



- 1 Factorise completely.

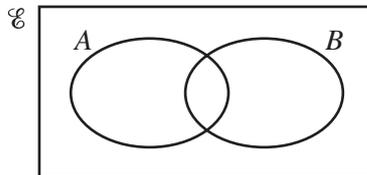
$$2xy - 4yz$$

Answer ..... [2]

- 2 Make  $x$  the subject of the formula.  $y = \frac{x}{3} + 5$

Answer  $x =$  ..... [2]

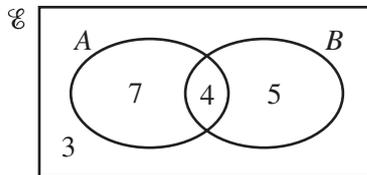
- 3 (a)



Shade the region  $A \cap B'$ .

[1]

- (b)



This Venn diagram shows the number of elements in each region.

Write down the value of  $n(A \cup B')$ .

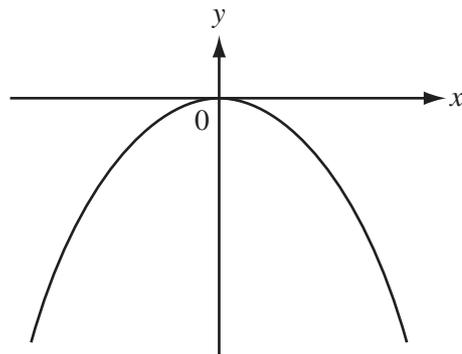
Answer(b)  $n(A \cup B') =$  ..... [1]

- 4 Helen measures a rectangular sheet of paper as 197 mm by 210 mm, each correct to the nearest millimetre.  
Calculate the upper bound for the perimeter of the sheet of paper.

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Answer ..... mm [2]

5



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The sketch shows the graph of  $y = ax^n$  where  $a$  and  $n$  are integers.

Write down a possible value for  $a$  and a possible value for  $n$ .

Answer  $a =$  .....

$n =$  ..... [2]

- 6 (a) Write 16 460 000 in standard form.

Answer(a) ..... [1]

- (b) Calculate  $7.85 \div (2.366 \times 10^2)$ , giving your answer in standard form.

Answer(b) ..... [2]

7 (a) Find the value of  $x$  when  $\frac{18}{24} = \frac{27}{x}$ .

Answer(a)  $x = \dots\dots\dots$  [1]

(b) Show that  $\frac{2}{3} \div 1\frac{1}{6} = \frac{4}{7}$ .

Write down all the steps in your working.

Answer(b)

[2]

8 Solve the simultaneous equations.

$$\begin{aligned} x + 2y &= 3 \\ 2x - 3y &= 13 \end{aligned}$$

Answer  $x = \dots\dots\dots$

$y = \dots\dots\dots$  [3]

9 Eva invests \$120 at a rate of 3% per year **compound interest**.

Calculate the total amount Eva has after 2 years.

Give your answer correct to 2 decimal places.

Answer \$  $\dots\dots\dots$  [3]

10 The cost of a cup of tea is  $t$  cents.

The cost of a cup of coffee is  $(t + 5)$  cents.

The total cost of 7 cups of tea and 11 cups of coffee is 2215 cents.

Find the cost of one cup of tea.

Answer ..... cents [3]

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11 The volume of a solid varies directly as the **cube** of its length.  
When the length is 3 cm, the volume is  $108 \text{ cm}^3$ .

Find the volume when the length is 5 cm.

Answer .....  $\text{cm}^3$  [3]

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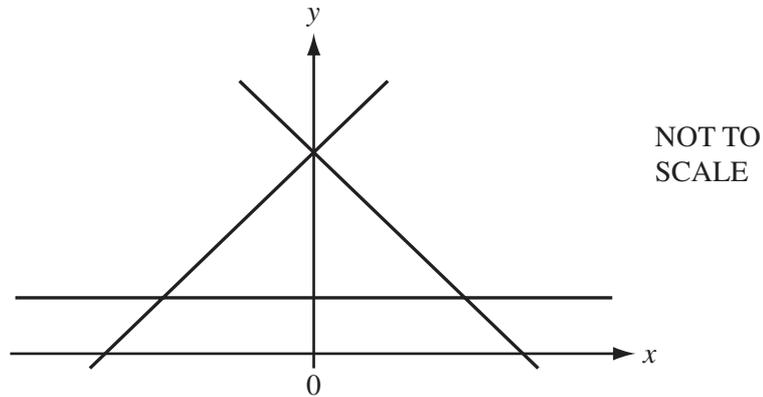
- 12 Federico changed 400 euros (€) into New Zealand dollars (NZ\$) at a rate of €1 = NZ\$ 2.1 .  
He spent  $x$  New Zealand dollars and changed the rest back into euros at a rate of €1 = NZ\$  $d$ .

Find an expression, in terms of  $x$  and  $d$ , for the number of euros Federico received.

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Answer € ..... [3]

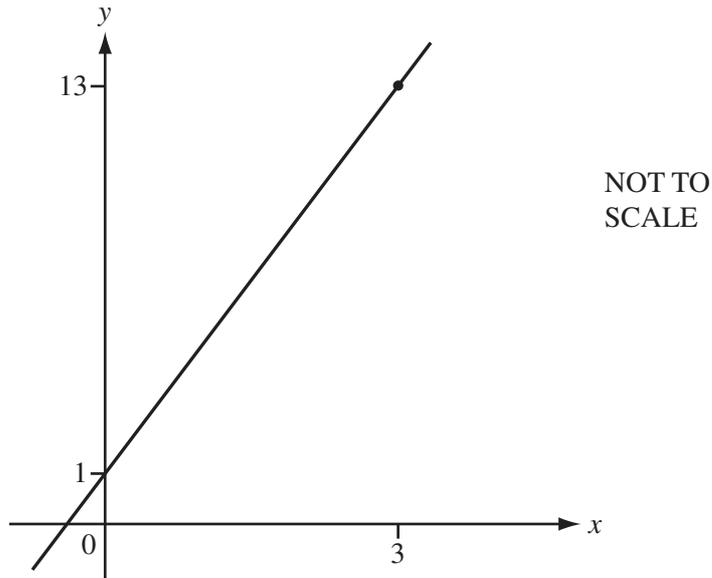
13



The diagram shows the lines  $y = 1$ ,  $y = x + 4$  and  $y = 4 - x$ .

On the diagram, **label the region R** where  $y \geq 1$ ,  $y \geq x + 4$  and  $y \leq 4 - x$ . [3]

14



The diagram shows the straight line which passes through the points  $(0, 1)$  and  $(3, 13)$ .

Find the equation of the straight line.

Answer ..... [3]

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15 A cylinder has a height of 12 cm and a volume of  $920 \text{ cm}^3$ .

Calculate the radius of the base of the cylinder.

Answer ..... cm [3]

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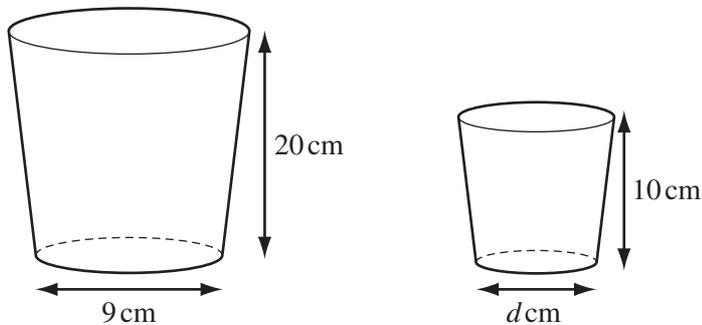
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- 16 Write  $\frac{2}{x-2} + \frac{3}{x+2}$  as a single fraction.

Give your answer in its simplest form.

Answer ..... [3]

17



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The diagrams show two mathematically similar containers.  
The larger container has a base with diameter 9 cm and a height 20 cm.  
The smaller container has a base with diameter  $d$  cm and a height 10 cm.

- (a) Find the value of  $d$ .

Answer(a)  $d =$  ..... [1]

- (b) The larger container has a capacity of 1600 ml.

Calculate the capacity of the smaller container.

Answer(b) ..... ml [2]

18 Simplify the following.

(a)  $(3x^3)^3$

Answer(a) ..... [2]

(b)  $(125x^6)^{\frac{2}{3}}$

Answer(b) ..... [2]

19 The scale of a map is 1 : 250 000.

(a) The actual distance between two cities is 80 km.

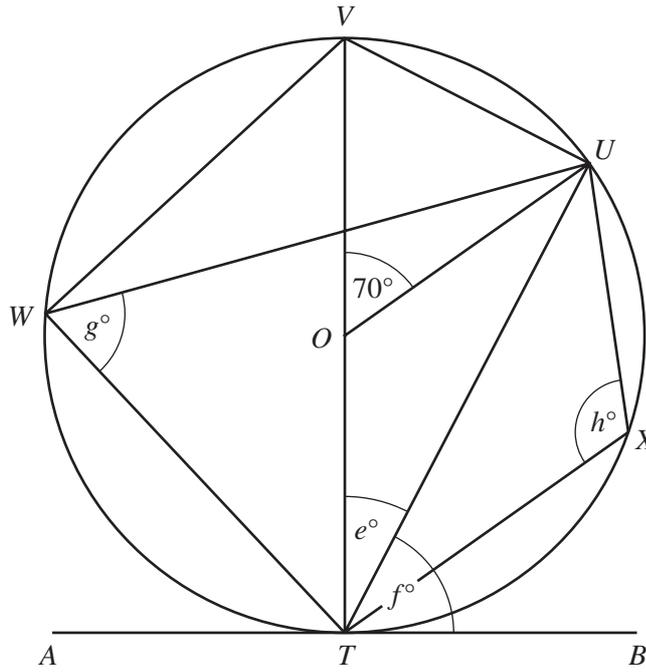
Calculate this distance on the map. Give your answer in centimetres.

Answer(a) ..... cm [2]

(b) On the map a large forest has an area of  $6 \text{ cm}^2$ .

Calculate the actual area of the forest. Give your answer in square kilometres.

Answer(b) .....  $\text{km}^2$  [2]



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The diagram shows a circle, centre  $O$ .  
 $VT$  is a diameter and  $ATB$  is a tangent to the circle at  $T$ .  
 $U, V, W$  and  $X$  lie on the circle and angle  $VOU = 70^\circ$ .

Calculate the value of

(a)  $e$ ,

Answer(a)  $e =$  ..... [1]

(b)  $f$ ,

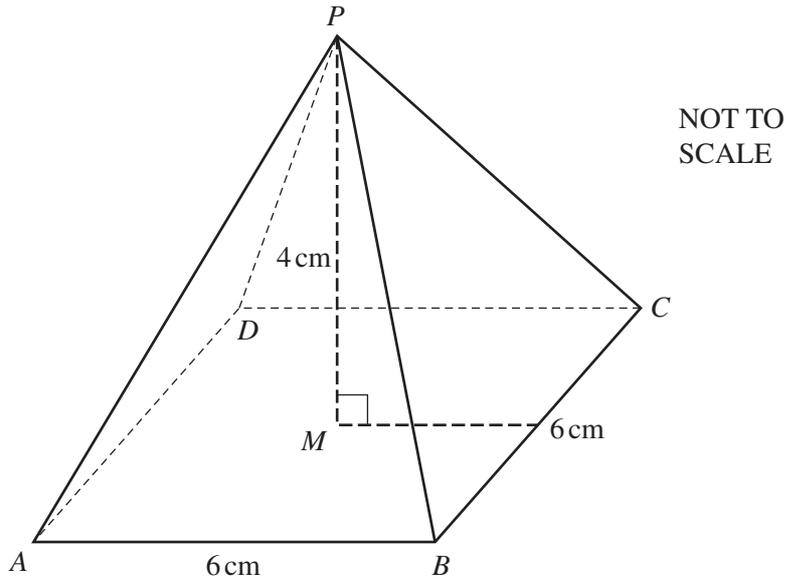
Answer(b)  $f =$  ..... [1]

(c)  $g$ ,

Answer(c)  $g =$  ..... [1]

(d)  $h$ .

Answer(d)  $h =$  ..... [1]



The diagram shows a pyramid with a square base  $ABCD$  of side  $6\text{ cm}$ .

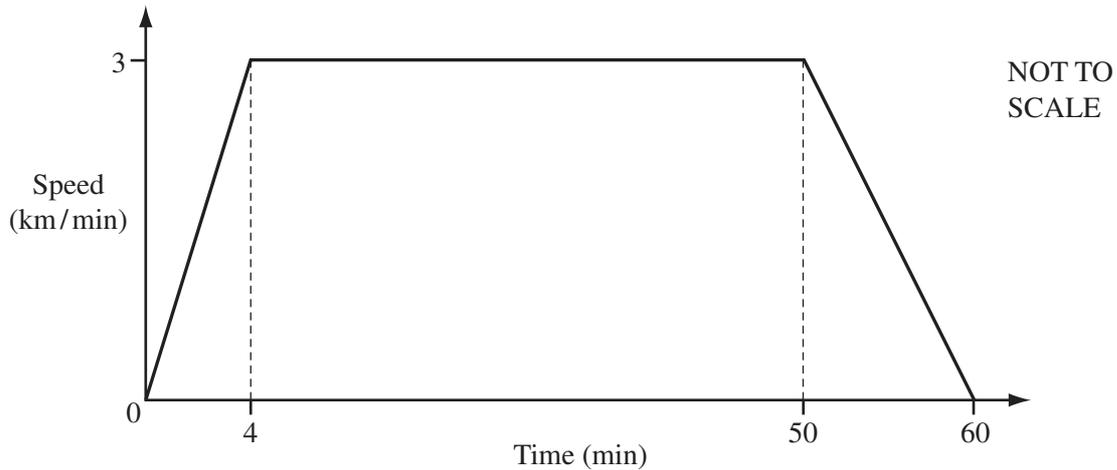
The height of the pyramid,  $PM$ , is  $4\text{ cm}$ , where  $M$  is the centre of the base.

Calculate the total surface area of the pyramid.

Answer .....  $\text{cm}^2$  [5]

Question 22 is printed on the next page.

22



For  
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A train journey takes one hour.  
The diagram shows the speed-time graph for this journey.

- (a) Calculate the total distance of the journey.

Give your answer in kilometres.

Answer(a) ..... km [3]

- (b) (i) Convert 3 kilometres/minute into metres/second.

Answer(b)(i) ..... m/s [2]

- (ii) Calculate the acceleration of the train during the first 4 minutes.

Give your answer in metres/second<sup>2</sup>.

Answer(b)(ii) ..... m/s<sup>2</sup> [2]

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