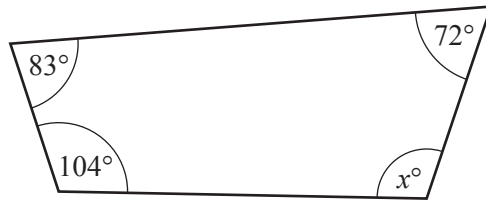


1



NOT TO SCALE

The diagram shows a quadrilateral.

Find the value of x .

$x = \dots\dots\dots$ [1]

2 Work out.

$$2^{-4} \times 2^5$$

$\dots\dots\dots$ [1]

3 (a) Use a calculator to work out $\frac{5^{0.4} - \sqrt{3}}{0.13 - 0.015}$.

Write down all the digits in your calculator display.

$\dots\dots\dots$ [1]

(b) Write your answer to **part (a)** correct to 2 significant figures.

$\dots\dots\dots$ [1]

4 Amber's mean mark on five tests is 80.
Her marks on four of these tests are 68, 81, 74 and 89.

Work out her mark on the fifth test.

$\dots\dots\dots$ [2]

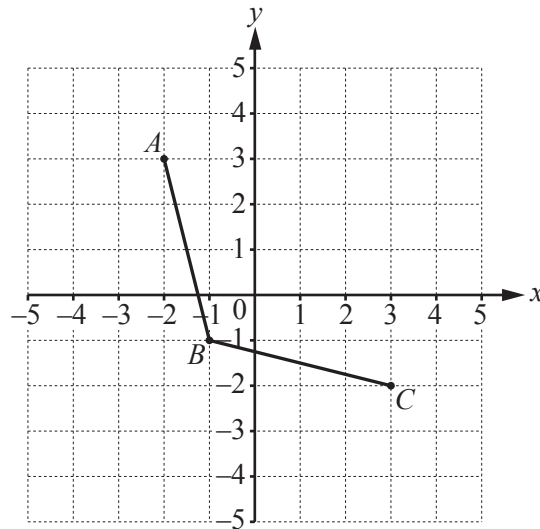
5 Factorise completely.

$$12x^2 + 15xy - 9x$$

$\dots\dots\dots$ [2]



6



The diagram shows two sides of a rhombus $ABCD$.

(a) Write down the co-ordinates of A .

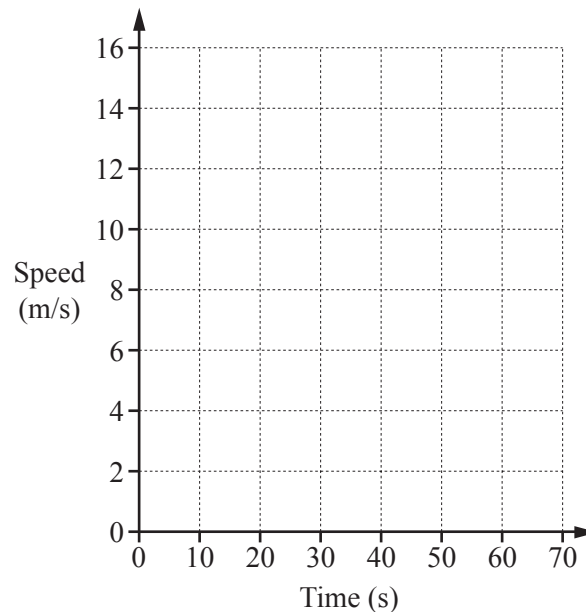
(.....,) [1]

(b) Complete the rhombus $ABCD$ on the grid.

[1]

- 7 Petra begins a journey in her car.
 She accelerates from rest at a constant rate of 0.4 m/s^2 for 30 seconds.
 She then travels at a constant speed for 40 seconds.

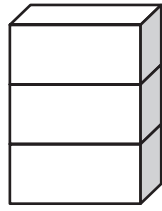
On the grid, draw the speed-time graph for the first 70 seconds of Petra's journey.



[2]



8



NOT TO SCALE

The diagram shows three identical cuboids in a tower.
The height of one cuboid is 6.5 cm, correct to the nearest millimetre.

Work out the upper bound of the height of the tower.

..... cm [2]

9 The value of a motorbike is \$12400.
Each year, the value of the motorbike decreases exponentially by 15%.

Calculate the value of the motorbike after 3 years.

\$..... [2]

10 **Without using a calculator**, work out $1\frac{2}{3} - \frac{11}{15}$.

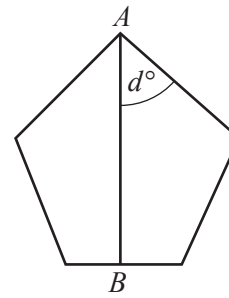
Write down all the steps of your working and give your answer as a fraction in its lowest terms.

..... [3]



- 11 The diagram shows a regular pentagon.
 AB is a line of symmetry.

Work out the value of d .



NOT TO SCALE

$d = \dots\dots\dots$ [3]

- 12 $\sqrt{5}$ -7 343 -11 0.4 2.5 $\frac{1}{3}$

From this list of numbers, write down

- (a) a cube number,

$\dots\dots\dots$ [1]

- (b) the smallest number,

$\dots\dots\dots$ [1]

- (c) a natural number.

$\dots\dots\dots$ [1]

- 13 Simplify.

- (a) $(m^5)^2$

$\dots\dots\dots$ [1]

- (b) $4x^3y \times 5x^2y$

$\dots\dots\dots$ [2]



- 14 (a) D is the point $(2, -5)$ and $\overrightarrow{DE} = \begin{pmatrix} 7 \\ 1 \end{pmatrix}$.

Find the co-ordinates of the point E .

(.....,) [1]

- (b) $\mathbf{v} = \begin{pmatrix} t \\ 12 \end{pmatrix}$ and $|\mathbf{v}| = 13$.

Work out the value of t , where t is negative.

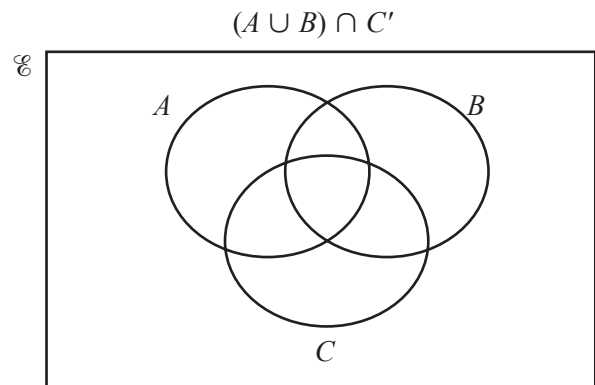
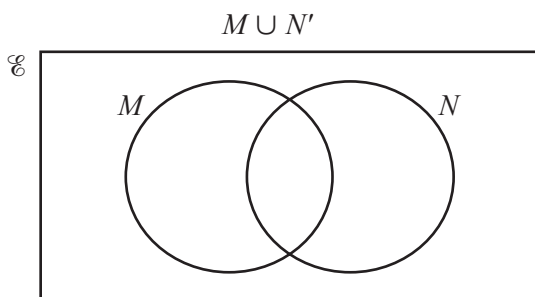
$t =$ [2]

- 15 (a) $Q = \{1, 2, 3, 4, 5, 6\}$

Write down a set P where $P \subset Q$.

$P =$ [1]

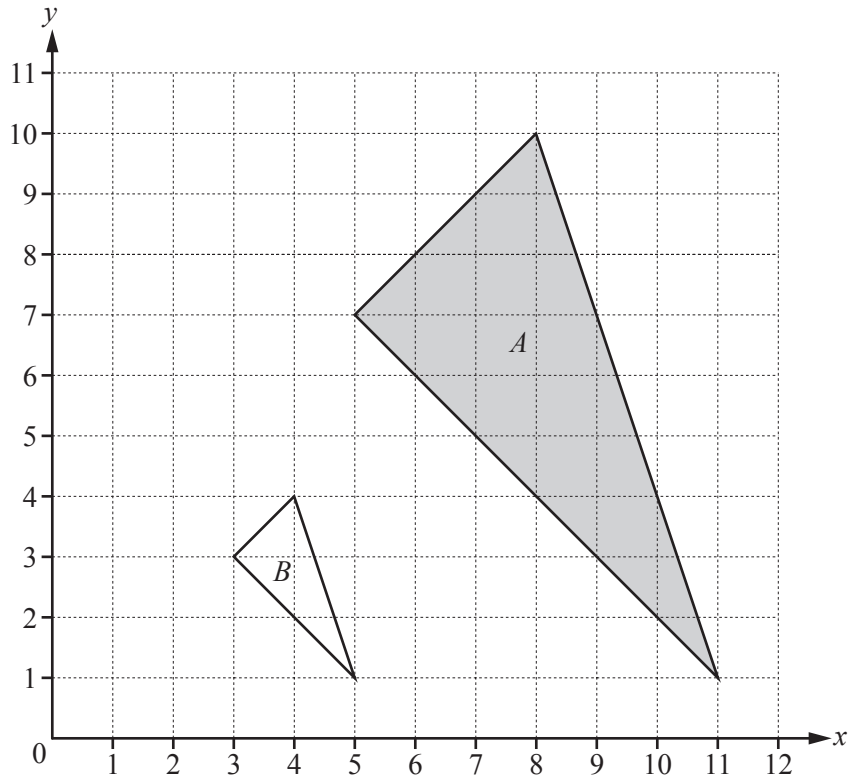
- (b) Shade these regions in the Venn diagrams.



[2]



16



Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

.....
 [3]

17 *y* is inversely proportional to $(x + 1)^2$.
 $y = 50$ when $x = 0.2$.

(a) Write *y* in terms of *x*.

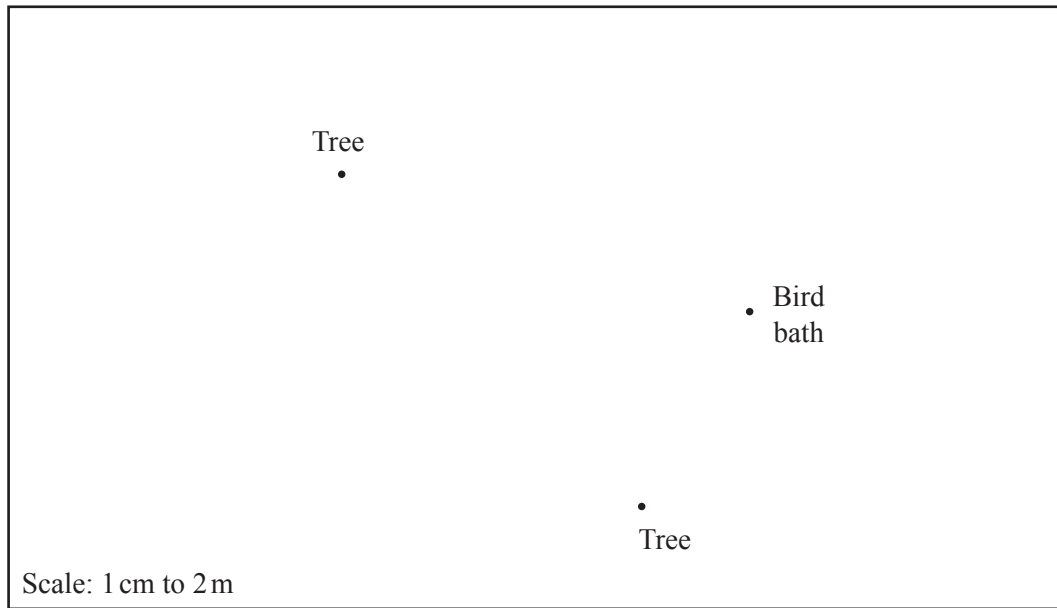
$y =$ [2]

(b) Find the value of *y* when $x = 0.5$.

$y =$ [1]



- 18 The diagram shows a scale drawing of Tariq’s garden.
The scale is 1 centimetre represents 2 metres.



Tariq puts a statue in the garden.
The statue is equidistant from the two trees and 10 m from the bird bath.

Find, by construction, the point where Tariq puts the statue.
Label the point *S*.

[4]

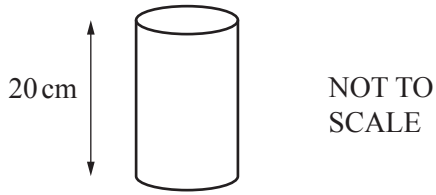
- 19 Write as a single fraction in its simplest form.

$$\frac{5}{x-3} + \frac{3}{x+7} + \frac{1}{2}$$

..... [4]



20 (a)

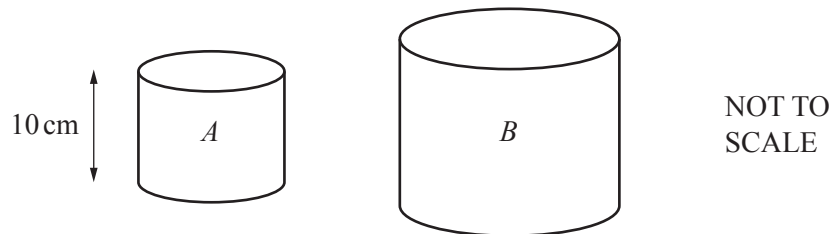


A cylinder has height 20 cm.
The area of the circular cross section is 74 cm^2 .

Work out the volume of this cylinder.

..... cm^3 [1]

(b) Cylinder *A* is mathematically similar to cylinder *B*.

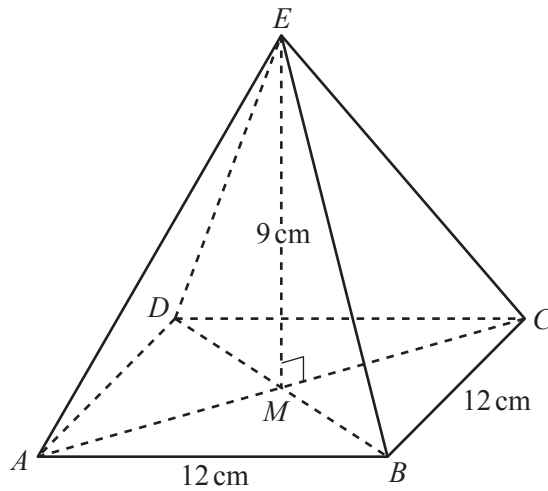


The height of cylinder *A* is 10 cm and its surface area is 440 cm^2 .
The surface area of cylinder *B* is 3960 cm^2 .

Calculate the height of cylinder *B*.

..... cm [3]





NOT TO
SCALE

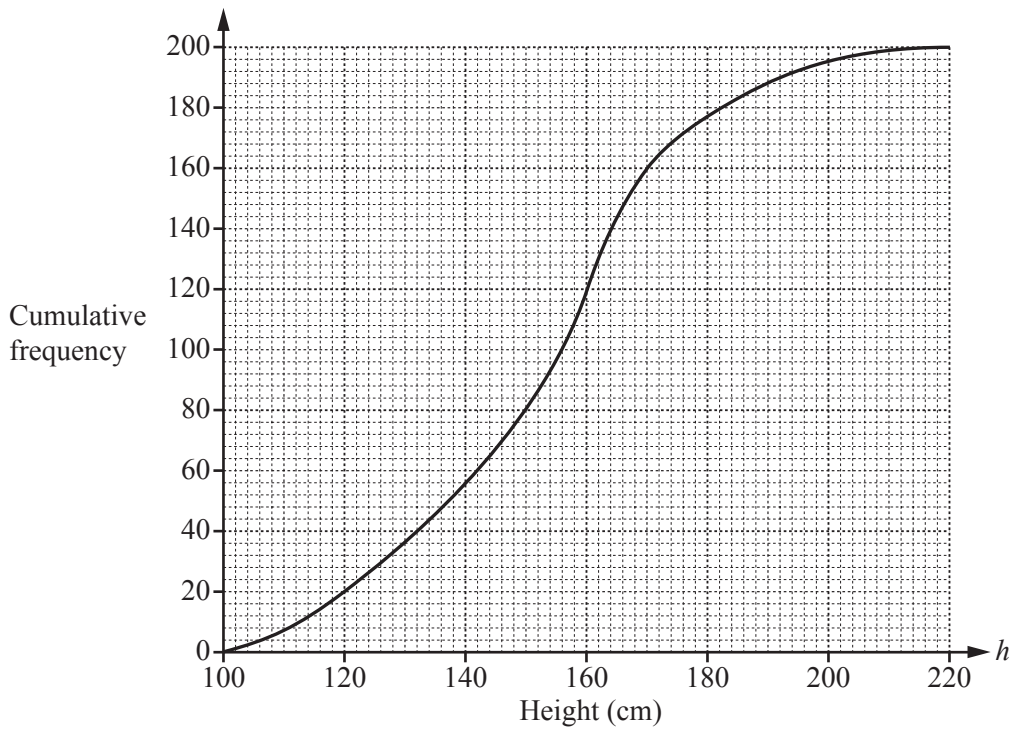
The diagram shows a square-based pyramid $ABCDE$.
 The diagonals of the square meet at M .
 E is vertically above M .
 $AB = BC = 12$ cm and $EM = 9$ cm.

Calculate the angle between the edge EC and the base, $ABCD$, of the pyramid.

..... [4]



- 22 Simon records the heights, h cm, of 200 sunflowers in his garden. The cumulative frequency diagram shows this information.



- (a) Find the number of these sunflowers that have a height of more than 160 cm.

..... [2]

- (b) Sue records the heights, h cm, of 200 sunflowers in her garden. The cumulative frequency table shows this information.

Height (h cm)	Cumulative frequency
$h \leq 100$	0
$h \leq 110$	20
$h \leq 120$	48
$h \leq 130$	100
$h \leq 140$	140
$h \leq 150$	172
$h \leq 160$	188
$h \leq 170$	200

On the grid above, draw another cumulative frequency diagram to show this information. [3]

- (c) Work out the difference between the median heights of Simon's sunflowers and Sue's sunflowers.

..... cm [2]

Question 23 is printed on the next page.



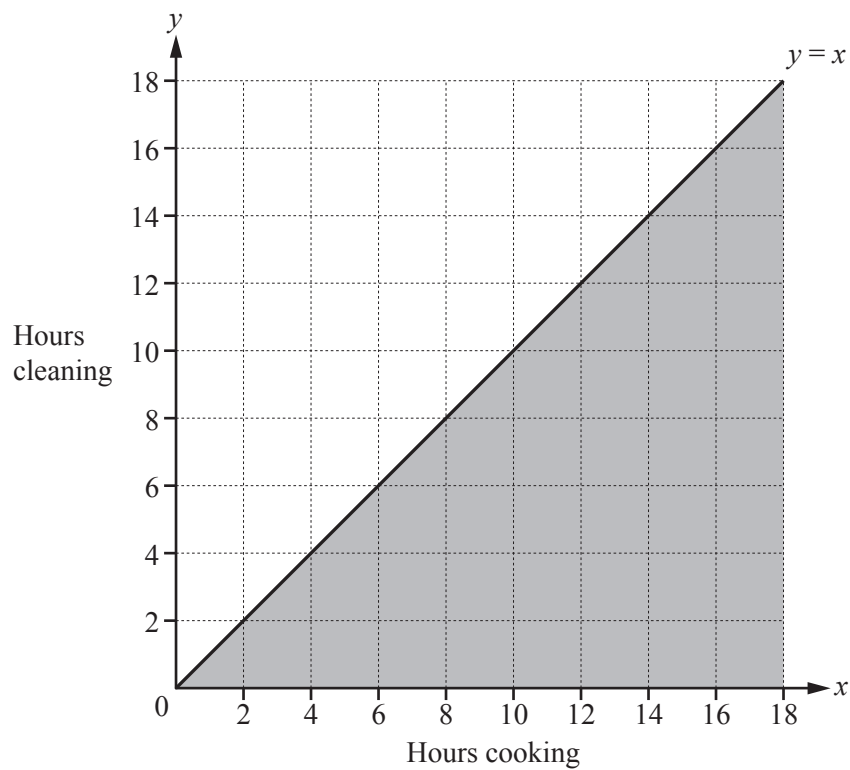
- 23 In one week, Neha spends x hours cooking and y hours cleaning.
 The time she spends cleaning is at least equal to the time she spends cooking.
 This can be written as $y \geq x$.

She spends no more than 16 hours in total cooking and cleaning.
 She spends at least 4 hours cooking.

- (a) Write down two more inequalities in x and/or y to show this information.

.....
 [2]

- (b) Complete the diagram to show the three inequalities.
 Shade the **unwanted** regions.



[3]

- (c) Neha receives \$10 for each hour she spends cooking and \$8 for each hour she spends cleaning.
 Work out the largest amount she could receive.

\$..... [2]

