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11 $\sqrt{2} \times 16 = 2^x$

- (a) Find the value of x .
Show your working clearly.

$x = \dots\dots\dots$
(2)

$$\frac{(11^{-6})^5}{11^4} = 11^n$$

- (b) Find the value of n .
Show your working clearly.

$n = \dots\dots\dots$
(2)

(Total for Question 11 is 4 marks)



12 The diagram shows a sector of a circle with radius 7 cm.

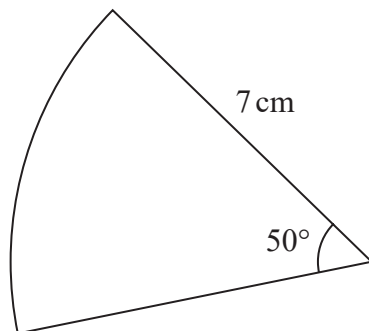


Diagram **NOT** accurately drawn

Work out the length of the arc of the sector.
Give your answer correct to one decimal place.

..... cm

(Total for Question 12 is 2 marks)

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- 13 Expand and simplify $4x(3x + 1)(2x - 3)$
Show your working clearly.

.....
(Total for Question 13 is 3 marks)

- 14 Here is the number of goals that Henri's team scored one summer in each water polo match.

5 8 9 11 13 13 14 15 16 17 20

Find the interquartile range of the numbers of goals.
Show your working clearly.

.....
(Total for Question 14 is 2 marks)



- 15 P , Q and R are points on a circle, centre O .
 TRV is the tangent to the circle at R .

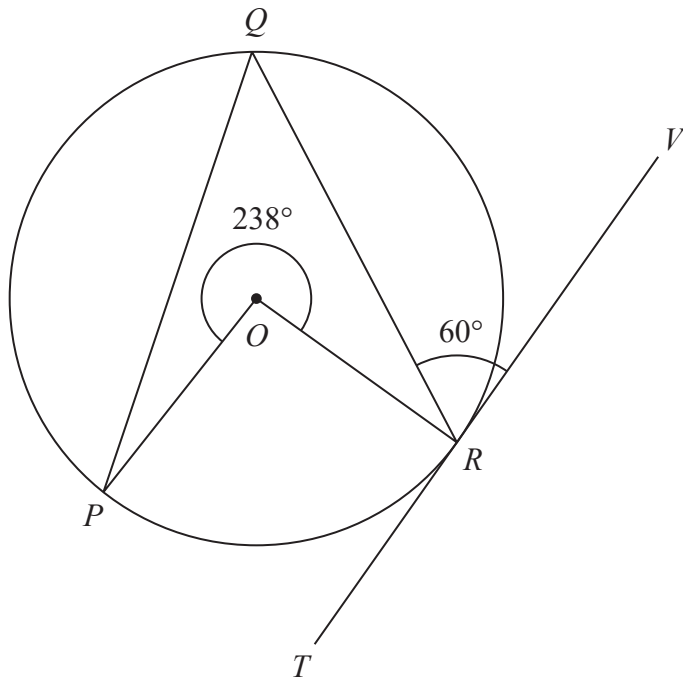


Diagram **NOT** accurately drawn

Reflex angle $POR = 238^\circ$
 Angle $QRV = 60^\circ$

Calculate the size of angle OPQ .
 Give a reason for each stage of your working.

(Total for Question 15 is 4 marks)

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16 Use algebra to show that the recurring decimal $0.28\dot{1}\dot{3} = \frac{557}{1980}$

(Total for Question 16 is 2 marks)

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17 Using algebra, prove that, given any 3 consecutive even numbers, the difference between the square of the largest number and the square of the smallest number is always 8 times the middle number.

(Total for Question 17 is 3 marks)

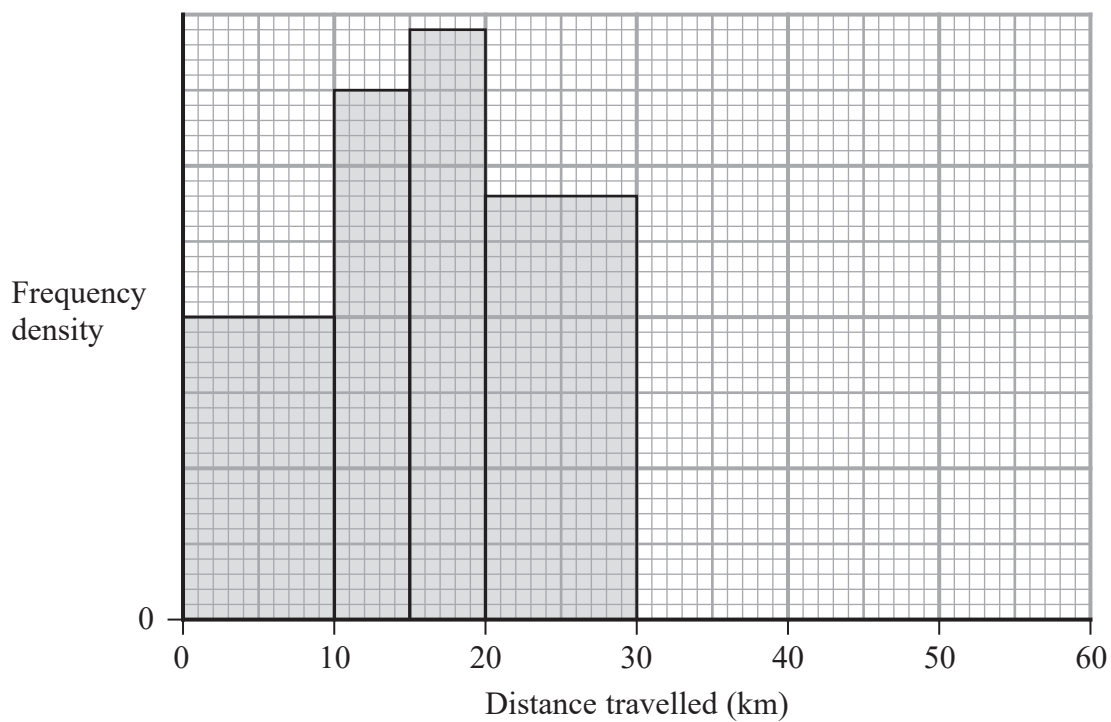
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P 6 5 9 1 4 A 0 1 5 2 8

- 18 The table and histogram give information about the distance travelled, in order to get to work, by each person working in a large store.

| Distance (d km) | Frequency |
|--------------------|-----------|
| $0 \leq d < 10$ | 40 |
| $10 \leq d < 15$ | |
| $15 \leq d < 20$ | |
| $20 \leq d < 30$ | |
| $30 \leq d < 60$ | 30 |



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Using the information in the table and in the histogram,

(a) complete the table,

(2)

(b) complete the histogram.

(1)

One of the people working in the store is chosen at random.

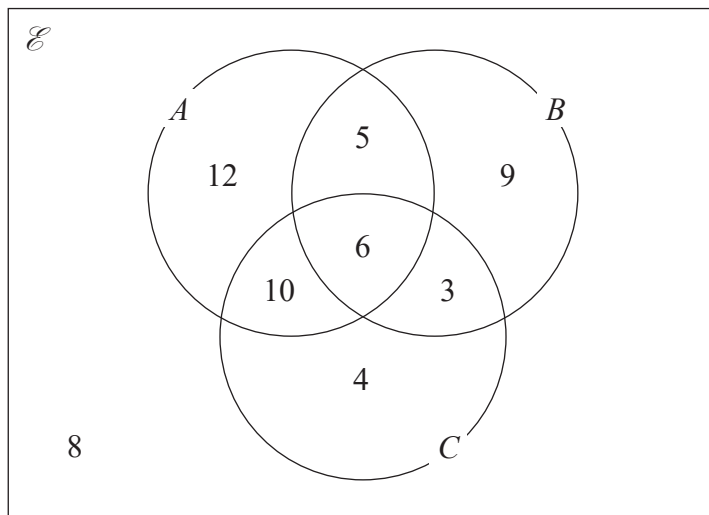
(c) Work out an estimate for the probability that the distance travelled by this person, in order to get to work, was greater than 25 km.

.....
(2)

(Total for Question 18 is 5 marks)



19 The Venn diagram shows a universal set, \mathcal{E} and sets A , B and C .



12, 5, 9, 10, 6, 3, 4 and 8 represent the **numbers** of elements.

Find

(i) $n(A \cup B)$

.....
(1)

(ii) $n(A' \cap B')$

.....
(1)

(iii) $n([A \cap B] \cup C)$

.....
(1)

(Total for Question 19 is 3 marks)

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