Interquartile Range

Starter

1. Find the median for the following data:
   (a) 7, 2, 9, 4, 8, 1, 5 (b) 12, 11, 19, 15, 17, 14

Working: (a) 1, 2, 4, 5, 7, 8, 9 Median = 5

(b) 11, 12, 14, 15, 17, 19 Median = 14.5

E.g. 1 For the data values 7, 9, 9, 13, 13, 17, 18, 20, 27, 28, 81 find:
(a) the median
(b) the upper and lower quartiles
(c) the interquartile range

Working: (a) The middle value is 17 so median = 17

(b) The number of values is 11 so $n = 11$

$$Q_1 = \frac{1}{4}(n+1)\text{th value} = \frac{1}{4}(11+1)\text{th value} = 3\text{rd value}$$

So the lower quartile, $Q_1 = 9$

$$Q_3 = \frac{3}{4}(n+1)\text{th value} = \frac{3}{4}(11+1)\text{th value} = 9\text{th value}$$

So the upper quartile, $Q_3 = 27$

(c) IQR $= Q_3 - Q_1 = 27 - 9 = 18$

E.g. 2 Calculate the IQR for the values: 80 70 34 21 21 56 75 89 84 20 17 45 87

Working: Ascending order: 17 20 21 21 34 45 56 70 75 80 84 87 89

The number of values is 11 so $n = 13$

$$Q_1 = \frac{1}{4}(13+1)\text{th value} = \frac{1}{4}(13+1)\text{th value} = 3.5\text{th value}$$

So the lower quartile, $Q_1 = 21$ ***(half-way between the 3rd and 4th value)***

$$Q_3 = \frac{3}{4}(n+1)\text{th value} = \frac{3}{4}(13+1)\text{th value} = 10.5\text{th value}$$

So the upper quartile, $Q_3 = \frac{80+84}{2} = 82$

IQR $= Q_3 - Q_1 = 82 - 21 = 61$

Video: Quartiles and interquartile range

Solutions to Starter and E.g.s

Exercise

9-1 class textbook:	p477 E14.1 Qu 1-6
A*-G class textbook:	p433 M14.6 Qu 1-6
9-1 homework book:	p477 E14.1 Qu 1-6
A*-G homework book:	p122 M14.6 Qu 1-4

Homework book answers (only available during a lockdown)