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12 (a) Simplify  $\frac{2}{y^0}$

.....  
(1)

(b) Simplify fully  $(16a^4)^{\frac{3}{4}}$

.....  
(2)

(c) Expand and simplify  $5x(3x + 4)(2x - 1)$

.....  
(3)

**(Total for Question 12 is 6 marks)**



13 A rectangle has length  $L$  and width  $W$

$L$  is increased by 20%

$W$  is decreased by 35%

Calculate the percentage reduction in the area of the rectangle.

.....%

(Total for Question 13 is 3 marks)

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14  $A$ ,  $B$  and  $C$  are points on a circle, centre  $O$

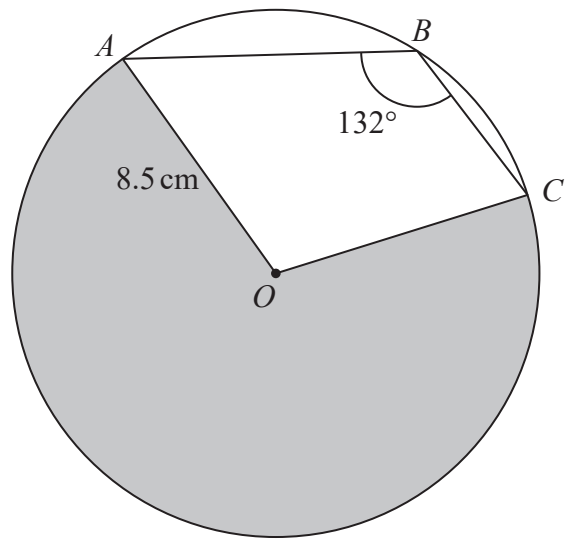


Diagram **NOT** accurately drawn

The radius of the circle is 8.5 cm  
Angle  $ABC = 132^\circ$

Work out the perimeter of the shaded sector  $AOC$   
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 14 is 3 marks)



P 7 2 4 4 4 A 0 1 5 3 2

15 Here are the numbers of aces that Rutger served in each of 11 tennis matches.

1    1    2    4    6    8    8    9    11    12    15

- (a) Find the interquartile range of the numbers of aces.  
Show your working clearly.

.....  
(2)

Kim also plays in 11 tennis matches.

For Kim

the median number of aces is 11

the interquartile range of the numbers of aces is 5

- (b) State, giving a reason, whether Rutger or Kim

- (i) served more aces on average,

.....  
.....  
.....  
(1)

- (ii) was more consistent with the number of aces served.

.....  
.....  
.....  
(1)

**(Total for Question 15 is 4 marks)**



16 Here are two vectors.

$$\vec{BA} = \begin{pmatrix} -5 \\ 4 \end{pmatrix} \quad \vec{BC} = \begin{pmatrix} 9 \\ 1 \end{pmatrix}$$

Find  $\vec{AC}$  as a column vector.

$$\vec{AC} = \begin{pmatrix} \phantom{0} \\ \dots \\ \dots \end{pmatrix}$$

(Total for Question 16 is 2 marks)

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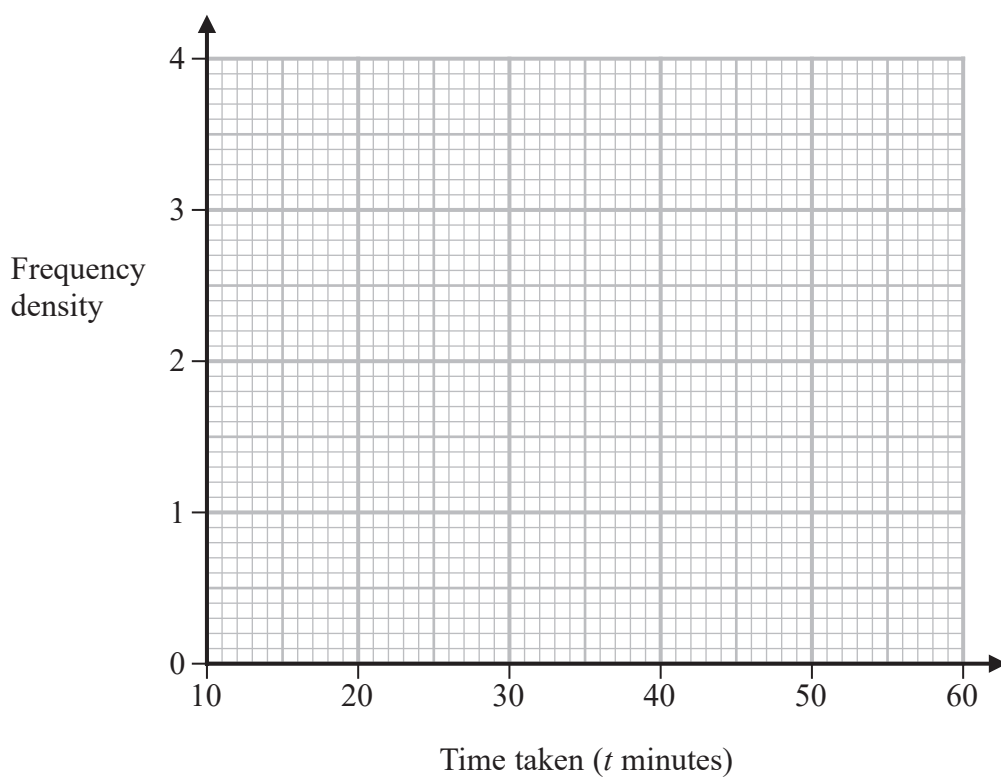


P 7 2 4 4 4 A 0 1 7 3 2

- 17 The table gives information about the time taken by each student in Year 11 to complete a homework task.

Time taken ( $t$ minutes)	Frequency
$10 < t \leq 25$	15
$25 < t \leq 30$	18
$30 < t \leq 50$	32
$50 < t \leq 60$	4

- (a) On the grid, draw a histogram for this information.



(3)

One of these students who took 50 minutes or less and more than 25 minutes to complete this homework task is chosen at random.

- (b) Find an estimate for the probability that this student took 45 minutes or less to complete this homework task.

(2)

(Total for Question 17 is 5 marks)



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**18** A statue and a model of the statue are mathematically similar.

The statue has a total surface area of  $3600 \text{ cm}^2$

The model has a total surface area of  $625 \text{ cm}^2$

The volume of the model is  $750 \text{ cm}^3$

Work out the volume of the statue.

.....  $\text{cm}^3$

**(Total for Question 18 is 3 marks)**



19 Prove algebraically that, for any three consecutive even numbers,

the sum of the squares of the smallest even number and the largest even number is 8 more than twice the square of the middle even number.

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(Total for Question 19 is 3 marks)





20  $A$ ,  $B$  and  $C$  are three sets.

$$n(A \cap B \cap C) = 5$$

$$n(A \cap B \cap C') = 2$$

$$n(A \cap C) = 5$$

$$n(A) = 17$$

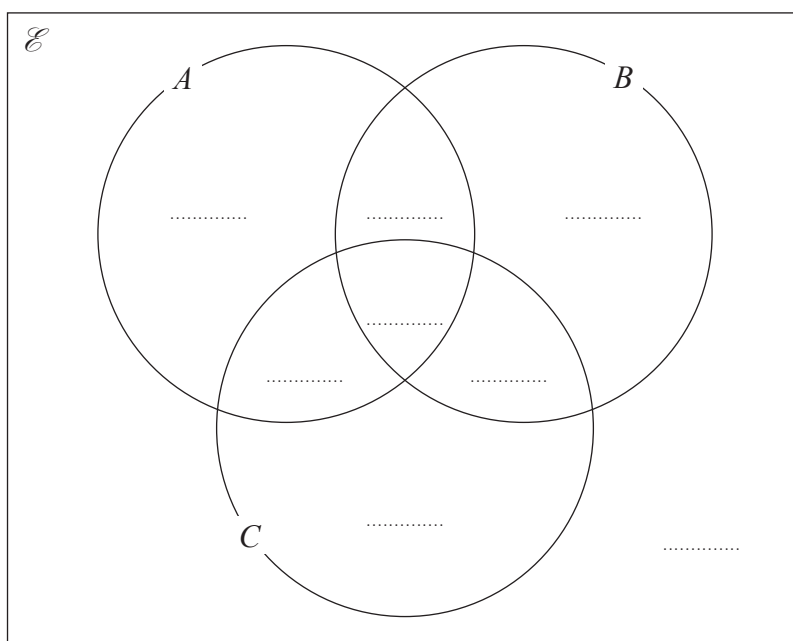
$$n([A \cup B \cup C]') = 3$$

$$n(A' \cap B \cap C') = 6$$

$$n(B \cap C) = 7$$

$$n(C) = 14$$

Complete the Venn diagram to show the number of elements in each region.



(Total for Question 20 is 4 marks)

