

8.2 Answers

A-level Statistics : Year 1 Partitioning Data

Answer 1

(i)

Spider Count	0	1	2	3	4	5	6
Squares	1	9	7	6	1	1	0

(ii)

$$\begin{aligned} \text{mean} &= \frac{50}{25} \\ &= 2 \text{ spiders per m}^2 \end{aligned}$$

(iii)

$$\begin{aligned} \text{standard deviation} &= \sqrt{\frac{132}{25} - 2^2} \\ &= 1.13 \text{ spiders per m}^2 \end{aligned}$$

(iv)

$$\begin{aligned} \text{mean} + 2 \times \text{standard deviation} &= 2 + 2 \times 1.13 \\ &= 4.26 \end{aligned}$$

$\therefore$ The square with 5 spiders is an outlier

Answer 2

Height (cm)	160-164	165-169	170-174	175-179	180-184	185-189	190-194	195-199
Frequency	11	49	190	488	632	470	137	23
Cumulative	11	60	250	738	1370	1840	1977	2000

For Q_2 : $\frac{2000 \times 2}{4} = 1000$ which is in the class 175 - 179

$$\begin{array}{ccccc} 179.5 & & Q_2 & & 184.5 \\ \bullet & \text{---} & \bullet & \text{---} & \bullet \\ 738 & & 1000 & & 1370 \\ \hline \frac{Q_2 - 179.5}{184.5 - 179.5} & = & \frac{1000 - 738}{1370 - 738} \\ Q_2 & = & 181.5727848 \\ \text{median} & = & 181.6 \text{ cm} \end{array}$$

Answer 3

$$\begin{aligned}
 x_{\mu} &= 10 y_{\mu} + 14.5 \\
 &= 10 \times 0.69 + 14.5 \\
 &= 21.4
 \end{aligned}$$

$$\begin{aligned}
 x_{\sigma} &= 10 y_{\sigma} \\
 &= 10 \times 1.24 \\
 &= 12.4
 \end{aligned}$$

Answer 4

$$\begin{aligned}
 \text{mean} &= \frac{230}{50} \\
 &= 4.6 \text{ (exact)}
 \end{aligned}$$

$$\begin{aligned}
 \text{standard deviation} &= \sqrt{\frac{1258}{50} - 4.6^2} \\
 &= 2
 \end{aligned}$$

Answer 5**(i) (a)**

$$\text{For } Q_1 : \frac{30 \times 1}{4} = 7.5 \Rightarrow \text{ARU} \Rightarrow 8^{\text{th}} \text{ which gives 14}$$

(b)

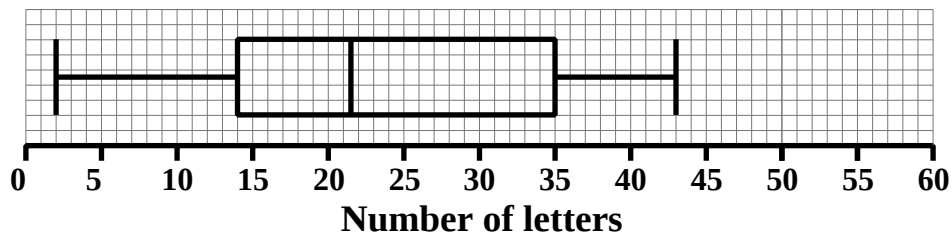
$$\begin{aligned}
 \text{For } Q_2 : \frac{30 \times 2}{4} &= 15 \Rightarrow \text{Integer} \\
 \Rightarrow \frac{15^{\text{th}} + 16^{\text{th}}}{2} &= \frac{21 + 22}{2} \text{ which gives 21.5}
 \end{aligned}$$

(c)

$$\text{For } Q_3 : \frac{30 \times 3}{4} = 22.5 \Rightarrow \text{ARU} \Rightarrow 23^{\text{rd}} \text{ which gives 35}$$

(d) $35 - 14 = 21$

(ii)



(iii)

$$Q_3 - Q_2 = 35 - 21.5 = 13.5$$

$$Q_2 - Q_1 = 21.5 - 14 = 7.5$$

$$\therefore Q_3 - Q_2 > Q_2 - Q_1 \Rightarrow \text{Positive skew}$$

Answer 6

Each item of quantitative data has a numerical value associated with it and so can be ordered according to that numerical value.

For example: The heights of adult males in the UK

Each item of qualitative data has no obvious numerical value associated with it and so there is no sense of relative importance or natural ordering.

For example: The colour of a person's eyes.