean of the three expressions $2(x + 3)$, $3(x - 1)$ and $x + 12$ is 21. Work out [4 marks] the value of x .

Answer

Extension hints

Cover these with paper. Uncover one at a time.

E1 **Hint 1** The mean is 21, so the three expressions add up to 3×21 .

Hint 2 $2(x + 3) + 3(x - 1) + (x + 12) = 63$

Hint 3 Expand: $2x + 6 + 3x - 3 + x + 12 = 6x + 15$. So $6x + 15 = 63$, $6x = 48$ and $x = 8$.

How did it go?

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

I can solve an equation with a bracket by dividing first or by expanding first. ☐ ☐ ☐

I can solve equations whose answers are negative numbers or fractions. ☐ ☐ ☐

I can clear a fraction from an equation by multiplying. ☐ ☐ ☐

I can write and solve an equation from a perimeter or a word problem. ☐ ☐ ☐