

Answers

Year 12 Mathematics

Test 2

Time Allowed: 45 minutes

Total Marks: 34

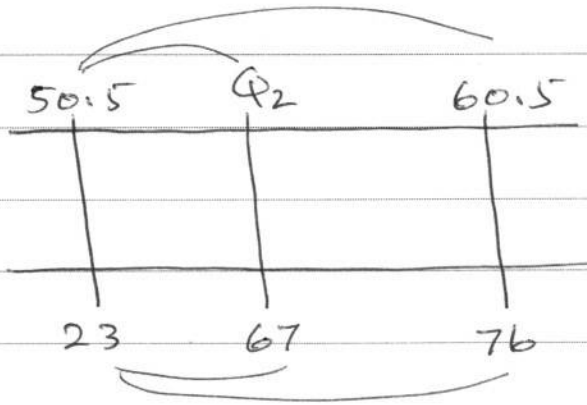
17 January 2021

Calculator Allowed

1.

(a) Median $\rightarrow \frac{n}{2} = \frac{134}{2} = 67^{\text{th}}$ data.

Class: 51 - 60
50.5 ← → 60.5

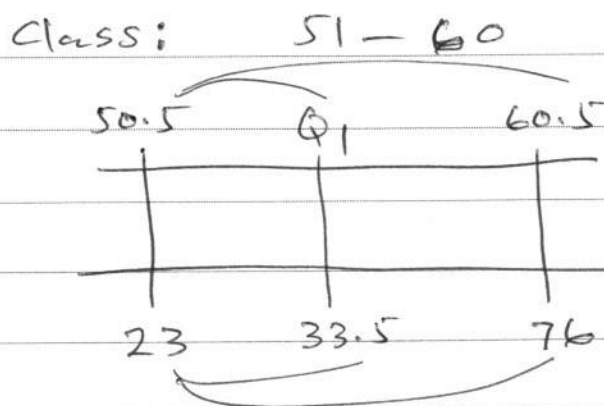


$$\frac{Q_2 - 50.5}{60.5 - 50.5} = \frac{67 - 23}{76 - 23}$$

$$Q_2 - 50.5 = \frac{44}{53} \times 10$$

$$\underline{\underline{Q_2 = 58.8 \text{ km (1 d.p.)}}}$$

Lower Quartile $\rightarrow \frac{n}{4} = \frac{134}{4} = 33.5^{\text{th}}$ data



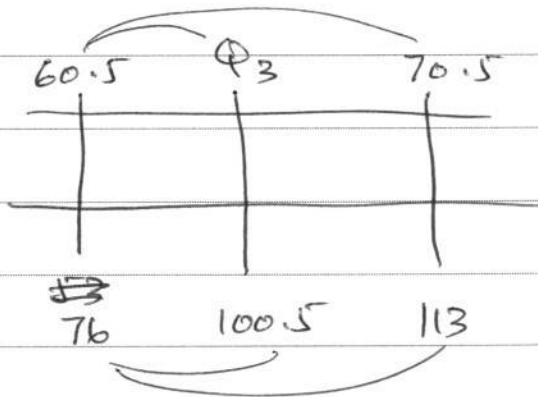
$$\frac{Q_1 - 50.5}{60.5 - 50.5} = \frac{33.5 - 23}{76 - 23}$$

$$\underline{\underline{Q_1 = 52.5 \text{ km (1 d.p.)}}}$$

$$\text{Upper Quartile} \rightarrow \frac{3n}{4} = \frac{3 \times 134}{4} = 100.5^{\text{th}} \text{ data}$$

Class: 61-70

60.5 ← → 70.5



$$\frac{Q_3 - 60.5}{70.5 - 60.5} = \frac{100.5 - 76}{113 - 76}$$

$$Q_3 = \underline{\underline{67.1 \text{ km (1 d.p.)}}}$$

(b)

Distance (km)	frequency	Midpoint
41-45	4	43
46-50	19	48
51-60	53	55.5
61-70	37	65.5
71-90	15	80.5
91-150	6	120.5

Using the calculator,

$$\sum fx = 8379.5$$

$$\sum fx^2 = 557489.75$$

$$\sum f = n = 134$$

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{8379.5}{134} = \underline{\underline{62.5 \text{ km (1 d.p.)}}}$$

(\bar{x})

Standard deviation for OCR, EDEXCEL and AQA

$$\begin{aligned}\sigma &= \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2} \\ &= \sqrt{\frac{557489.75}{134} - 62.53^2} \\ &= \underline{\underline{15.8 \text{ km (1 d.p.)}}}\end{aligned}$$

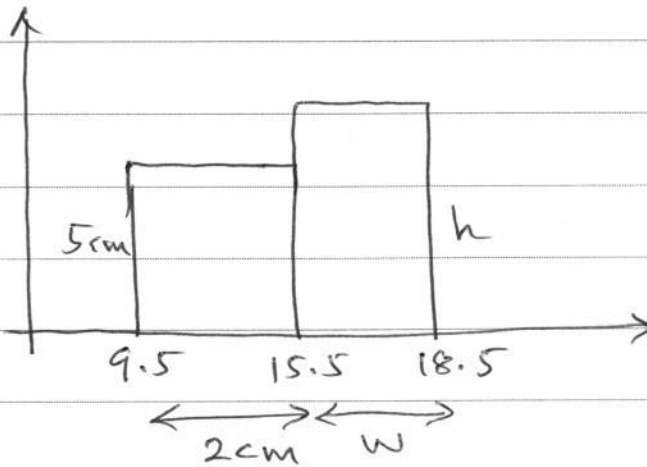
Standard deviation for MEI

$$\begin{aligned}S_{xx} &= \sum fx^2 - n\bar{x}^2 \\ &= 557489.75 - 134 \times 62.53^2 \\ &= 33549.6294\end{aligned}$$

$$\begin{aligned}s &= \sqrt{\frac{S_{xx}}{n-1}} \\ &= \sqrt{\frac{33549.6294}{134-1}} \\ &= \underline{\underline{15.9 \text{ km (1 d.p.)}}}\end{aligned}$$

2.

(a)



$$15.5 - 9.5 = 6$$

$$18.5 - 15.5 = 3$$

$$6 \rightarrow 2\text{cm}$$

$$3 \rightarrow 1\text{cm}$$

$$\therefore \text{Width} = \underline{\underline{1\text{cm}}}$$

(b)

	frequency	Area
10 - 15	15	10cm ²
16 - 18	9	6cm ²

$\left. \begin{array}{l} 10\text{cm}^2 \\ 6\text{cm}^2 \end{array} \right\} \div \frac{15}{9}$

$$\therefore wh = 6$$

$$1 \times h = 6$$

$$h = 6\text{cm}$$

$$\text{Height} = \underline{\underline{6\text{cm}}}$$

3.

$$(a) \quad \text{Total Area} = 8 + 16 + 12 + 16 + 8 \\ = 60 \text{ small squares.}$$

$$\div \frac{60}{8} \left(\begin{array}{l} 60 \text{ squares} \rightarrow 300 \text{ days} \\ 8 \text{ squares} \rightarrow ? \\ (\pounds 4000 - \pounds 6000) \end{array} \right) \div \frac{60}{8}$$

$$\text{No. of days} = 300 \div \frac{60}{8} \\ = 40 \text{ days.}$$

(b)

~~4 units~~

$\pounds 1000 = 4$ units along the x-axis.

$$\therefore \pounds 300 = \frac{4}{1000} \times 300 \\ = 1.2 \text{ units.}$$

$$\pounds 200 = \frac{4}{1000} \times 200 \\ = 0.8 \text{ units}$$

$$\text{Area } (\pounds 2700 \text{ to } \pounds 3000) = 1.2 \times 4 \\ = 4.8 \text{ unit}^2$$

$$\text{Area } (\pounds 3000 \text{ to } \pounds 3200) = 0.8 \times 6 \\ = 4.8 \text{ unit}^2$$

$$\therefore \text{Total Area } (\pounds 2700 \text{ to } \pounds 3200) = \cancel{4.8 \text{ unit}^2} \\ = 4.8 \times 2 \\ = 9.6 \text{ unit}^2$$

$60 \text{ unit}^2 \rightarrow 300 \text{ days.}$

$$\therefore 9.6 \text{ unit}^2 \rightarrow \frac{300}{60} \times 9.6 = 48$$

Answer = 48 days

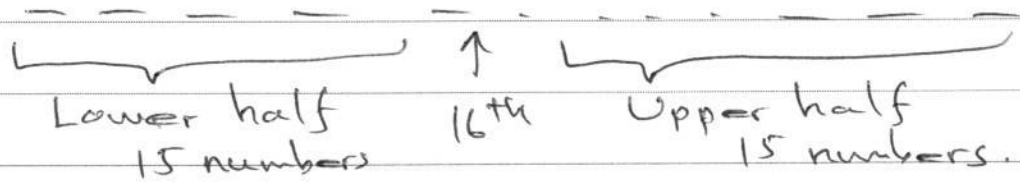
4.

(a)

$$n = 31$$

$$\text{Median} \rightarrow \frac{31+1}{2} = 16^{\text{th}} \text{ data.}$$

$$\therefore \text{Median} = \underline{\underline{41}}$$



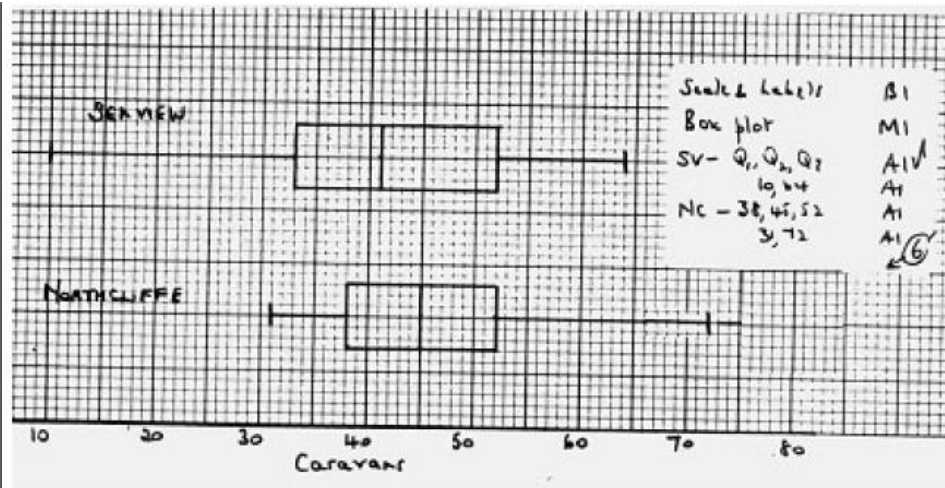
$$Q_1 \rightarrow \text{Median of lower half} \rightarrow \frac{15+1}{2} = 8^{\text{th}} \text{ data}$$

$$\therefore Q_1 = \underline{\underline{33}}$$

$$Q_3 \rightarrow \text{Median of upper half} \rightarrow 8^{\text{th}} \text{ data in the upper half} \\ = (16+8)^{\text{th}} \\ = 24^{\text{th}} \text{ data.}$$

$$\therefore Q_3 = \underline{\underline{52}}$$

(b)



(6)

(c)

Median of Northcliffe is greater than median of Seaview.
Upper quartiles are the same
IQR of Northcliffe is less than IQR of Seaview
Northcliffe positive skew, Seaview negative skew
Northcliffe symmetrical, Seaview positive skew (quartiles)
Range of Seaview greater than range of Northcliffe

any 3 acceptable comments B1B1B1

(3)

(d)

On 75% of the nights that month
both had no more than 52 caravans on site.

B1
B1

(2)