

1 Write down the number that is 23 less than -1.6 .

\mathcal{R}

$-1.6 - 23$

..... -24.6 [1]

2 Write as a fraction in its simplest form.

\mathcal{R}

(a) 72%

$\frac{72}{100} = \frac{18}{25}$

..... $\frac{18}{25}$ [1]

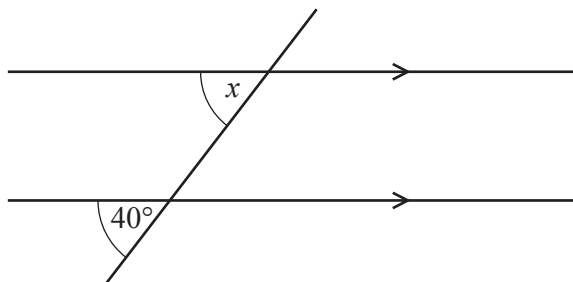
(b) 0.004

$\frac{4}{1000}$

..... $\frac{1}{250}$ [1]

3

\mathcal{R}



NOT TO SCALE

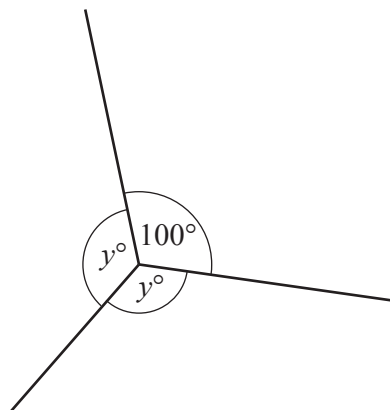
The diagram shows a pair of parallel lines and a straight line.

Complete the statement with the correct geometrical reason.

$x = 40^\circ$ because the angles are *corresponding* [1]

4

\mathcal{R}



NOT TO SCALE

Find the value of y .

$y = \frac{360^\circ - 100^\circ}{2}$

$y =$ 130° [2]

5 Jo invests \$600 for 7 years at a rate of 1.5% per year simple interest.

R

Calculate the total interest earned during the 7 years.

$$600 \times \frac{1.5}{100} \times 7$$

\$ 6.3 [2]

6 Maria buys n pencils that cost p cents each.

R

She pays with a \$ y note.

Find, in terms of n , p and y , the amount of change Maria receives.

Give your answer in cents.

$$\text{\$ } y = 100 y \text{ cents}$$

$$100 y - np$$

..... 100y - np cents [2]

7 12 18 29 49 91 125

R

From the list of numbers, write down

(a) a cube number,

..... 125 [1]

(b) a prime number.

..... 29 [1]

8 Alex changes 190 euros (€) into pounds (£) when £1 = €1.1723 .

R

Calculate the amount Alex receives.

Give your answer correct to 2 decimal places.

$$\frac{190}{1.1723}$$

£ 162.07 [2]

9 Without using a calculator, work out $1\frac{2}{3} \div 7\frac{1}{2}$.

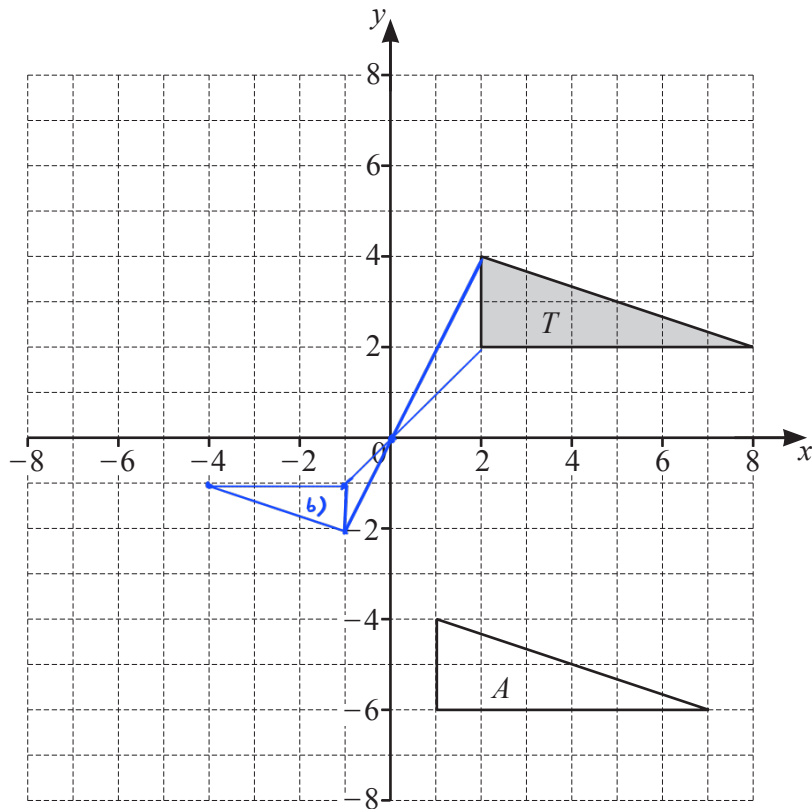
R You must show all your working and give your answer as a fraction in its simplest form.

$$\begin{aligned} & \frac{5}{3} \div \frac{15}{2} \\ &= \frac{5}{3} \times \frac{2}{15} \\ &= \frac{5 \times 2}{3 \times 3 \times 5} \end{aligned}$$

..... $\frac{2}{9}$ [3]

10

R



(a) Describe fully the **single** transformation that maps triangle *T* onto triangle *A*.

..... Translation $\begin{pmatrix} -1 \\ -8 \end{pmatrix}$

[2]

(b) Draw the image of triangle *T* after an enlargement, scale factor $-\frac{1}{2}$, centre (0, 0).

[2]

11 Simplify $3x^3 \times 4x^4$.

R

$$3 \times 4 (x^3 \times x^4)$$

..... $12x^7$ [2]

12 x is an integer and $-3 \leq 2x-1 < 3$.

R

Find the values of x .

$$-3 \leq 2x-1 \Rightarrow -2 \leq 2x \Rightarrow -1 \leq x$$

$$2x-1 < 3 \Rightarrow 2x < 4 \Rightarrow x < 2$$

$$-1 \leq x < 2$$

$$\Rightarrow x = -1, 0, 1$$

$$\dots -1, 0, 1 \dots [2]$$

13 Expand and simplify.

R

$$6(t-q) - 2(t-3q)$$

$$6t - 6q - 2t + 6q$$

$$4t$$

$$\dots 4t \dots [2]$$

14 The magnitude of the vector $\begin{pmatrix} 20 \\ k \end{pmatrix}$ is 29.

R

Find the value of k .

$$\sqrt{20^2 + k^2} = 29$$

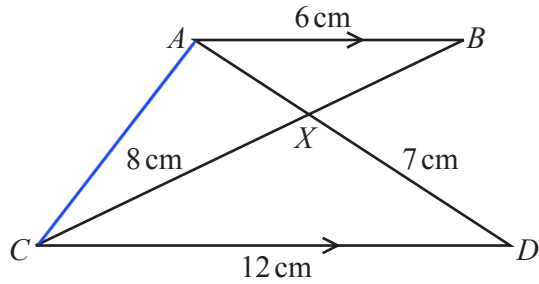
$$400 + k^2 = 841$$

$$k^2 = 441$$

$$k = 21$$

$$k = \dots 21 \dots [3]$$

15

NOT TO
SCALE

In the diagram, AB is parallel to CD .
 AD and BC intersect at X .
 $AB = 6$ cm, $CD = 12$ cm, $CX = 8$ cm and $DX = 7$ cm.

(a) Complete the statement.

Triangle ABX is *similar* to triangle DCX . [1]

(b) Work out the length of BX .

$$\frac{BX}{CX} = \frac{AB}{DC} = \frac{6}{12} = \frac{1}{2}$$

$$BX = \frac{1}{2} CX = \frac{1}{2} \times 8 = 4$$

$BX =$ *4* cm [2]

(c) The area of triangle DCX is 26.906 cm².

Use this value to find the area of

(i) triangle ABX ,

$$\text{Ratio area} = (\text{Ratio length})^2$$

$$\frac{A_{\Delta DCX}}{A_{\Delta ABX}} = \left(\frac{CX}{BX}\right)^2 = \left(\frac{8}{4}\right)^2 = 4$$

$$A_{\Delta ABX} = 26.906 : 4$$

..... *6.7265* cm² [2]

(ii) triangle ACX .

$$\frac{A_{\Delta ACX}}{A_{\Delta ABX}} = \frac{CX}{BX} = \frac{8}{4} = 2$$

$$\Rightarrow A_{\Delta ACX} = 2 \times 6.7265$$

..... *13.453* cm² [1]

16 The sides of a regular hexagon are 80 mm, correct to the nearest millimetre.

R Calculate the lower bound of the perimeter of the hexagon.

$$6 \times \left(80 - \frac{1}{2} \right)$$

..... 477 mm [2]

17 The interior angle of a regular polygon is 175° .

R Calculate the number of sides.

$$\frac{(n-2) 180}{n} = 175$$

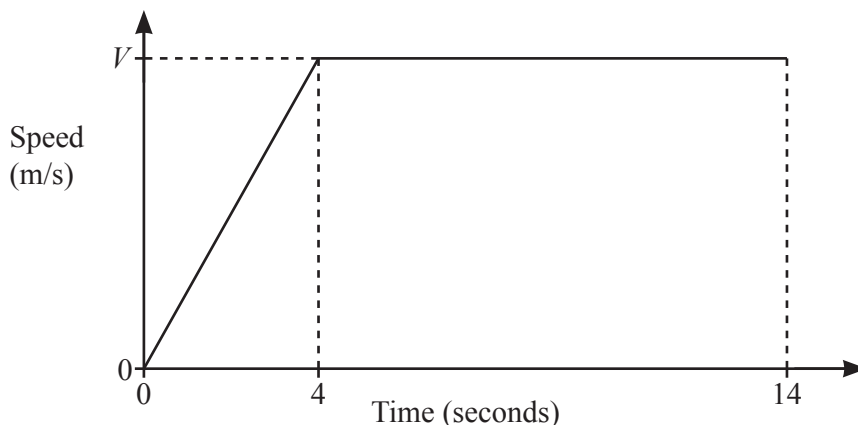
$$180n - 360 = 175n$$

$$5n = 360$$

..... 72° [2]

18 A car starts from rest and accelerates at a rate of 3 m/s^2 for 4 seconds.

R The car then travels at a constant speed for 10 seconds.



The diagram shows the speed–time graph for this journey.

(a) Find the value of V .

$$\frac{V}{4} = 3$$

$V =$ 12 [1]

(b) Calculate the total distance travelled by the car during the 14 seconds.

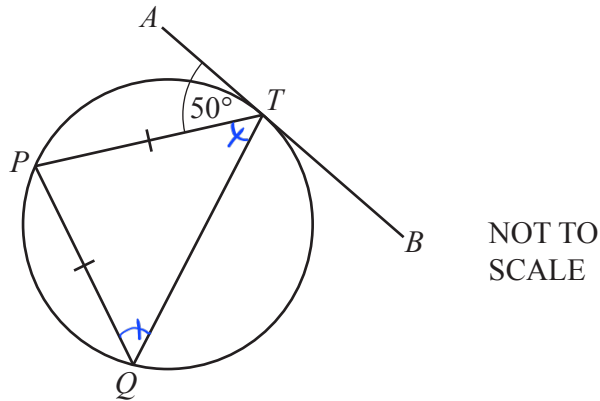
$$\frac{1}{2} \times 4 \times 12 + (14-4) 12$$

$$24 + 120$$

..... 144 m [2]

19 (a)

7c



P , Q and T are points on a circle.
 ATB is a tangent to the circle at T and $PT = PQ$.

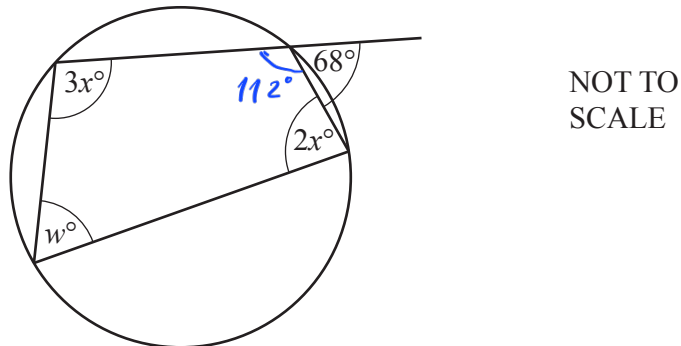
Find angle TPQ .

$$\widehat{PQT} = \widehat{ATP} = 50^\circ \text{ (alternate segment theorem)}$$

$$\widehat{TPQ} = 180^\circ - 2 \times 50^\circ = 80^\circ$$

Angle $TPQ = \dots 80^\circ \dots$ [2]

(b)



The diagram shows a cyclic quadrilateral with an exterior angle of 68° .

Find the value of w and the value of x .

$$180 - 68 = 112$$

$$w = 180 - 112 = 68 \text{ (cyclic quadrilateral)}$$

$$3x + 2x = 180$$

$$\Rightarrow 5x = 180$$

$$x = 36$$

$w = \dots 68 \dots$

$x = \dots 36 \dots$ [3]

- 20 Simplify $2.1 \times 10^p + 2.1 \times 10^{p-1}$.
Give your answer in standard form.

(K)

$$2.1 \times 10^p + 0.21 \times 10^p$$

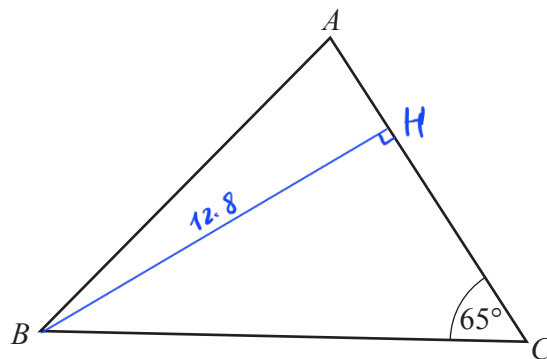
$$(2.1 + 0.21) 10^p$$

$$2.31 \times 10^p$$

..... 2.31×10^p [2]

21

(K)



NOT TO
SCALE

The shortest distance from B to AC is 12.8 cm.

Calculate BC .

$$\sin 65^\circ = \frac{BH}{BC} = \frac{12.8}{BC}$$

$$BC = \frac{12.8}{\sin 65^\circ} \approx 14.1$$

$BC = \dots 14.1 \dots$ cm [3]

- 22 z is inversely proportional to the square of $(y-2)$.
When $y = 5$, $z = 9$.

(K)

Find z in terms of y .

$$z \sim \frac{k}{(y-2)^2}$$

$$9 = \frac{k}{(5-2)^2} = \frac{k}{9} \Rightarrow k = 81$$

$z = \dots \frac{81}{(y-2)^2} \dots$ [2]

23 A triangle has sides of length 11 cm, 10 cm and 9 cm.

(K)

Calculate the largest angle in the triangle.

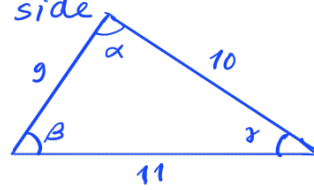
The largest angle is opposite to the largest side

$$11^2 = 9^2 + 10^2 - 2 \times 9 \times 10 \cos \alpha$$

$$-60 = -180 \cos \alpha$$

$$\cos \alpha = \frac{1}{3}$$

$$\alpha = 70.5^\circ$$

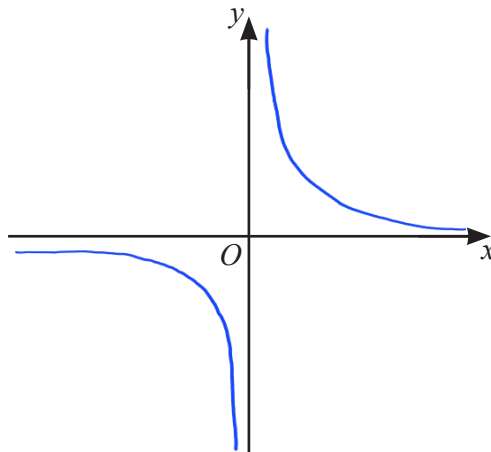


..... 70.5° [4]

24 On the axes, sketch the graph of each of these functions.

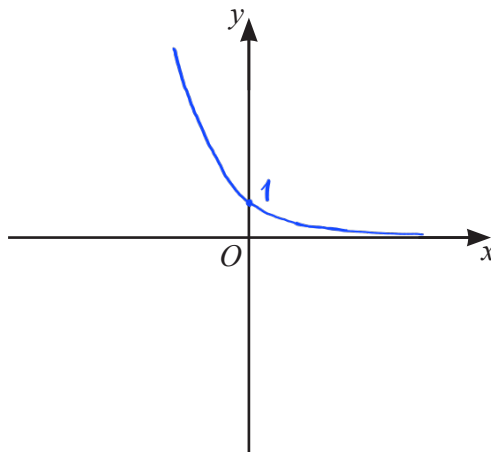
(K)

(a) $y = \frac{2}{x}$



[2]

(b) $y = 2^{-x}$



[2]

- 25 Find the x -coordinates of the points on the graph of $y = x^5 - 5x^4$ where the gradient is 0.

76

$$\frac{dy}{dx} = 5x^4 - 20x^3 = 0$$

$$5x^3(x - 4) = 0$$

$$x = 0 \text{ or } x = 4$$

..... 0, 4 [4]

- 26 Malik goes to a shop every day to buy bread.

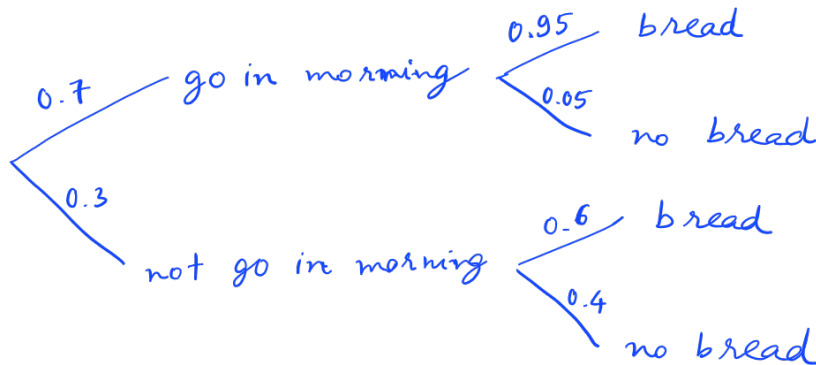
76

On any day, the probability that Malik goes to the shop in the morning is 0.7 .

If he goes in the morning, the probability that there is bread for Malik to buy is 0.95 .

If he goes later, the probability that there is bread for Malik to buy is 0.6 .

Calculate the probability that, on any day, there is bread for Malik to buy.



$$0.7 \times 0.95 + 0.3 \times 0.6$$

..... 0.845 [3]