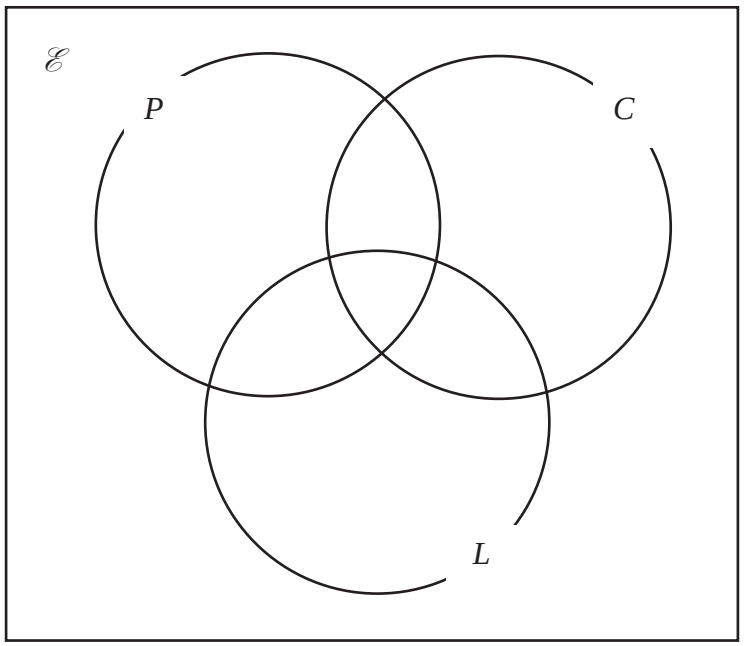
6 80 gardeners were asked if they grow potatoes (P), carrots (C) or lettuce (L)

Of these gardeners

9 grow potatoes, carrots and lettuce
17 grow potatoes and carrots
23 grow carrots and lettuce
19 grow potatoes and lettuce
48 grow carrots
49 grow lettuce
2 grow none of these three crops

(a) Using this information, complete the Venn diagram below to show the number of gardeners in each subset.



(3)

(b) Find $n(C \cap L')$

(1)

One of the gardeners is chosen at random.

Given that this gardener grows carrots,

(c) find the probability that this gardener also grows lettuce.

(2)

Question 6 continued

(Total for Question 6 is 6 marks)

7 $\mathbf{A} = \begin{pmatrix} 10 & -6 \\ -8 & 5 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} -15 & 10 \\ 14 & -5 \end{pmatrix}$ $\mathbf{C} = \begin{pmatrix} 1 & -3 & 1 \\ 2 & -4 & -2 \end{pmatrix}$

(a) Find $4\mathbf{A} + 2\mathbf{B}$

(2)

(b) Find $\mathbf{AC}$

(3)

(c) Find the matrix $\mathbf{D}$ such that $\mathbf{A}^{-1} + \mathbf{D} = 2\mathbf{I}$ where $\mathbf{I} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

(4)

$$\left[\text{The inverse of matrix } \begin{pmatrix} a & b \\ c & d \end{pmatrix} \text{ is } \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix} \right]$$

Question 7 continued

(Total for Question 7 is 9 marks)

8 Aalia delivers letters and parcels.

(a) Last week Aalia worked for 5 days and wrote down 5 integers that represent the distance, in miles, she drove each day.

For these integers

the mode is 15
the median is 16
the largest − the smallest = 7

Find 5 integers that Aalia could have written down.

(3)

(b) Aalia has 8 letters to deliver to Tom.
The mean weight of the 8 letters is 104 grams.

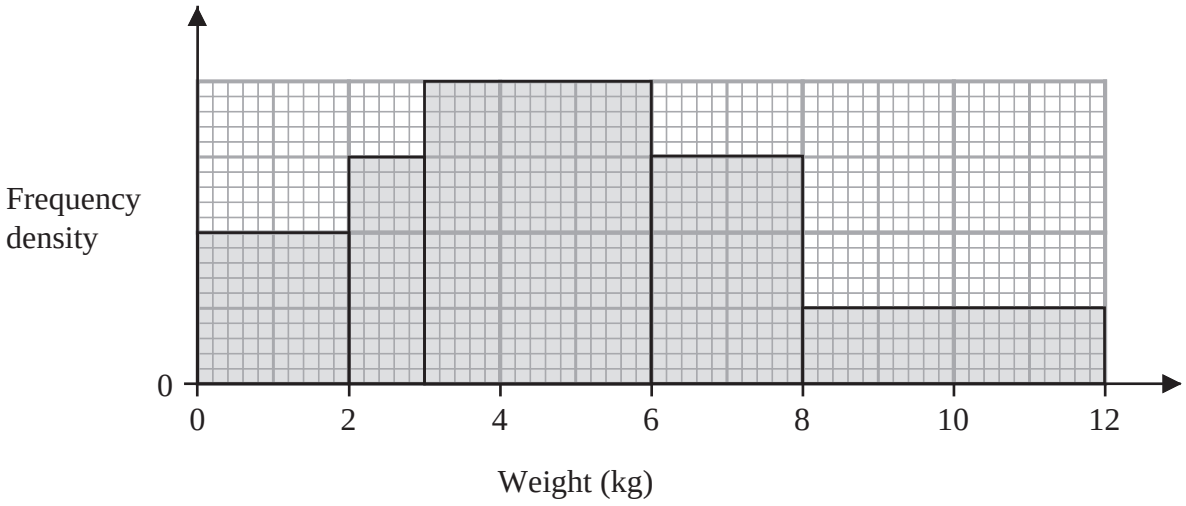
5 of the letters are each of weight 89 grams.

The mean weight of the remaining letters is A grams.

Work out the value of A

(3)

The histogram shows information about the weights of all the parcels Aalia has in her delivery van on Friday.



75 of the parcels in the van each have a weight between 2 kg and 6 kg.

Aalia takes 2 parcels at random from the van.

(c) Find an estimate for the probability that both parcels weigh more than 4 kg.

(5)

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.....

.....

Question 8 continued

Question 8 continued

Question 8 continued

(Total for Question 8 is 11 marks)

9

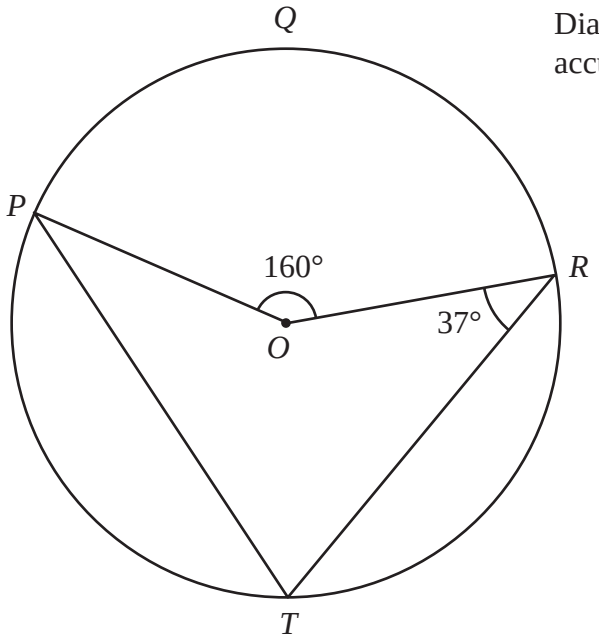

Diagram **NOT** accurately drawn

Figure 2

Figure 2 shows the points P, Q, R and T on a circle centre O

$\angle POR = 160°$ $\angle ORT = 37°$

(a) (i) Work out the size, in degrees, of $\angle PTR$

(1)

(ii) Give a reason for your answer.

(1)

(b) Work out the size, in degrees, of $\angle TPO$

(2)

Question 9 continued

The sector, *OPQR*, is cut out from the circle in Figure 2

A hollow right circular cone is formed by joining *OP* and *OR* together as shown in Figure 3

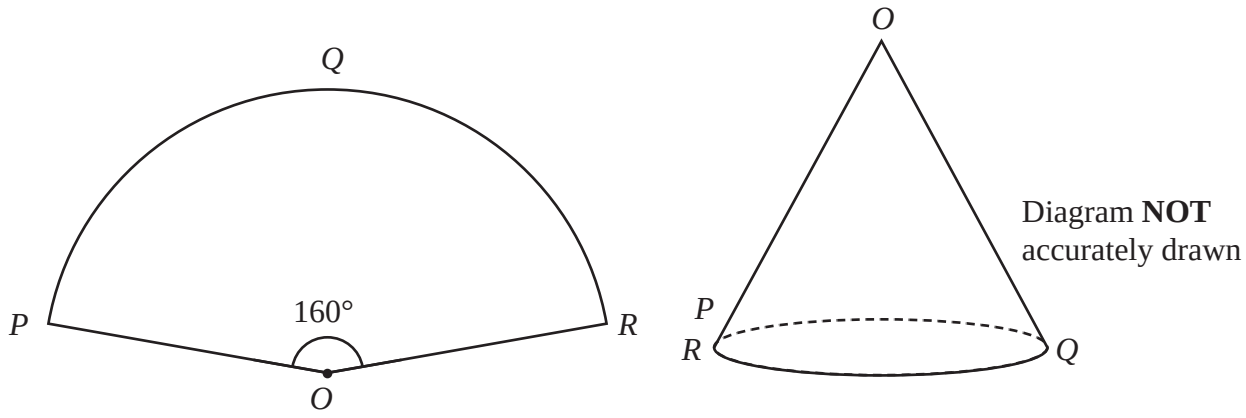

Figure 3

The curved surface area of the cone is $\frac{196}{25}\pi$ cm²

(c) Calculate the volume, in cm³ to 3 significant figures, of the cone.

(6)

$$\left(\begin{array}{l}\text{Volume of cone} = \frac{1}{3}\pi r^2 h \\ \text{Curved surface area of cone} = \pi r l\end{array}\right)$$

Question 9 continued

Question 9 continued

(Total for Question 9 is 10 marks)