# Activity 15.6 (page 281)

Prove to yourself that the median for 'This year' data is 8. Explain why this is the median. [4]

An approximation of the median value is:

### number of values

2

Thus the median =  $20 \div 2 = 10$ th result.

This year 0, 2, 3, 3, 4, 5, 6, 7, 8, 8, 10, 11, 12, 12, 12, 14, 15, 18, 20, 22

The tenth result is 8.



1 a What was the mean number of visits made by the respondents to the survey? [3]

The mean is the arithmetic average.

mean = total visits/respondents = 110/20 = 5.5

Answer: 5.5 visits per month

**b** What was the modal number of visits? [3]

The modal value is the most common value.

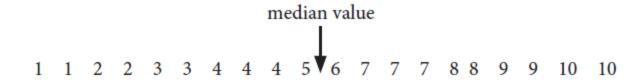
Both these numbers occur three times.

The modal number of visits is 4 and 7.

c Calculate the median of these data. [4]

First sort data from smallest to largest.

Median value is: 
$$\frac{(n+1)}{2}$$
$$= 21/2 = 10.5 \text{th value}$$



Thus the median value is 5.5 visits per month.

### **e** Calculate the range and the inter-quartile range. **[6]**

The range measures the dispersion of the data.

Range 
$$= 10 - 1$$
  
= 9 visits

The inter-quartile range measures the middle 50% of the data.

IQR = upper quartile – lower quartile

$$UQ = \frac{3}{4} (n + 1)$$

$$= 15.75 \text{th value}$$

$$= 8 \text{ visits}$$

$$LQ = \frac{1}{4} (n + 1)$$
= 5.25th value
= 3 visits

This means that 50% of respondents visit between three and eight times a month.

Therefore, the 
$$IQR = 8 - 3$$
  
= 5 visits



IQR = upper quartile – lower quartile

This means that 50% of respondents visit between three and eight times a month.

$$UQ = \frac{34}{n+1}$$
  $UQ = \frac{20 + 1 \times .75}{1 \times .75}$   
= 15.75th value  
= 8 visits

Therefore, the IQR = 
$$8 - 3$$
  
= 5 visits

LQ = 
$$\frac{1}{4}(n+1)$$
 UQ = 20+1x.25  
= 5.25th value  
= 3 visits

## 2 a Calculate the mean number of litres purchased on each visit. [4]

Litres	Midpoint (x) [1 mark for identifying midpoints]	Number of customers $(f)$	Frequency x midpoint $f  imes x$
1 ≤ 10	5.5	2	11
10 ≤ 20	15	5	75
20 ≤ 30	25	10	250
30 ≤ 40	35	2	70
	Totals	$\Sigma f = 19$	$\sum fx = 406$

An estimate of the mean number of litres purchased on each visit is:

$$\Sigma fx$$

$$\Sigma f$$

$$= \frac{406}{19}$$

$$= 21.4 \text{ litres}$$

### **b** What is the modal group? [2]

Most common.

20 to less than 30 litres.

#### c Estimate the median result. [4]

Median = 
$$\frac{(n+1)}{2}$$
  
=  $\frac{20}{2}$   
= 10th result

This will be in the 20 to less than 30 litres class.

Approximately 23 litres.