

Exercise 3D

1 Key: 1|2 means 12 movies

0	6	9	3								
1	2	7	2	8	5	5	5	9	2		
2	5	9	5	9	2	0	6	7	7	6	5
3	4	4	2	2	5						
4	5	2									

Ordering the stem and leaf diagram gives:

Key: 1|2 means 12 movies

0	3	6	9								
1	2	2	2	5	5	5	7	8	9		
2	0	2	5	5	5	6	6	7	7	9	9
3	2	2	4	4	5						
4	2	5									

a The median is the $\frac{n+1}{2} = \frac{30+1}{2} = 15.5$ th piece of data

Therefore the median lies at the midpoint of the 15th and 16th pieces of data.

$$\frac{25+25}{2} = 25$$

b To find the lower quartile

$$\frac{n}{4} = \frac{30}{4} = 7.5$$

Since this is not a whole number round up, so the lower quartile is the 8th piece of data, therefore $Q_1 = 15$

c To find the upper quartile

$$\frac{3n}{4} = \frac{90}{4} = 22.5$$

Since this is not a whole number round up, so the upper quartile is the 23rd piece of data, therefore $Q_3 = 29$

2 a 49

b 8

c 3

d 37

2 e The median is the $\frac{n+1}{2} = \frac{24+1}{2} = 12.5$ th piece of data.

Therefore the median lies at the midpoint of the 12th and 13th pieces of data.

$$\frac{34+34}{2} = 34$$

f To find the lower quartile:

$$\frac{n}{4} = \frac{24}{4} = 6$$

Since this is a whole number the lower quartile lies at the midpoint of the 6th and 7th pieces of data.

$$Q_1 = \frac{19+23}{2} = 21$$

g To find the upper quartile:

$$\frac{3n}{4} = \frac{72}{4} = 18$$

Since this is a whole number the upper quartile lies at the midpoint of the 18th and 19th pieces of data.

$$Q_3 = \frac{37+37}{2} = 37$$

3 a Key: 2|6 means 26

	Boys	2	Girls	
	9 8	2	6 4 8	
	2 4 2	3	2 4 4 9 3	
	5 4 8 7 5	4	7 5 6	
	7 6 6 4 4	5	4 2	
	0	6		

Key: 2|6 means 26

	Boys	2	Girls	
	9 8	2	4 6 8	
	4 2 2	3	2 3 4 4 9	
	8 7 5 5 4	4	5 6 7	
	7 6 6 4 4	5	2 4	
	0	6		

b The girls gained lower marks than the boys.

4 a The median is the $\frac{n+1}{2} = \frac{51+1}{2} = 26$ th piece of data.

So the median is 19.

b To find the lower quartile:

$$\frac{n}{4} = \frac{51}{4} = 12.75$$

Since this is not a whole number round up, so Q_1 is the 13th piece of data.

$$Q_1 = 18$$

To find the upper quartile:

$$\frac{3n}{4} = \frac{153}{4} = 38.25$$

Since this is not a whole number round up, so Q_3 is the 39th piece of data.

$$Q_3 = 21$$

$$\text{IQR} = Q_3 - Q_1$$

$$= 21 - 18$$

$$= 3$$

$$Q_3 + 1.5 \times \text{IQR} = 21 + 1.5 \times 3 = 25.5$$

Therefore the outliers are 27, 34, 34 and 41.