

- 1 Two quantities c and d are connected by the formula $c = 2d + 30$.
Find c when $d = -100$.

For
Examiner's
Use

Answer [1]

- 2 (a)

$$\frac{2}{3} + \frac{5}{6} = \frac{x}{2}.$$

Find the value of x .

Answer(a) $x =$ [1]

- (b)

$$\frac{5}{3} \div \frac{3}{y} = \frac{40}{9}.$$

Find the value of y .

Answer(b) $y =$ [1]

- 3 Use your calculator to work out

(a) $\sqrt{(7 + 6 \times 243^{0.2})},$

Answer(a) [1]

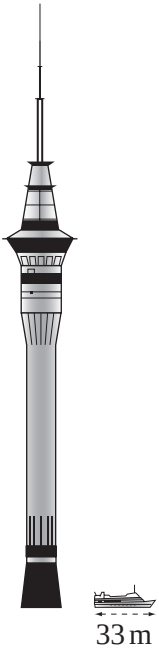
(b) $2 - \tan 30^\circ \times \tan 60^\circ.$

Answer(b) [1]

- 4 Angharad sleeps for 8 hours each night, correct to the nearest 10 minutes.
The total time she sleeps in the month of November (30 nights) is T hours.
Between what limits does T lie?

Answer $\leq T <$ [2]

5



The picture shows the Sky Tower in Auckland.
 Alongside the tower is a boat. The boat is 33 metres long.
 Use the length of the boat to estimate the height of the Sky Tower.

Answerm [2]

6

0.0008 8×10^{-5} 0.8% $\frac{1}{125\,000}$

Write the numbers above in order, smallest first.

Answer < < < [2]

7 Find the value of n in each of the following statements.

(a) $32^n = 1$

Answer(a) $n =$ [1]

(b) $32^n = 2$

Answer(b) $n =$ [1]

(c) $32^n = 8$

Answer(c) $n =$ [1]

- 8 The Canadian Maple Leaf train timetable from Toronto to Buffalo is shown below.

Toronto	10 30
Oakville	10 52
Aldershot	11 07
Grimsby	11 41
St Catharines	11 59
Niagra Falls	12 24
Buffalo	13 25

For
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Use

- (a) How long does the journey take from Toronto to Buffalo?

Answer(a) h min [1]

- (b) This journey is 154 kilometres. Calculate the average speed of the train.

Answer(b) km/h [2]

- 9 For each of the following sequences, write down the next term.

- (a) 2, 3, 5, 8, 13, ...

Answer(a) [1]

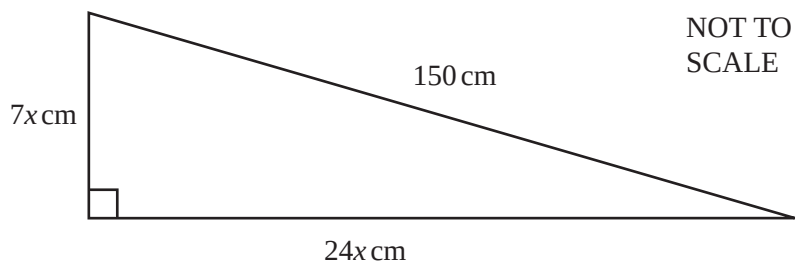
- (b) x^6 , $6x^5$, $30x^4$, $120x^3$, ...

Answer(b) [1]

- (c) 2, 6, 18, 54, 162, ...

Answer(c) [1]

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For
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Use

The right-angled triangle in the diagram has sides of length $7x$ cm, $24x$ cm and 150 cm.

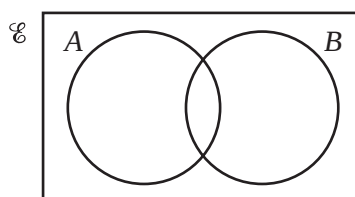
(a) Show that $x^2 = 36$.

[2]

(b) Calculate the perimeter of the triangle.

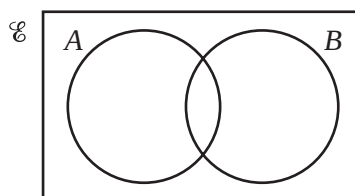
Answer(b)cm [1]

11 (a) Shade the region $A \cap B$.



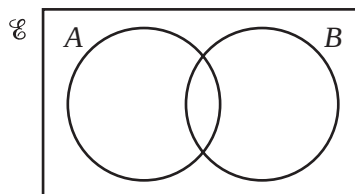
[1]

(b) Shade the region $(A \cup B)'$.



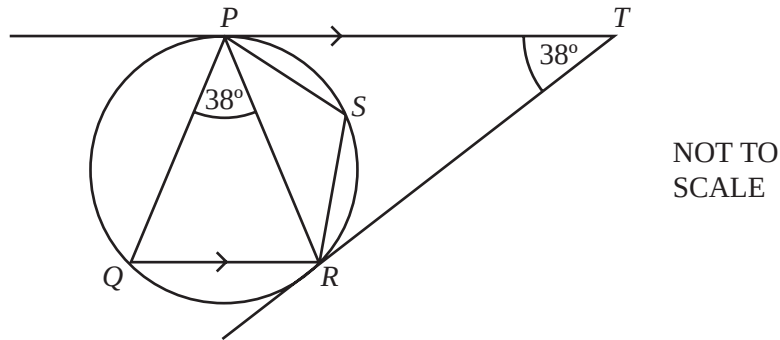
[1]

(c) Shade the complement of set B .



[1]

12

For
Examiner's
Use

In the diagram PT and QR are parallel. TP and TR are tangents to the circle $PQRS$.
Angle $PTR = \text{angle } RPQ = 38^\circ$.

- (a) What is the special name of triangle TPR . Give a reason for your answer.

Answer(a) name

reason [1]

- (b) Calculate

- (i) angle PQR ,

Answer(b)(i) Angle $PQR = \dots\dots\dots$ [1]

- (ii) angle PSR .

Answer(b)(ii) Angle $PSR = \dots\dots\dots$ [1]

- 13 A statue two metres high has a volume of five cubic metres.
A similar model of the statue has a height of four centimetres.

- (a) Calculate the volume of the model statue in cubic centimetres.

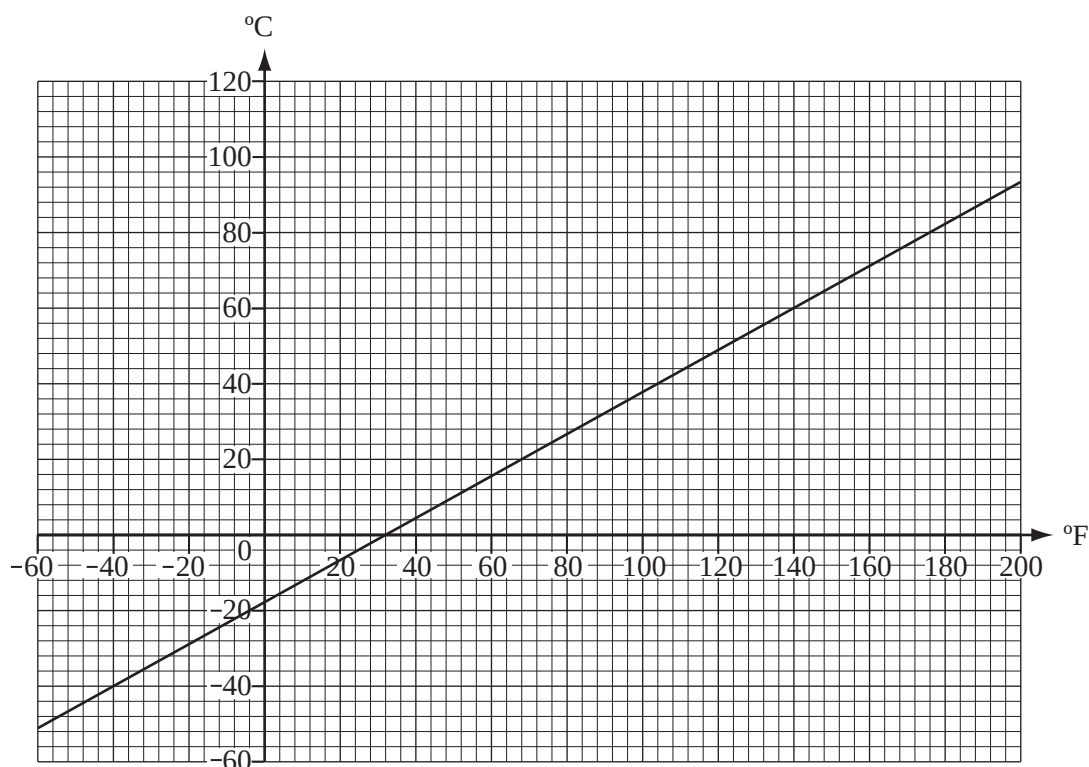
Answer(a) cm^3 [2]

- (b) Write your answer to **part (a)** in cubic metres.

Answer(b) m^3 [1]

- 14 The graph drawn below shows the conversion of temperatures in degrees Fahrenheit ($^{\circ}\text{F}$) to temperatures in degrees Celsius ($^{\circ}\text{C}$).

For
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Use



- (a) The temperature of a room is 20°C . What is the temperature in Fahrenheit?

Answer(a) [1]

- (b) A liquid has a boiling point of 176°F . What is the temperature in Celsius?

Answer(b) [1]

- (c) Find T when $T^{\circ}\text{C} = T^{\circ}\text{F}$.

Answer(c) $T =$ [1]

- 15 $f: x \mapsto 5 - 3x$.

- (a) Find $f(-1)$.

Answer(a) [1]

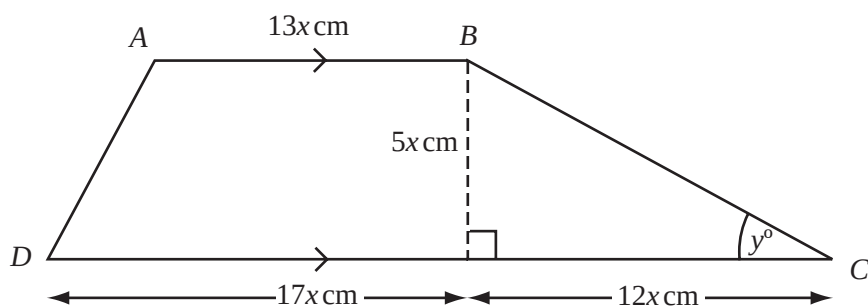
- (b) Find $f^{-1}(x)$.

Answer(b) [2]

- (c) Find $ff^{-1}(8)$.

Answer(c) [1]

16

NOT TO
SCALEFor
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Use

$ABCD$ is a trapezium.

- (a) Find the area of the trapezium in terms of x and simplify your answer.

Answer(a) cm^2 [2]

- (b) Angle $BCD = y^\circ$. Calculate the value of y .

Answer(b) $y =$ [2]

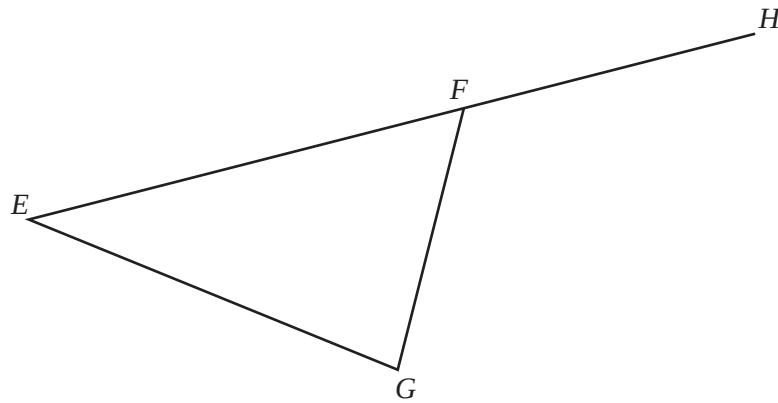
17 Solve the equations

- (a) $0.2x - 3 = 0.5x$,

Answer(a) $x =$ [2]

- (b) $2x^2 - 11x + 12 = 0$.

Answer(b) $x =$ or $x =$ [3]



The diagram shows a triangle EFG . The side EF is extended to H .

- (a) Using a straight edge and compasses only, **showing your construction arcs**, draw
- (i) the locus of points that are equidistant from E and G , [2]
 - (ii) the locus of points that are equidistant from FG and FH . [2]
- (b) Measure accurately and write down the acute angle between the two lines drawn in **part (a)**.

Answer(b) [1]

19 (a) Find $\begin{pmatrix} 3 & 4 \end{pmatrix} \begin{pmatrix} 5 \\ 2 \end{pmatrix}$.

Answer(a) [2]

(b) $\begin{pmatrix} 7 \\ 3 \end{pmatrix} \begin{pmatrix} x & y \end{pmatrix} = \begin{pmatrix} 28 & 42 \\ 12 & 18 \end{pmatrix}$. Find the values of x and y .

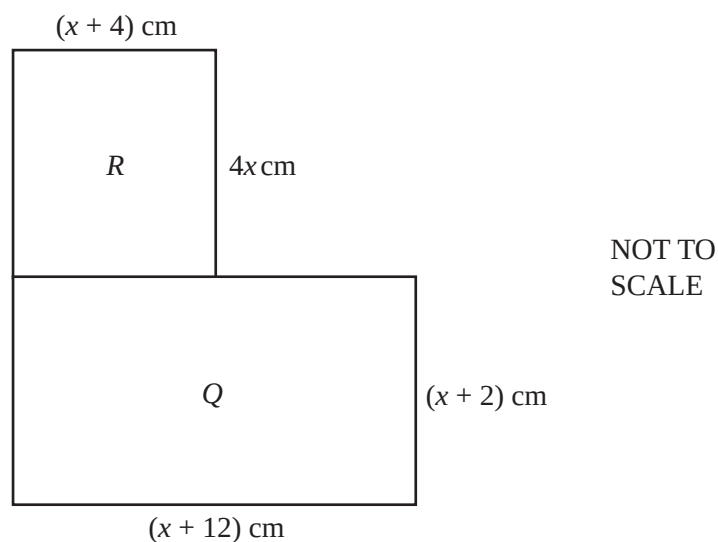
Answer(b) $x =$

$y =$ [2]

(c) Explain why $\begin{pmatrix} 15 & 20 \\ 6 & 8 \end{pmatrix}$ does not have an inverse.

Answer(c) [1]

20

For
Examiner's
Use

- (a) (i) Write down an expression for the area of rectangle *R*.

Answer(a) (i)cm² [1]

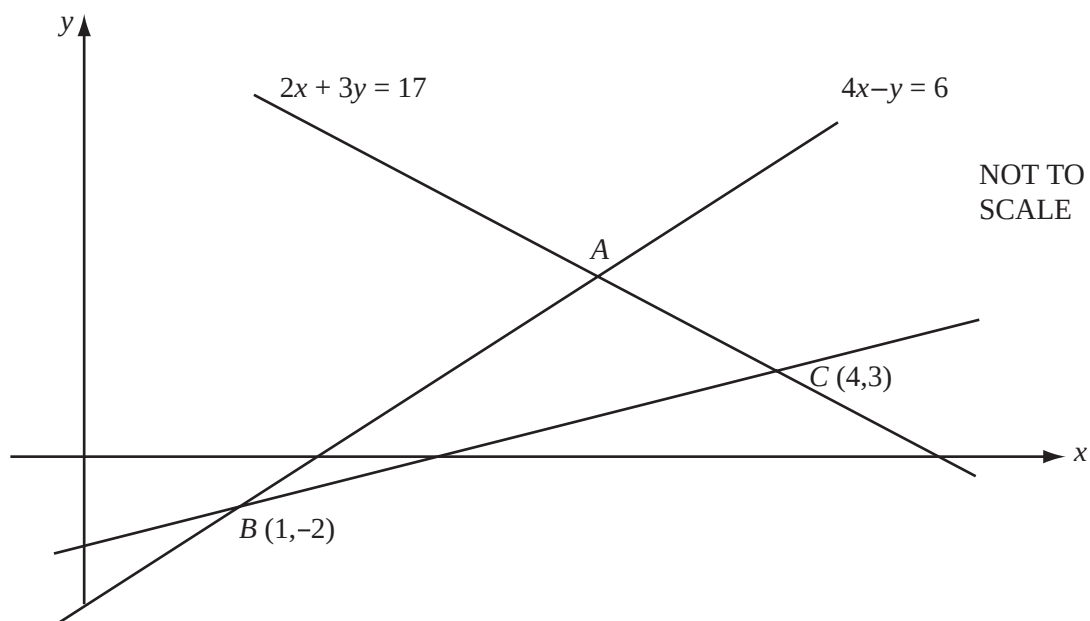
- (ii) Show that the total area of rectangles *R* and *Q* is $5x^2 + 30x + 24$ square centimetres.

[1]

- (b) The total area of rectangles *R* and *Q* is 64 cm².
Calculate the value of x correct to 1 decimal place.

Answer(b) $x =$ [4]

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For
Examiner's
Use

In the diagram, the line AC has equation $2x + 3y = 17$ and the line AB has equation $4x - y = 6$.
 The lines BC and AB intersect at $B(1, -2)$.
 The lines AC and BC intersect at $C(4, 3)$.

(a) Use algebra to find the coordinates of the point A .

Answer(a) [3]

(b) Find the equation of the line BC .

Answer(b) [3]

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