

1 These are the first eight terms of a sequence.



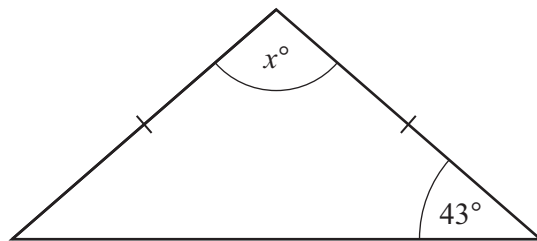
c -3 -9 -15 -21 -27 -33 k

Find the value of c and the value of k .

$c = \dots\dots\dots$

$k = \dots\dots\dots$ [2]

2 The diagram shows an isosceles triangle.



NOT TO
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Find the value of x .

$x = \dots\dots\dots$ [2]

3



0.25	3.142	$\sqrt{3}$	-3	24	-0.4	1.2	$-\frac{1}{4}$
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Complete each statement with a number from the list.

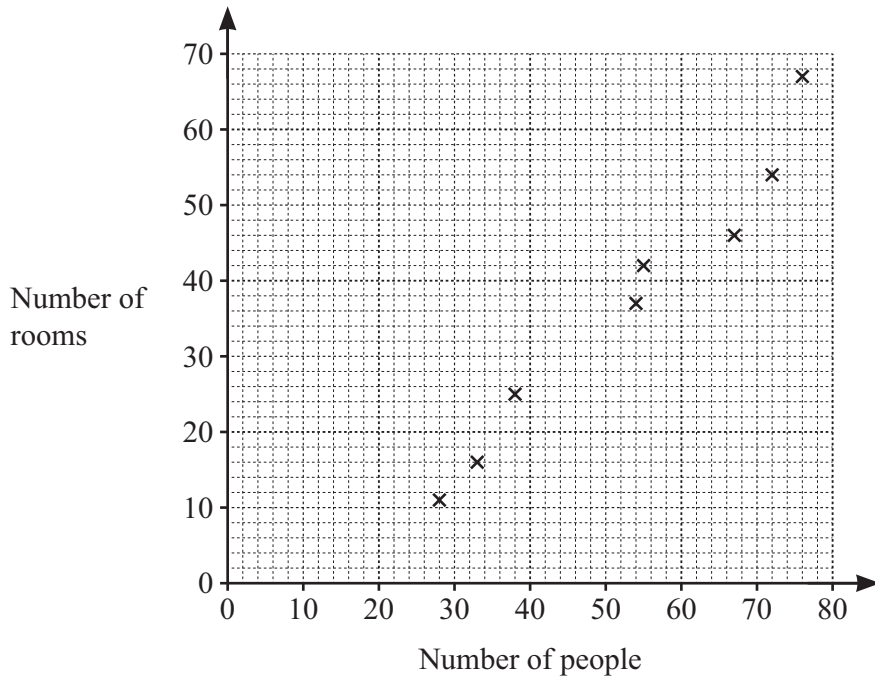
..... is a natural number.

..... is an irrational number.

..... is the reciprocal of 4.

[3]

4 The scatter diagram shows the number of rooms and the number of people in each of eight buildings.



(a) One of the buildings has 67 rooms.

Write down the number of people in this building.

..... [1]

(b) In another building there are 42 people and 33 rooms.

On the scatter diagram, plot this point.

[1]

(c) (i) On the scatter diagram, draw a line of best fit.

[1]

(ii) There are 45 people in a different building.

Find an estimate for the number of rooms in this building.

..... [1]

(d) What type of correlation is shown in the scatter diagram?

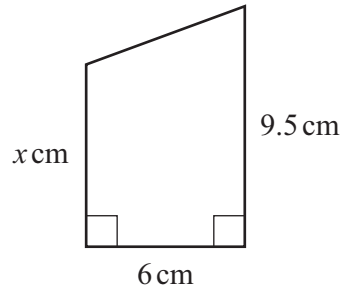
..... [1]

5 Convert 7.51 m^2 into cm^2 .



..... cm^2 [1]

6 The diagram shows a trapezium.



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The area of the trapezium is 42 cm^2 .

Calculate the value of x .

$x =$ [2]

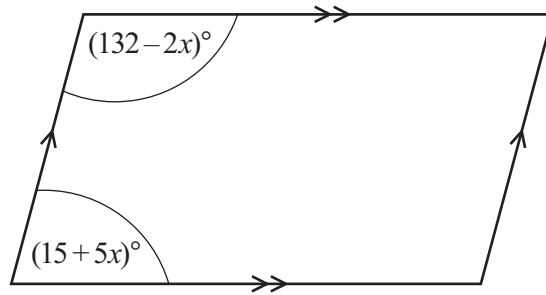
7 **Without using a calculator**, work out $\frac{2}{7} \div \frac{6}{11}$.



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

..... [2]

- 8 The diagram shows a parallelogram.



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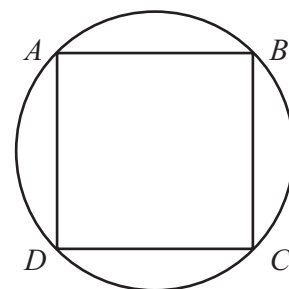
Work out the size of the smallest interior angle of the parallelogram.

..... [4]

- 9 Points A , B , C and D lie on a circle.
 $ABCD$ is a square with area 72 cm^2 .



Calculate the area of the circle.
Give your answer as a multiple of π .



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SCALE

..... cm^2 [3]

10 Calculate $\sqrt[3]{1 + 10.9 \times 0.4^2}$.

R

..... [1]

11 Factorise fully.

R

(a) $24x^2 - 9xy$

..... [2]

(b) $63x^2 - 28y^2$

..... [3]

12 y is directly proportional to the square root of $x + 1$.

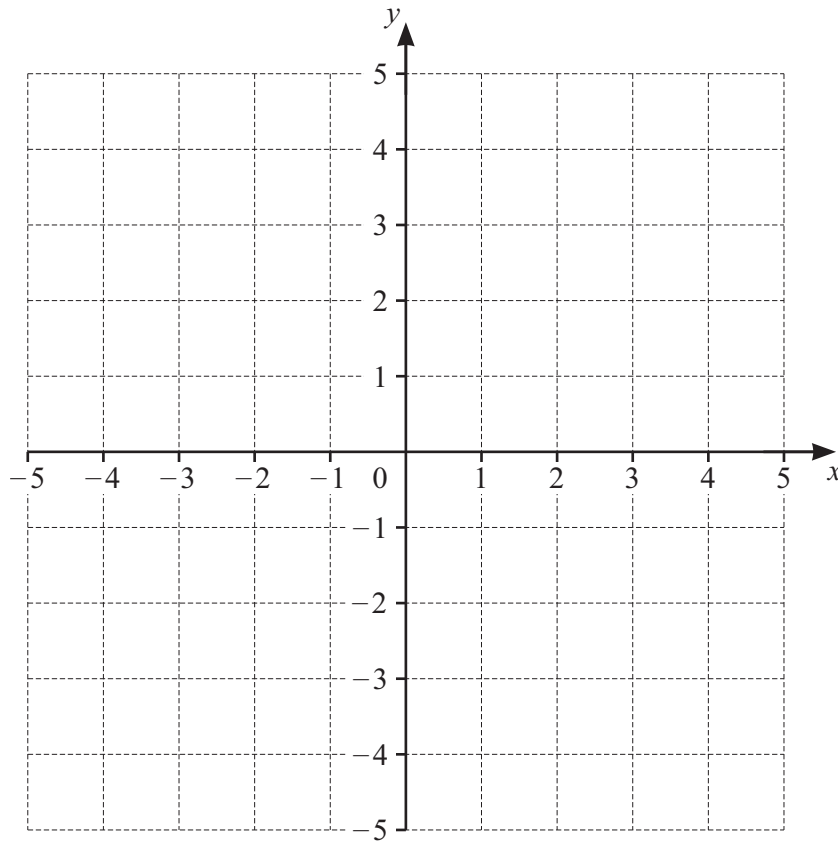
R

$y = 10.5$ when $x = 8$.

Find y when $x = 1.56$.

$y =$ [3]

13



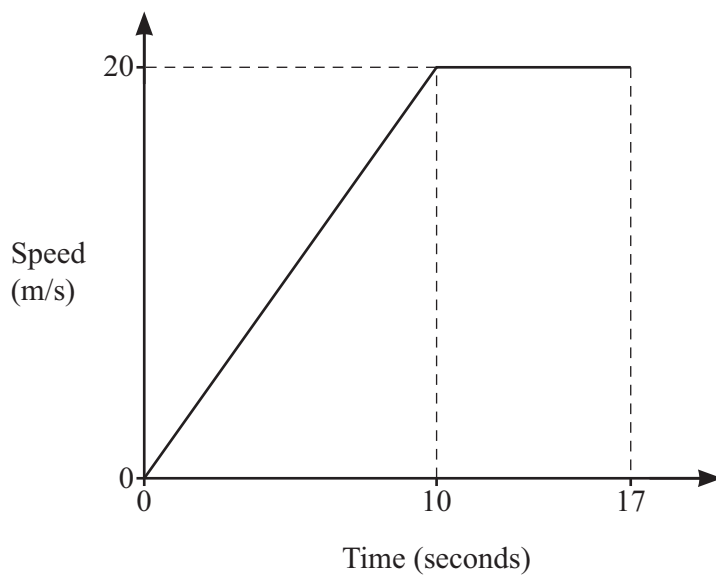
The region R satisfies these inequalities.

$$-3 < y \leq 2 \quad y \leq x - 1$$

By drawing suitable straight lines and shading **unwanted** regions, find and label the region R .

[4]

14



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The diagram shows the speed–time graph for 17 seconds of a car journey.

(a) Find the acceleration of the car during the first 10 seconds.

..... m/s^2 [1]

(b) Calculate the total distance travelled by the car during the 17 seconds.

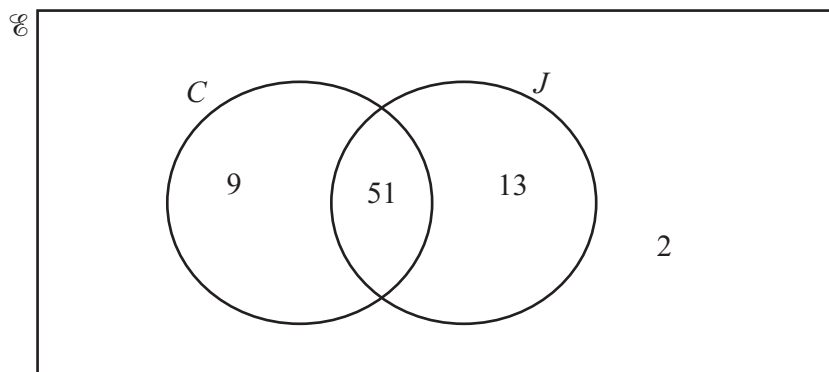
..... m [3]

- 15 At the start of an experiment there are 40 000 bacteria.
 (R) The number of bacteria increases at a rate of 15% per hour.

Calculate the number of bacteria after 3 hours.

..... [2]

- 16 75 people are asked if they have a car, C , and if they have a job, J .
 (R) The Venn diagram shows the results.

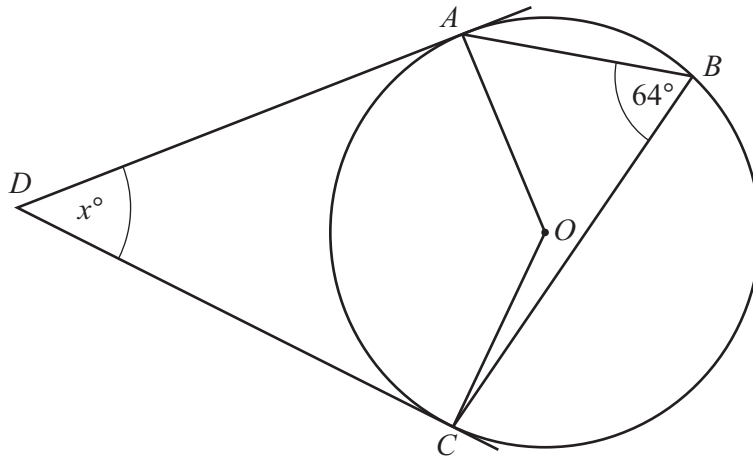


A person is chosen at random from those who have a car.

Find the probability that this person also has a job.

..... [1]

17



NOT TO SCALE

A , B and C are points on the circumference of a circle with centre O .

DA and DC are tangents to the circle.

Angle $ABC = 64^\circ$.

Work out the value of x .

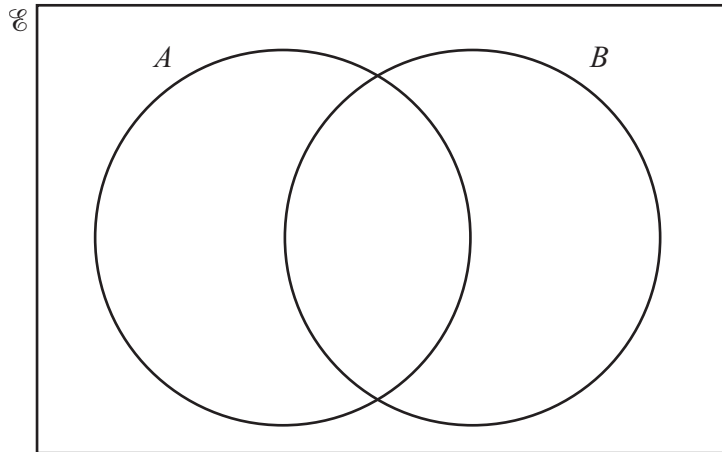
$x =$ [2]

18 (a) $\mathcal{E} = \{8 \times 10^{-1}, 0.8, 8\%, \sqrt{0.08}\}$

7

$$A = \{a: 0.08 < a \leq 0.8\}$$

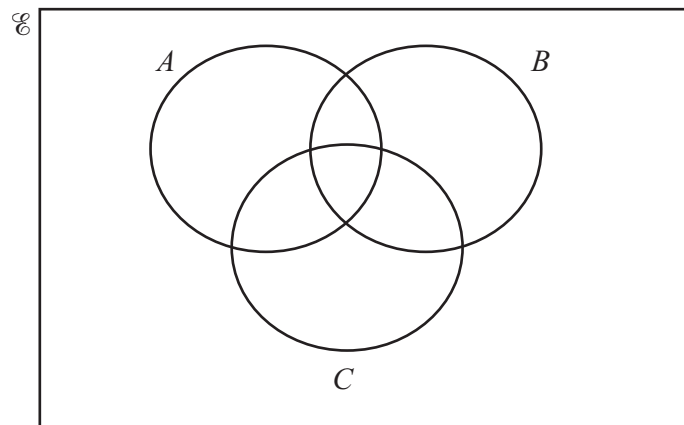
$$B = \{b: b \geq 0.8\}$$



Complete the Venn diagram.

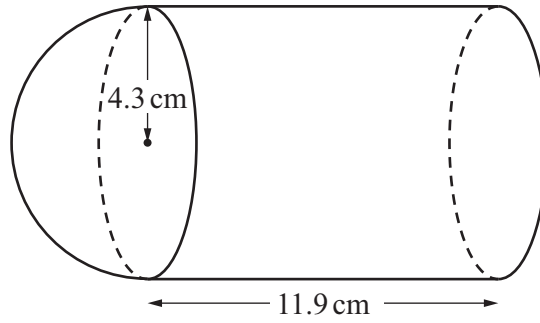
[3]

(b) Shade the region $(A \cup C) \cap B'$ in the Venn diagram.



[1]

19



NOT TO
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A solid is made from a cylinder and a hemisphere, both of radius 4.3 cm.
The cylinder has length 11.9 cm.

(a) Calculate the volume of the solid.

..... cm³ [3]

(b) Calculate the total surface area of the solid.

..... cm² [4]

20 Find an expression for the n th term of this sequence.



$$\frac{1}{7}, 1, 7, 49, 343, 2401, \dots$$

..... [2]

21 Expand and simplify.



$$(x+3)(x+5)(2x+1)$$

..... [3]

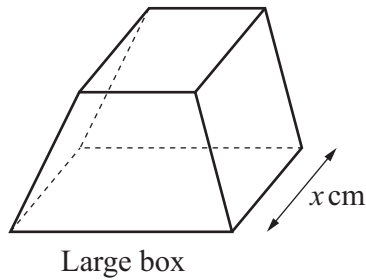
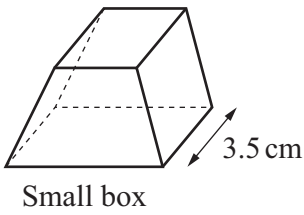
22 A is the point $(17, 9)$ and B is the point $(23, 39)$.



Find the equation of the perpendicular bisector of line AB .
Give your answer in the form $y = mx + c$.

$y = \dots\dots\dots$ [5]

23



NOT TO SCALE

The small box is mathematically similar to the large box.
 The volume of the large box is 72.8% greater than the volume of the small box.
 The small box has length 3.5 cm and the large box has length x cm.

Calculate the value of x .

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