Example 10

◄ Self Tutor

A library surveys 20 borrowers each day from Monday to Friday, and records the number who are not satisfied with the range of reading material. The results are: 3 7 6 8 11.

The following year the library receives a grant that enables the purchase of a large number of books. The survey is then repeated and the results are: 2 3 5 4 6.

Find the range of data in each survey.

The range is the maximum minus the minimum data value.

For the first survey, the range is 11 - 3 = 8.

For the second survey, the range is 6-2=4.

Example 11

■ Self Tutor

For the data set: 7, 3, 1, 7, 6, 9, 3, 8, 5, 8, 6, 3, 7, 1, 9 find the:

- a median
- **b** lower quartile
- upper quartile
- d interquartile range.

The ordered data set is: 1, 1, 3, 3, 3, 5, 6, 6, 7, 7, 7, 8, 8, 9, 9 (15 of them)

- **a** As n=15, $\frac{n+1}{2}=8$: the median = 8th data value = 6
- **b/c** As the median is a data value we now ignore it and split the remaining data into two:

 $Q_1 = median of lower half = 3$

 $Q_3 = median of upper half = 8$

d
$$IQR = Q_3 - Q_1 = 8 - 3 = 5$$

Example 12

Self Tutor

For the data set: 6, 4, 9, 15, 5, 13, 7, 12, 8, 10, 4, 1, 13, 1, 6, 4, 5, 2, 8, 2 find:

- a the median
- **b** Q₁ **c** Q₃
- d the IQR.

The ordered data set is:

a As
$$n = 20$$
, $\frac{n+1}{2} = 10.5$

$$\therefore \ \ \text{the median} = \frac{10 \text{th value} \ + \ 11 \text{th value}}{2} = \frac{6+6}{2} = 6$$

b/c As we have an even number of data values, we split the data into two:

$$\therefore$$
 $Q_1 = \frac{4+4}{2} = 4$, $Q_3 = \frac{9+10}{2} = 9.5$

d
$$IQR = Q_3 - Q_1$$

= $9.5 - 4$
= 5.5

Example 13

Self Tutor

Consider the data set:

20, 31, 4, 17, 26, 9, 29, 37, 13, 42, 20, 18, 25, 7, 14, 3, 23, 16, 29, 38, 10, 33, 29

Use technology to find the:

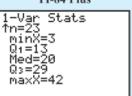
- a range
- interquartile range.



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		Rad Norm2 d/c	Real		
	1-Vai	iable			
	n	=23		1	
	minX	=3			
	Q1	=13			
	Med	=20			
	Q3	=29			
	maxX	=42		↓	

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"ox := oax"	10.838	į.
"n"	23.	•
"MinX"	3.	
"Q1X"	13.	
"MedianX"	20.	
"Q₃X"	29.	
"MaxX"	42.	
"SSX := $\Sigma(x-\overline{x})^2$ "	2701.65	
		4 10 0

$$\begin{tabular}{ll} \textbf{a} & range = maximum - minimum \\ \end{tabular}$$

$$= 42 - 3$$

$$= 39$$

b
$$IQR = Q_3 - Q_1$$

$$= 29 - 13$$

$$= 16$$