GCSE Maths: Writing formulae (Higher): answers

GCSE Maths - Substitution and Formulae - Higher - Lesson 8.5

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at **websink.site/gcse/maths/ch08-substitution-formulae/higher/writing-formulae/**

Exercise 8F Writing formulae Non-calculator

1 **Write a formula for each situation. Use the letters given.**

(a) The cost C pounds of n tickets at £7 each

Answer: $C = 7n$

(b) The total T pounds charged by a plumber who charges £40 call-out plus £25 per hour for h hours

Answer: $T = 40 + 25h$

(c) The perimeter P of a square with side s

Answer: $P = 4s$

(d) The area A of a square with side s

Answer: $A = s^2$

(e) The mean m of two numbers a and b

Answer: $m = \frac{a + b}{2}$

(f) The change C pounds from £20 after buying n books at £4 each

Answer: $C = 20 - 4n$

2 **A plumber charges a £40 call-out fee plus £25 for each hour of work.**

(a) Write a formula for the total charge T pounds for h hours.

Answer: $T = 40 + 25h$

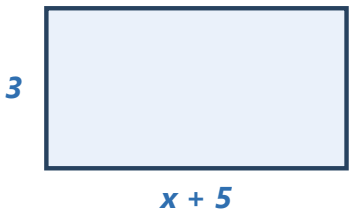
(b) Use your formula to find the charge for 3 hours.

Answer: £115

(c) A customer is charged £140. For how many hours did the plumber work?

Answer: 4 hours

3 **The diagram shows a rectangle with length (x + 5) cm and width 3 cm. Write simplified expressions for**



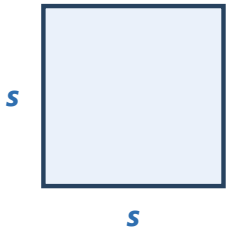
(a) the perimeter, P cm

Answer: 2x + 16

(b) the area, A cm^2

Answer: 3x + 15

4 **A square has side s cm. Write a formula for**



(a) its perimeter P

Answer: $P = 4s$

(b) its area A

Answer: $A = s^2$

5 **Matchsticks are used to make a row of n triangles. The formula is $m = 2n + 1$, where m is the number of matchsticks.**

(a) How many matchsticks are needed for 10 triangles?

Answer: 21

(b) Meg has exactly 100 matchsticks. Explain why she cannot use them all to make a row of triangles.

Answer: The formula always gives an odd number

6 **A bike shop charges £6 for each hour plus a £10 deposit.**

(a) Write a formula for the total cost C pounds for h hours.

Answer: $C = 6h + 10$

(b) Work out the cost for 4 hours.

Answer: £34

7 **An electricity company charges £15 a month plus 20p for each unit used. Write a formula for the monthly cost C pounds for u units and use it to find the cost of 250 units.**

(a) Formula for C

Answer: $C = 15 + 0.2u$

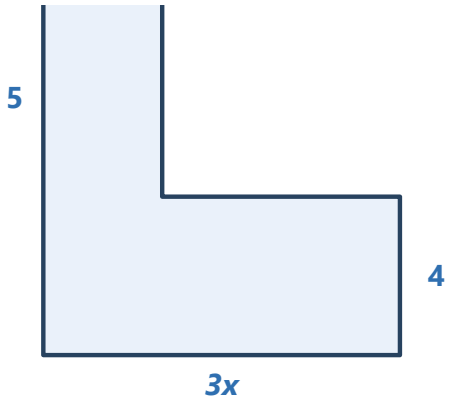
(b) Cost of 250 units

Answer: £65

8 Matt writes a formula for the cost, in pounds, of n pencils at 45p each and a ruler costing £2: $C = 45 + 2n$. Test his formula with $n = 2$. Explain what is wrong and write a correct formula.

Answer: C = 0.45n + 2

9 The shape is made from two rectangles. The lengths are in centimetres. Write simplified expressions for the perimeter P and the area A of the whole shape.



(a) perimeter, P cm

Answer: 6x + 18

(b) area, A cm^2

Answer: 17x

10 A hall costs £120 to hire plus £3.50 for each guest. Write a formula for the total cost C pounds for g guests, and work out the cost for 60 guests.

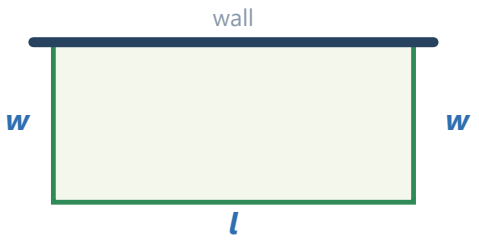
(a) Formula for C

Answer: $C = 120 + 3.5g$

(b) Cost for 60 guests

Answer: £330

11 A farmer fences a rectangular field on three sides. The fourth side is a wall. The field has length l metres and width w metres.



(a) Write a formula for the length of fence, F metres.

Answer: F = l + 2w

(b) Work out F when $l = 40$ and $w = 15$.

Answer: 70 m

12 Shirts cost £p each. A shop takes 20% off the total price when you buy n shirts. Write a formula for the amount paid, £C, and use it to find the cost of 3 shirts at £10 each.

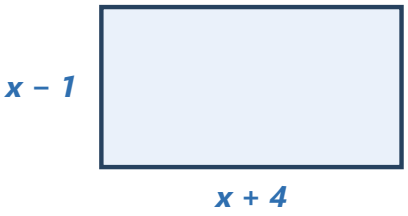
(a) Formula for C

Answer: $C = 0.8np$

(b) Cost of 3 shirts at £10

Answer: £24

13 **A rectangle has length (x + 4) cm and width (x − 1) cm.**



(a) Show that the perimeter is ($4x$ + 6) cm.

Answer: $4x + 6$

(b) Write and simplify an expression for the area.

Answer: $x^2 + 3x - 4$

(c) The perimeter is 30 cm. Work out the value of x.

Answer: $x = 6$

14 **Taxi firm A charges £2 plus £1.50 per mile. Taxi firm B charges £5 plus £1 per mile. For a journey of m miles the costs are $A = 2 + 1.5m$ and $B = 5 + m$ pounds.**

(a) Work out both costs for a 6 mile journey. What do you notice?

Answer: Both £11

(b) Which firm is cheaper for a 10 mile journey? Show your working.

Answer: Firm B (£15 compared with £17)

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