

GCSE Maths: Writing formulae (Higher): worksheet

GCSE Maths - Substitution and Formulae - Higher - Lesson 8.5

Name: _____

Date: _____

Score: _____

14 questions. Write your answers in the spaces. Answers and step-by-step help 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:

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

Answer:

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

Answer:

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

Answer:

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

Answer:

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

Answer:

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:

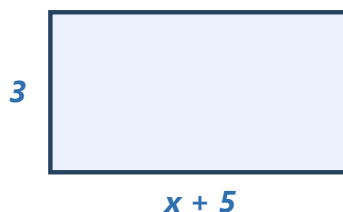
- (b) Use your formula to find the charge for 3 hours.

Answer:

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

Answer:

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



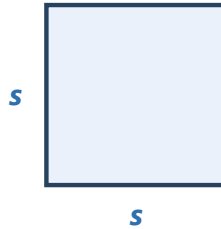
- (a) the perimeter, P cm

Answer:

(b) the area, $A \text{ cm}^2$

Answer:

- 4 A square has side $s \text{ cm}$. Write a formula for



(a) its perimeter P

Answer:

(b) its area A

Answer:

- 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:

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

Answer:

- 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:

(b) Work out the cost for 4 hours.

Answer:

- 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:

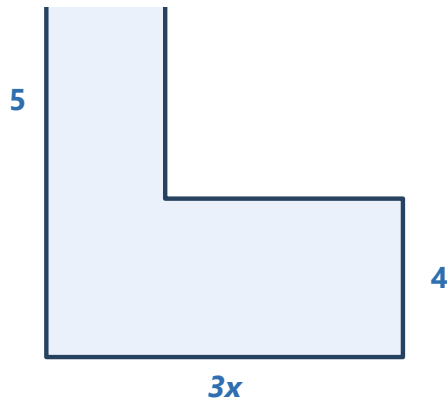
(b) Cost of 250 units

Answer:

- 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:

- 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:

- (b) area, A cm²

Answer:

- 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.

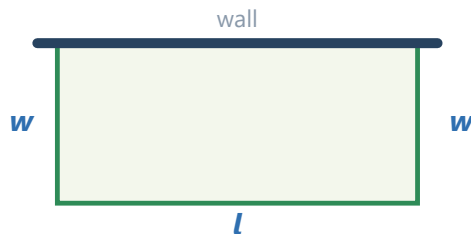
- (a) Formula for C

Answer:

- (b) Cost for 60 guests

Answer:

- 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:

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

Answer:

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

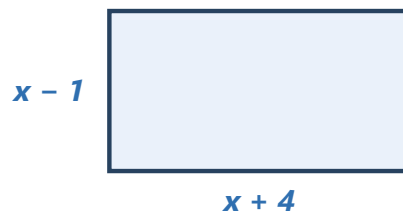
- (a) Formula for C

Answer:

- (b) Cost of 3 shirts at £10

Answer:

- 13 A rectangle has length $(x + 4)$ cm and width $(x - 1)$ cm.



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

Answer:

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

Answer:

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

Answer:

- 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:

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

Answer: