



1 $T = 4x + 3y$

Work out the value of T when $x = 5$ and $y = 2$.

(2 marks)

Substitution means replacing each letter with its given value. Numbers next to letters mean multiplication, so $4x$ becomes 4×5 . Multiply before adding
Substitute the values

$$T = 4 \times 5 + 3 \times 2$$

$$T = 20 + 6 = 26$$

26

2 $v = 5t - 8$

Work out the value of v when $t = 3.4$

(2 marks)

$$\text{Substitute } t = 3.4: v = 5 \times 3.4 - 8$$

$$v = 17 - 8 = 9$$

9

3 The perimeter of a rectangle is given by the formula $P = 2l + 2w$

Work out the value of P when $l = 7.5$ and $w = 4.2$

(2 marks)

$$P = 2l + 2w$$

$$P = 2 \times 7.5 + 2 \times 4.2$$

$$P = 15 + 8.4$$

$$P = 23.4$$

4 $E = 3a - 2b$

Work out the value of E when $a = -4$ and $b = 5$.

(2 marks)

Substitute the values

$$E = 3 \times (-4) - 2 \times 5$$

$$E = -12 - 10 = -22$$

-22

- 5 Work out the value of $x^2 + 7x$ when $x = 6$.

(2 marks)

$$x^2 = 6 \times 6 = 36$$

$$7x = 7 \times 6 = 42$$

$$36 + 42 = 78$$

78

- 6 $5y = 35$

- a. Work out the value of y .
b. Work out the value of $2y^2$

(3 marks)

$$a) y = 35 \div 5 = 7$$

b) Square first

$$y^2 = 49$$

b) Then multiply by 2

$$2 \times 49 = 98$$

- 7 a. Simplify $4c \times 2d$

- b. Work out the value of $4c \times 2d$ when $c = 3$ and $d = 1.5$

(3 marks)

$$a) 4 \times 2 = 8 \text{ and the letters are } c \text{ and } d, \text{ so } 8cd$$

$$b) \text{ Substitute into } 8cd: 8 \times 3 \times 1.5$$

$$b) 8 \times 3 = 24, \text{ then } 24 \times 1.5 = 36$$

8

Here is a table of values for $4n - 5$

n	2	5	?	?
$4n - 5$	?	?	19	35

Work out the four missing numbers in the table (the two n values and the two values of $4n - 5$ marked ?).

(4 marks)

$$n = 2$$

$$4 \times 2 - 5 = 3$$

$$n = 5$$

$$4 \times 5 - 5 = 15$$

$$\text{Value} = 19$$

$$\begin{array}{rcl} 4n - 5 & = & 19 \\ +5 & & \\ \hline 4n & = & 24 \\ \div 4 & & \\ n & = & 6 \end{array}$$

$$\text{Value} = 35$$

$$\begin{array}{rcl} 4n - 5 & = & 35 \\ +5 & & \\ \hline 4n & = & 40 \\ \div 4 & & \\ n & = & 10 \end{array}$$

3, 15, 6, 10

9

$$F = 5v + 20$$

- Work out the value of F when $v = 6$.
- Work out the value of v when $F = 95$.

(4 marks)

$$a) F = 5 \times 6 + 20 = 30 + 20 = 50$$

$$b) \text{Substitute } F = 95: 95 = 5v + 20$$

$$b) \text{Subtract 20}$$

$$5v = 75, \text{ so } v = 15$$

Check

$$5 \times 15 + 20 = 95$$

10

A tool hire company uses this rule to work out the cost of hiring a floor sander.

Total cost = £45 × number of days + £60 deposit

a. Meera hires the sander for 7 days.

Work out her total cost.

b. Liam's total cost is £555.

Work out the number of days Liam hires the sander for.

(4 marks)

a) $45 \times 7 = 315$, then $315 + 60 = 375$. Total cost £375

b) Take off the deposit

$$555 - 60 = 495$$

b) Divide by the daily rate

$$495 \div 45 = 11 \text{ days}$$

Check

$$45 \times 11 + 60 = 555$$

11

a. Work out the value of $2a - 3b$ when $a = -1$ and $b = 4$.

b. Work out the value of $4a^2 + b$ when $a = -3$ and $b = -7$.

(4 marks)

$$a) 2 \times (-1) = -2 \text{ and } 3 \times 4 = 12, \text{ so } -2 - 12 = -14$$

$$b) a^2 = (-3) \times (-3) = 9, \text{ so } 4a^2 = 36$$

$$b) 36 + (-7) = 29$$

- 12 The speed, S , in metres per second of a runner is given by the formula

$$S = \frac{60}{t}$$

where t is the time in seconds taken to run 60 metres.

- Work out the value of S when $t = 4$ and when $t = 12$.
- Zara says, "When t gets bigger, S gets bigger." Use your answers to part (a) to show that Zara is wrong.
- Work out the value of t when $S = 7.5$

(4 marks)

a)

$$t = 4: S = 60 \div 4 = 15$$

$$t = 12: S = 60 \div 12 = 5$$

b)

t goes from 4 to 12 (bigger)

S goes from 15 to 5 (smaller)

Zara is wrong

c)

$$7.5 = \frac{60}{t}$$

$$t = 60 \div 7.5$$

$$t = 8$$

- 13 $v = u + at$

- Work out the value of v when $u = 7$, $a = 9.8$ and $t = 5$.
- Work out the value of t when $v = 87$, $u = 12$ and $a = 5$.

(4 marks)

$$a) v = 7 + 9.8 \times 5 = 7 + 49 = 56$$

b) Substitute

$$87 = 12 + 5t$$

b) Subtract 12

$$5t = 75, \text{ so } t = 15$$

Check

$$12 + 5 \times 15 = 87$$

14 $y = 3(x + 4)$

- Work out the value of y when $x = 5$
- Work out the value of x when $y = 27$

(4 marks)

a)

$$y = 3 \times (5 + 4)$$

$$y = 3 \times 9$$

$$y = 27$$

b)

$$27 = 3(x + 4)$$

Expand the bracket

$$\begin{array}{rcl} 27 & = & 3x + 12 \\ -12 & & -12 \\ \hline 15 & = & 3x \\ \div 3 & & \div 3 \\ 5 & = & x \end{array}$$

$$x = 5$$

15 $m = 3n - 2p$

- Work out the value of m when $n = -5$ and $p = 4$.
- Work out the value of n when $m = 19$ and $p = -2$.

(4 marks)

a) $m = 3 \times (-5) - 2 \times 4 = -15 - 8 = -23$

b) Substitute

$$19 = 3n - 2 \times (-2) = 3n + 4$$

b) Subtract 4

$$3n = 15, \text{ so } n = 5$$

Check

$$3 \times 5 - 2 \times (-2) = 15 + 4 = 19$$

16

a. Work out the value of $5x + 2y$ when $x = 4$ and $y = -3$.b. Work out the value of $x^2 - 4x$ when $x = -2$.c. $D = (h + 3k) \div 2$ Work out the value of h when $D = 10$ and $k = 4$.

(6 marks)

$$a) 5 \times 4 = 20 \text{ and } 2 \times (-3) = -6, \text{ so } 20 + (-6) = 14$$

$$b) x^2 = (-2) \times (-2) = 4 \text{ and } 4x = 4 \times (-2) = -8$$

$$b) 4 - (-8) = 4 + 8 = 12$$

c) Substitute

$$10 = (h + 12) \div 2$$

c) Multiply both sides by 2

$$h + 12 = 20, \text{ so } h = 8$$

Check

$$(8 + 12) \div 2 = 10$$

17

A builder uses the formula $C = 8n + 45$ to work out the cost, in pounds, of a job that takes n hours.

Priya estimates the cost of a 16 hour job as £150.

An estimate is acceptable if it is within 10% of the cost given by the formula.

Is Priya's estimate acceptable? You must show your working.

(4 marks)

$$C = 8 \times 16 + 45$$

$$C = 128 + 45 = 173$$

$$10\% \text{ of } 173 = 17.3$$

$$\text{Lowest acceptable} = 173 - 17.3 = 155.7$$

$$150 < 155.7$$

No, it is not acceptable