Basic stats 17.04 *[35 marks]*

Elsie, a librarian, wants to investigate the length of time, T minutes, that people spent in her library on a particular day.

1a. State whether the variable T is discrete or continuous. *[1 mark]*

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Elsie's data for 160 people who visited the library on that particular day is shown in the following table.

T (minutes)	$0 \leq T < 20$	$20 \leq T < 40$	$40 \leq T < 60$	$60 \leq T < 80$	$80 \leq T < 100$
Frequency	50	62	k	14	8

1b. Find the value of k. *[2 marks]*

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1c. Write down the modal class. *[1 mark]*

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1d. Write down the mid-interval value for this class. *[1 mark]*

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1e. Use Elsie's data to calculate an estimate of the mean time that people spent in the library. *[2 marks]*

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1f. Using the table, write down the maximum possible number of people who spent 35 minutes or less in the library on that day. *[1 mark]*

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Elsie assumes her data to be representative of future visitors to the library.

1g. Find the probability a visitor spends at least 60 minutes in the library. *[2 marks]*

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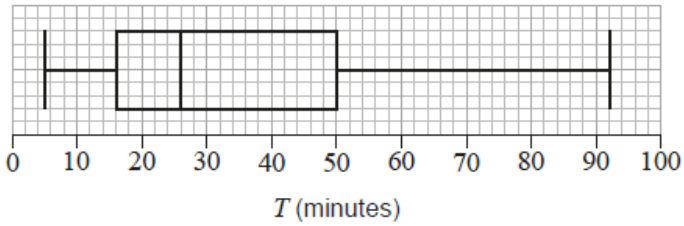
The following box and whisker diagram shows the times, in minutes, that the 160 visitors spent in the library.



1h. Write down the median time spent in the library. *[1 mark]*

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1i. Find the interquartile range. *[2 marks]*

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1j. Hence show that the longest time that a person spent in the library is not an outlier. *[3 marks]*

Elsie believes the box and whisker diagram indicates that the times spent in the library are not normally distributed.

1k. Identify one feature of the box and whisker diagram which might support Elsie's belief. *[1 mark]*

Hafizah harvested 49 mangoes from her farm. The weights of the mangoes, w, in grams, are shown in the following grouped frequency table.

Weight (g)	$100 \leq w < 200$	$200 \leq w < 300$	$300 \leq w < 400$	$400 \leq w < 500$	$500 \leq w < 600$
Frequency	4	7	14	16	8

2a. Write down the modal group for these data. *[1 mark]*

2b. Use your graphic display calculator to find an estimate of the standard deviation of the weights of mangoes from this harvest. *[2 marks]*

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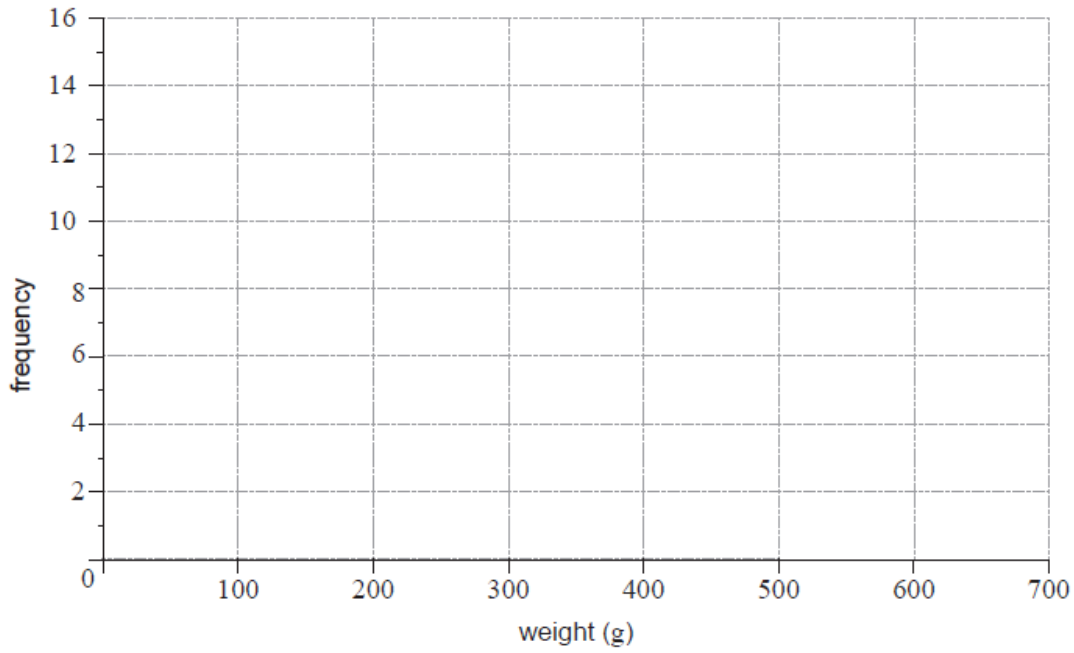
2c. On the grid below, draw a histogram for the data in the table. *[3 marks]*



Chicken eggs are classified by grade (4, 5, 6, 7 or 8), based on weight. A mixed carton contains 12 eggs and could include eggs from any grade. As part of the science project, Rocky buys 9 mixed cartons and sorts the eggs according to their weight.

Grade	Weight, w (grams)	Frequency
4	$40 \le w < 50$	3
5	$50 \le w < 60$	30
6	$60 \le w < 70$	45
7	$70 \le w < 80$	25
8	$80 \le w < 90$	5

3a. State whether the weight of the eggs is a continuous or discrete variable. *[1 mark]*

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3b. Write down the modal grade of the eggs. *[1 mark]*

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3c. Use your graphic display calculator to find an estimate for the standard deviation of the weight of the eggs. *[2 marks]*

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3d. The mean weight of these eggs is 64.9 grams, correct to three significant figures. *[2 marks]*

Use the table and your answer to part (c) to find the **smallest possible** number of eggs that could be within one standard deviation of the mean.

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A florist sells bouquets of roses. The florist recorded, in **Table 1**, the number of roses in each bouquet sold to customers.

Table 1

Number of roses in a bouquet (n)	2	3	4	5	6	7	8	9	10	11	12
Number of customers (f)	9	2	4	5	7	3	10	2	3	1	4

The roses can be arranged into bouquets of size small, medium or large. The data from **Table 1** has been organized into a cumulative frequency table, **Table 2**.

Table 2

Bouquet size	**Number of roses (n)**	**Frequency (f)**	**Cumulative frequency**
small	$2 \leq n \leq 4$	15	
medium	$5 \leq n \leq 8$	25	
large	$9 \leq n \leq 12$		

4a. Complete the cumulative frequency table. *[2 marks]*

4b. Write down the probability that a bouquet of roses sold is **not** small. *[2 marks]*

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4c. A customer buys a large bouquet. *[2 marks]*

Find the probability that there are 12 roses in this bouquet.

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