



GCSE Foundation/Higher 09

Algebra



Questions



75 minutes



69 marks

Simplifying expressions

Q1. Expand $w(w + 6)$

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Answer

(Total 2 marks)

Q2. (a) Solve $5x + 3 = 3(x + 2)$

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.....
.....

Answer $x =$

(3)

(b) $2(x + 16) + 4(x - 5)$ simplifies to $a(x + b)$

Work out the values of a and b .

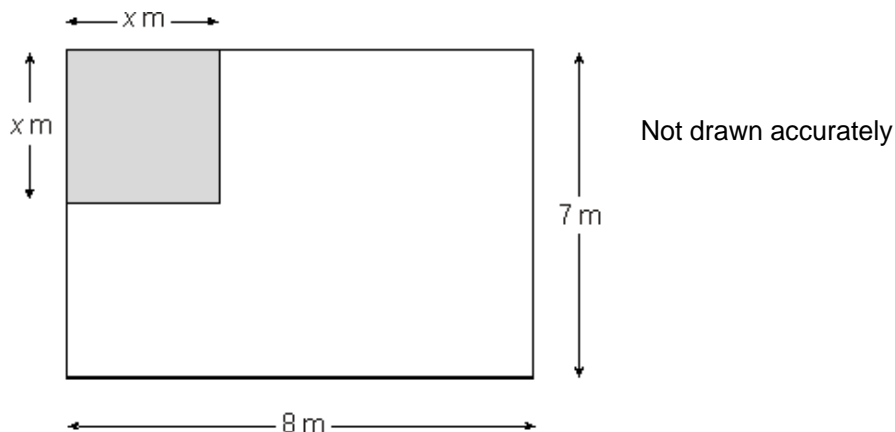
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Answer $a =$, $b =$

(3)

(Total 6 marks)

Q3. A rectangular carpet is 7 metres wide and 8 metres long.
A square piece of side length x metres is cut from one of the corners.



- (a) Dean works out the area of the remaining carpet in terms of x .

His answer is $56 - x^2$

Explain how Dean might have obtained his expression.

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(1)

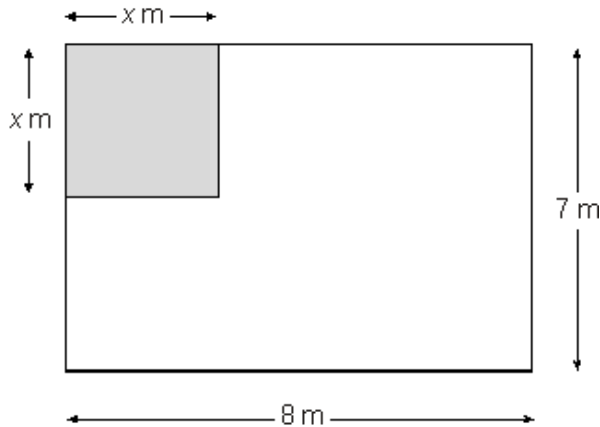
- (b) Lucy also works out the area of the remaining carpet in terms of x .

Her answer is $x(8 - x) + 8(7 - x)$

Use the diagram below to show how Lucy might have obtained her expression.

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(3)

(Total 4 marks)

- Q4.** (a) Work out the value of $8(16 - 1)$

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Answer

(1)

- (b) Factorise $2x^2 - x$

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Answer

(1)

- (c) Work out the value of $2x^2 - x$ when $x = 8$

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Answer

(1)

(Total 3 marks)

- Q5.** (a) Simplify $x^2 \times x^3$

Answer

(1)

- (b) Simplify $y^8 \div y^5$

Answer

(1)

- (c) Expand $x(x^3 - 3)$

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.....

Answer

(2)

(Total 4 marks)

- Q6.** (a) Solve $8t - 5 = 19$

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Answer $t =$

(2)

- (b) Nails cost 3 pence each.

Screws cost 5 pence each.

Write down an expression for the cost of x nails and y screws.

.....

Answer pence

(2)

- (c) Expand and simplify $4(2w + 3) - 5(3w + 7)$

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.....

Answer

(2)
(Total 6 marks)

- Q7.** (a) Simplify $a^2 \times a^4$

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Answer

(1)

- (b) Simplify $b^9 \div b^3$

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Answer

(1)

- (c) Simplify $c^5 \times c \times c^5$

.....

Answer

(1)
(Total 3 marks)

- Q8.** (a) Solve the equation $\frac{x}{20} = -4$

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Answer $x =$

(1)

- (b) Solve the equation $8w - 5 = 3w + 1$

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.....

.....

Answer $w =$

(3)

- (c) Simplify $y + 2 \times y \times y$

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Answer

(1)

- (d) Factorise $15t + 25$

.....

Answer

(1)

- (e) Factorise $z^2 + 8z$

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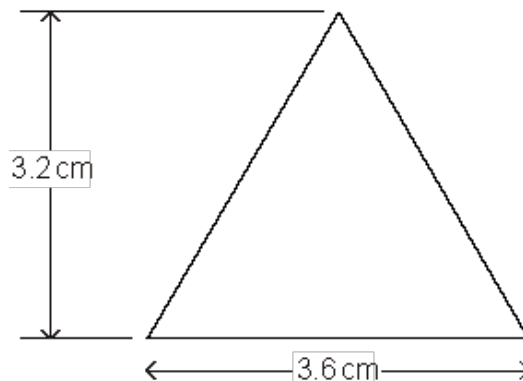
Answer

(1)

(Total 7 marks)

Q9. The length of the base of a triangle is 3.6 cm.

The height of the triangle is 3.2 cm.



Not drawn accurately

- (a) Work out the area of the triangle.

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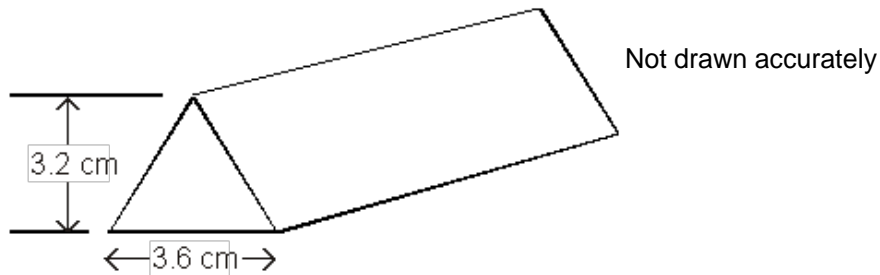
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Answer cm^2

(2)

- (b) The triangle is the cross-section of a prism of volume 120.96 cm^3 .



Work out the length of the prism.

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Answer cm

(2)

(Total 4 marks)

- Q10.** (a) Expand and simplify $2(3x - 2) + 4(x + 5)$

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Answer

(2)

(b) Solve the equation $2(3x - 2) + 4(x + 5) = 4(x - 2)$

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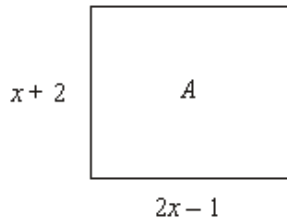
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Answer $x =$

(3)
(Total 5 marks)

Q11. Rectangle A has length $(2x - 1)$ cm and width $(x + 2)$ cm.



Not drawn accurately

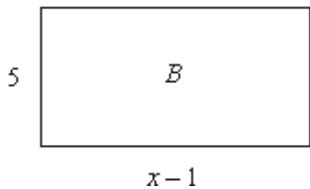
(a) Show that the perimeter of rectangle A is $(6x + 2)$ cm.

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(1)

(b) Rectangle B has length $(x - 1)$ cm and width 5 cm.



Not drawn accurately

The perimeter of rectangle A is equal to the perimeter of rectangle B.
Write down and solve an equation in x .

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Answer $x =$

(4)

(c) Find the **area** of rectangle A.

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Answer cm^2

(2)

(Total 7 marks)

Q12. (a) Simplify $2x + 8 + 4x - 3$

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Answer

(2)

(b) Solve the equation.

$$\frac{x}{3} = 5$$

.....

Answer $x =$

(1)

(c) Tom is investigating the two expressions $ab + c$ and $a(b + c)$

- (i) He finds that both expressions have the same value when $a = 1$, $b = 3$ and $c = 4$. Show that this is true.

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(3)

- (ii) Tom says that this means that $a(b + c) = ab + c$. Explain why Tom is wrong.

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(2)

(Total 8 marks)

Q13. (a) Expand and simplify $4(2x - 1) + 3(x + 6)$

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Answer

(2)

(b) Expand $x^2(4 - 2x)$

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.....

Answer

(2)

(Total 4 marks)

- Q14.** In the table below, the letters w , x , y and z represent different numbers. The total of each row is given at the side of the table.

w	w	w	w	24
w	w	x	x	28
w	w	x	y	25
w	x	y	z	23

Find the values of w , x , y and z .

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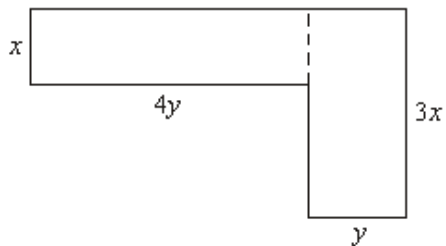
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Answer $w = \dots\dots\dots$, $x = \dots\dots\dots$, $y = \dots\dots\dots$, $z = \dots\dots\dots$

(Total 4 marks)

- Q15.** This shape is made up of rectangles.



Not to scale

- (a) Write down an expression, in terms of x and y , for the **perimeter** of the shape.

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Answer

(2)

(b) If $x = 2$ cm and $y = 5$ cm, find the **area** of the shape.

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Answer cm^2

(2)
(Total 4 marks)

Q16. Prove that the sum of any two consecutive numbers is always an odd number.

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(Total 2 marks)

