

A LEVEL Cambridge Topical Past Papers

STATISTICS 1

2017 — 2023

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1 - (9709/61_Summer_2017_Q1) - Representation Of Data

Kadijat noted the weights, x grams, of 30 chocolate buns. Her results are summarised by

$$\Sigma(x - k) = 315, \quad \Sigma(x - k)^2 = 4022,$$

where k is a constant. The mean weight of the buns is 50.5 grams.

(i) Find the value of k . [2]

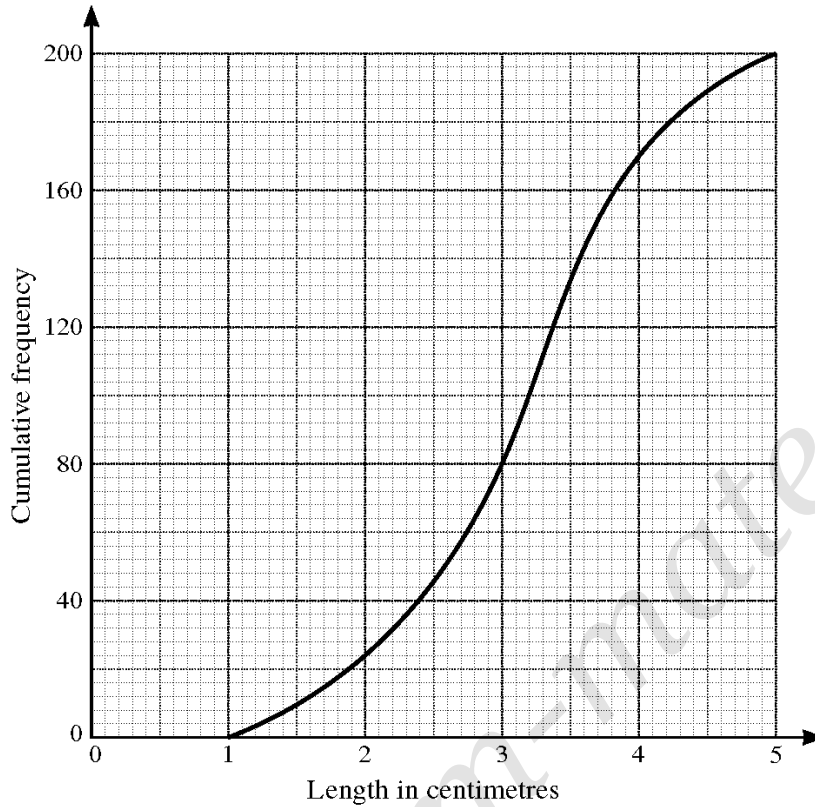
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(ii) Find the standard deviation of x . [2]

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2 - (9709/62_Summer_2017_Q2) - Representation Of Data

Anabel measured the lengths, in centimetres, of 200 caterpillars. Her results are illustrated in the cumulative frequency graph below.



(i) Estimate the median and the interquartile range of the lengths. [3]

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(ii) Estimate how many caterpillars had a length of between 2 and 3.5 cm. [1]

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(iii) 6% of caterpillars were of length l centimetres or more. Estimate l . [2]

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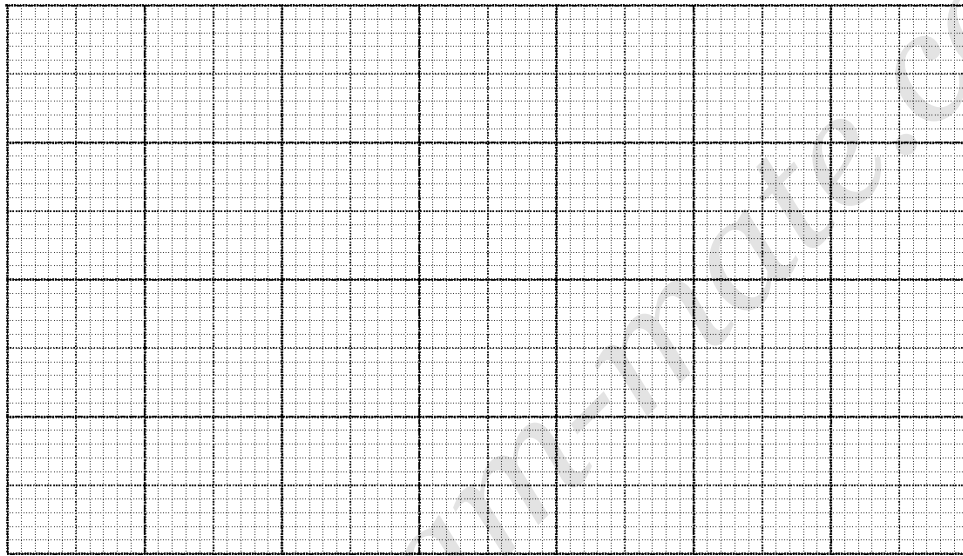
3 - (9709/61_Summer_2017_Q4) - Representation Of Data

The times taken, t seconds, by 1140 people to solve a puzzle are summarised in the table.

Time (t seconds)	$0 \leq t < 20$	$20 \leq t < 40$	$40 \leq t < 60$	$60 \leq t < 100$	$100 \leq t < 140$
Number of people	320	280	220	220	100

(i) On the grid, draw a histogram to illustrate this information.

[4]



(ii) Calculate an estimate of the mean of t .

[2]

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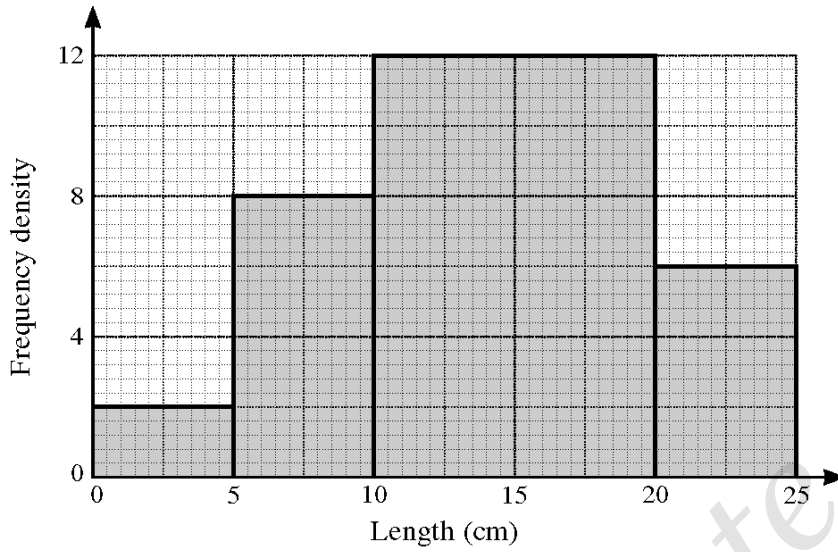
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4 - (9709/63_Summer_2017_Q7) - Representation Of Data

The following histogram represents the lengths of worms in a garden.



(i) Calculate the frequencies represented by each of the four histogram columns. [2]

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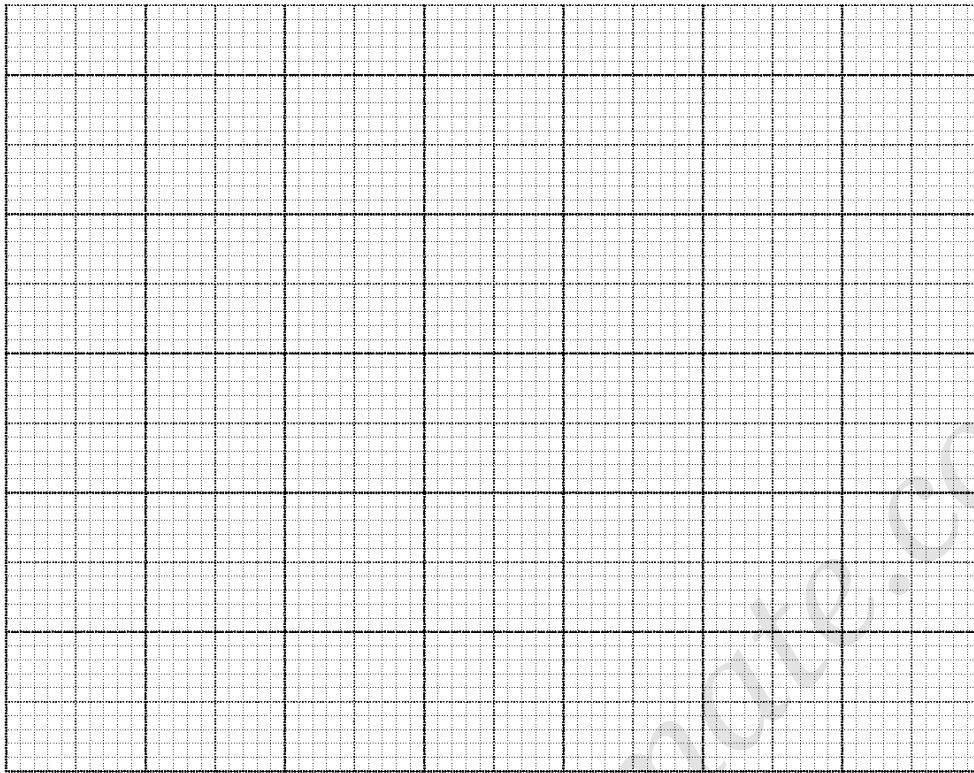
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(ii) On the grid on the next page, draw a cumulative frequency graph to represent the lengths of worms in the garden. [4]



(iii) Use your graph to estimate the median and interquartile range of the lengths of worms in the garden. [3]

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(iv) Calculate an estimate of the mean length of worms in the garden.

[2]

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5 - (9709/62_Summer_2018_Q1) - Representation Of Data

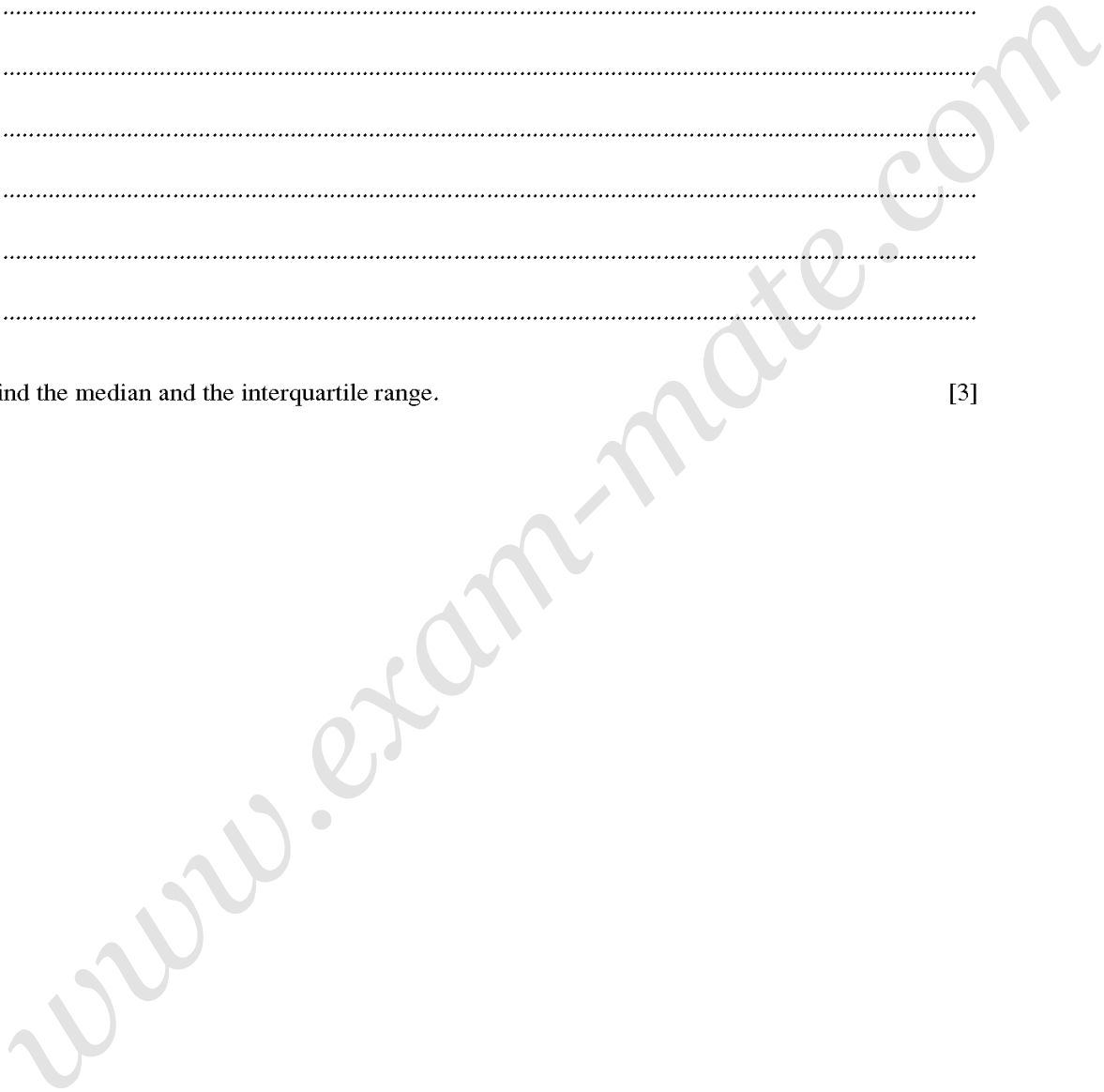
Each of a group of 10 boys estimates the length of a piece of string. The estimates, in centimetres, are as follows.

37 40 45 38 36 38 42 38 40 39

(i) Find the mode. [1]

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(ii) Find the median and the interquartile range. [3]



ANSWERS

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1 - (9709/61_Summer_2017_Q1) - Representation Of Data

(i)	<i>EITHER:</i> $\frac{\sum x}{30} - k = \frac{315}{30} = 10.5$	(M1)
	$k = 5.5 - 10.5 = 40$	A1)
	<i>OR:</i> $\sum x = 50.5 \times 30 = 1515, 1515 - 30k = 315$	(M1)
	$k = 40$	A1)
	Total:	2
(ii)	<i>EITHER:</i> $\text{var} = 4022/30 - 10.5^2 (=23.817)$	(M1)
	$\text{sd} = 4.88$	A1)
	<i>OR:</i> $\sum x^2 - 2(40)\sum x + 30(40)^2 = 4022, \sum x^2 = 77222$ $\text{Var} = 77222/30 - 50.5^2 (= 23.817)$	(M1)
	$\text{sd} = 4.88$	A1)
	Total:	2

2 - (9709/62_Summer_2017_Q2) - Representation Of Data

(i)	$\text{med} = 3.2$	B1
	$\text{UQ} = 3.65 \leq \text{uq} \leq 3.7 \text{ LQ} = 2.55 \leq \text{lq} \leq 2.6$	M1
	$\text{IQR} = 1.05 \leq \text{iqr} \leq 1.15$	A1
	Total:	3
(ii)	$134 - 24 = 110$	B1
	Total:	1
(iii)	$200 - 12 = 188$ less than length l	M1
	$l = 4.5 \text{ cm}$	A1
	Total:	2

3 - (9709/61_Summer_2017_Q4) - Representation Of Data

(i)	fd 16, 14, 11, 505, 2.5	M1
	<p>The histogram shows frequency density (fd) on the vertical axis and time in seconds on the horizontal axis. The vertical axis has tick marks at 0, 5, 10, 15, and 20. The horizontal axis has tick marks at 0, 20, 40, 60, 80, 100, 120, and 140. There are five bars with the following approximate heights: 16 for the first bar (0-20s), 14 for the second bar (20-40s), 11 for the third bar (40-60s), 5 for the fourth bar (60-100s), and 2.5 for the fifth bar (100-140s).</p>	A1
		B1
		B1
	Total:	4
(ii)	$(10 \times 320 + 30 \times 280 + 50 \times 220 + 80 \times 220 + 120 \times 100) / 1140$	M1
	$= 45.8$	A1
	Total:	2

4 - (9709/63_Summer_2017_Q7) - Representation Of Data

(i)	freq = fd × cw 10, 40, 120, 30	M1 A1
	Totals:	2