

1. $g = 9$
 $h = 4$

Work out the value of $2g + 3h$

$$\begin{aligned} & 2g + 3h \\ &= 2(9) + 3(4) \checkmark \\ &= 18 + 12 \\ &= 30 \end{aligned}$$

30 ✓

(Total for Question is 2 marks)

Prime number is number which is only divisible by itself and 1

2	17
3	19
5	23
7	29
11	31
13	

$$\begin{aligned} 3 + 29 &= 32 \\ 13 + 19 &= 32 \end{aligned}$$

(Either)

3	29
13	19

$$\begin{aligned}
 & \frac{3^4 \times 3^{-2}}{3^3} \\
 &= \frac{3^{4-2}}{3^3} \\
 &= \frac{3^2}{3^3} \\
 &= \frac{3^{2-3}}{3^0} \\
 &= \frac{3^{-1}}{1} \\
 &= \frac{1}{3}
 \end{aligned}$$

$$\begin{aligned}
 & a^x \times a^y = a^{x+y} \\
 & \frac{a^x}{a^y} = a^{x-y}
 \end{aligned}$$

$$\begin{aligned}
 & = 3^{5-3} \\
 & = 3^2 \\
 & = 9
 \end{aligned}$$

$$9$$

2. $v^2 = u^2 + 2as$

$$u = 12 \quad a = -3 \quad s = 18$$

(a) Work out a value of v .

$$v^2 = (12)^2 + 2(-3)(18)$$

$$v^2 = 144 + 2(-54)$$

$$v^2 = 144 - 108$$

$$v^2 = 36$$

$$\sqrt{\quad} \quad \sqrt{\quad}$$

$$v = \pm 6$$

$$\pm 6$$

(2)

(b) Make s the subject of $v^2 = u^2 + 2as$

$$v^2 = u^2 + 2as$$

$$(-u^2) \quad (-u^2)$$

$$v^2 - u^2 = 2as$$

$$(\div 2a) \quad (\div 2a)$$

$$\frac{v^2 - u^2}{2a} = s$$

$$s = \frac{v^2 - u^2}{2a}$$

(2)

(Total for Question is 4 marks)

3. An estimate of the height, H metres, of a tall building can be found using the formula

$$H = 4f + 12$$

where the building is f floors high.

A tall building is 110 floors high.

The real height of the building is 442 m.

Seb uses the formula to find an estimate of the height of this building.

He then finds the difference between his estimate and the real height.

Show that this difference is less than 5% of the real height.

$$H = 4(110) + 12 \quad (1)$$

$$H = 452 \text{ m} \quad (1)$$

← Seb's estimate

$$442 \times 1.05 = 464.1$$

↑ Increase by 5% (1)

Since $452 < 464.1$ the difference is less than 5% of the real height (1)

4. The number of days, d , that it will take to build a house is given by

$$d = \frac{720}{n}$$

where n is the number of workers used each day.

Ali's company will take 40 days to build the house.

Hayley's company will take 30 days to build the house.

Hayley's company will have to use more workers each day than Ali's company.

How many more?

Ali's Company: $n \times 40 = \frac{720}{n}$

$$\frac{40n}{40} = \frac{720}{40}$$

$$n = 18$$

Hayley's Company: $n \times 30 = \frac{720}{n}$

$$\frac{30n}{30} = \frac{720}{30}$$

$$n = 24$$

$$24 - 18 = 6$$

①

①

6

1 km = 1000 m
 $\downarrow \times 4$ $\downarrow \times 4$
 4 km = 4000 m

4000 ✓

1	2	3	5
:	2	3	4

shaded : unshaded
 3 : 5

3:5 ✓

5. $w = 4u + 3$

Find the value of w when $u = 8$

$w = 4(8) + 3$ ✓

$w = 32 + 3$

$w = 35$

35 ✓

(Total for Question is 2 marks)

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6. (a) Complete the table of values for $y = 4x - 6$

x	-1	0	1	2	3	4
y	-10	-6	-2	2	6	10

when $x = -1$ $y = 4(-1) - 6$
 $y = -4 - 6$
 $y = -10$

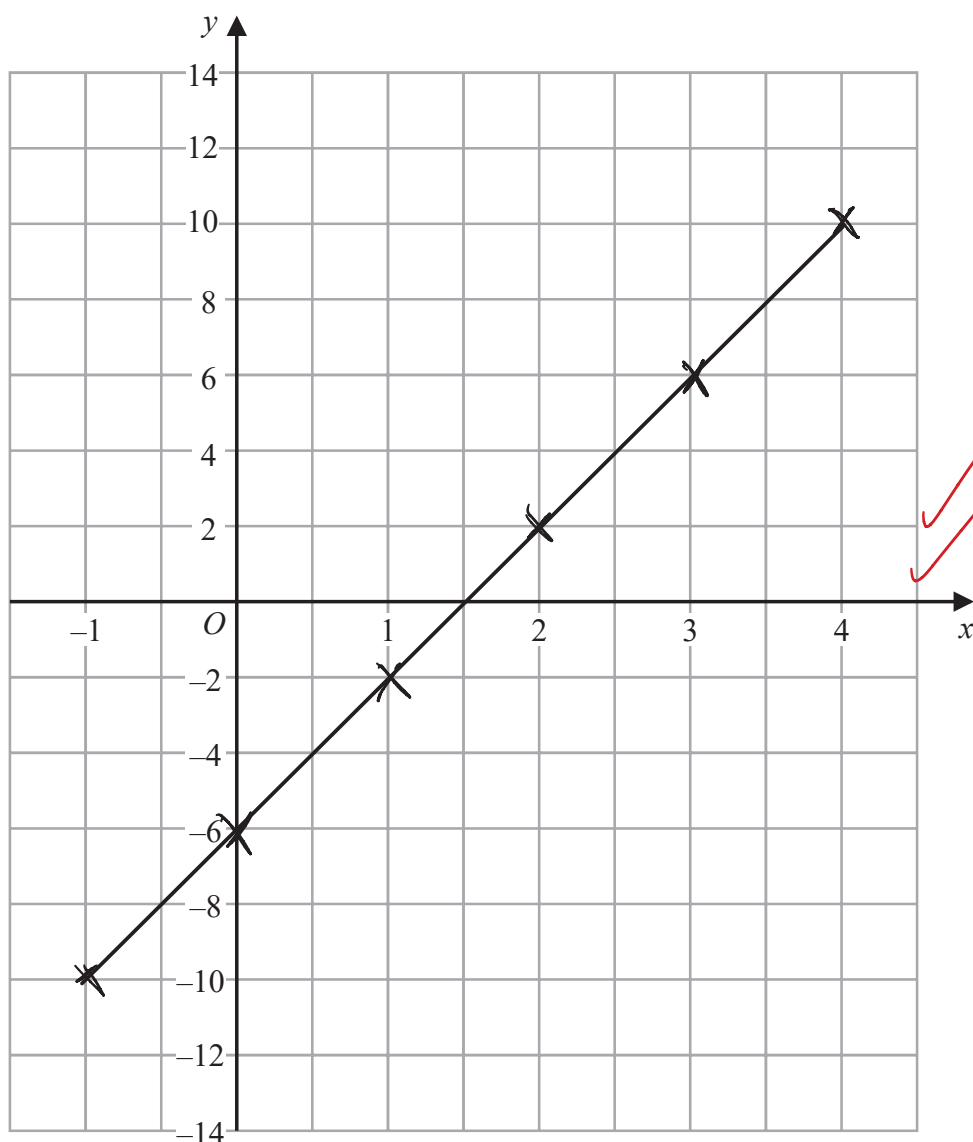
when $x = 2$ $y = 4(2) - 6$
 $y = 2$

when $x = 0$ $y = 4(0) - 6$
 $y = -6$

when $x = 3$ $y = 4(3) - 6$
 $y = 6$

(2)

(b) On the grid, draw the graph of $y = 4x - 6$ for values of x from -1 to 4



(2)

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7. $T = 3x + 4y$

(a) Work out the value of T when $x = 5$ and $y = -7$

$$\begin{aligned} T &= 3(5) + 4(-7) \quad \checkmark_1 \\ &= 15 - 28 \\ &= -13 \end{aligned}$$

$$-13 \quad \checkmark_2$$

(2)

(b) Work out the value of y when $T = 38$ and $x = 6$

$$\begin{aligned} T &= 3x + 4y \\ 38 &= 3(6) + 4y \\ 38 &= 18 + 4y \quad \checkmark_1 \\ -18 \downarrow & \quad \downarrow -18 \\ 20 &= 4y \quad \downarrow \div 4 \\ \div 4 \downarrow & \quad \downarrow \div 4 \\ y &= \frac{20}{4} = 5 \end{aligned}$$

$$5 \quad \checkmark_2$$

(2)

(Total for Question is 4 marks)