Other measures of location

Quartiles

Listed Data

Items	n	Position of LQ & UQ	LQ & UQ
1,4,7,9,10	5		
4,9,10,15	4		
2,4,5,7,8,9,11	7		
1,2,3,5,6,9,9,10,11,12	10		

Quartiles – Listed Data

Grouped Data

Items	n	Position of LQ & UQ	LQ & UQ
1,4,7,9,10	5		
4,9,10,15	4		
2,4,5,7,8,9,11	7		
1,2,3,5,6,9,9,10,11,12	10		

Quartiles – Grouped Data

Percentiles

Notation

Lower Quartile:

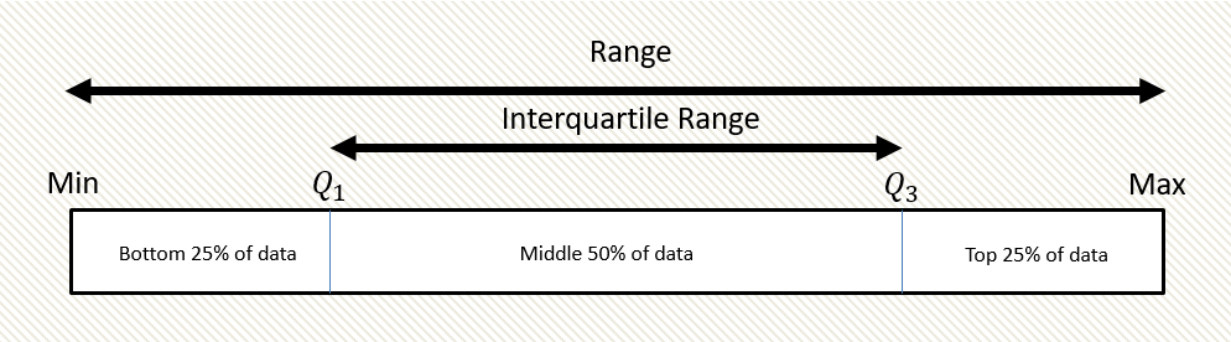
Median:

Upper Quartile:

57th Percentile:

Measures of Spread

The interquartile range and interpercentile range are examples of **measures of spread.**



Interquartile Range = Upper Quartile − Lower Quartile

Why might we favour the interquartile range over the range?

Test your understanding

Age of relic (years)	Frequency
0-1000	24
1001-1500	29
1501-1700	12
1701-2000	35

Shark length (cm)	Frequency
$40 \leq x < 100$	17
$100 \leq x < 300$	5
$300 \leq x < 600$	8
$600 \leq x < 1000$	11

Q1) S1 May 2013 Q4 (continued)

The following table summarises the times, t minutes to the nearest minute, recorded for a group of students to complete an exam.

Time (minutes) t	11 – 20	21 – 25	26 – 30	31 – 35	36 – 45	46 – 60
Number of students f	62	88	16	13	11	10

(*c*) Show that the estimated value of the lower quartile is 18.6 to 3 significant figures.

(1)

(*d*) Estimate the interquartile range of this distribution.

(2)

Q2) S1 June 2005 Q2

The following table summarises the distances, to the nearest km, that 134 examiners travelled to attend a meeting in London.

Distance (km)	Number of examiners
41–45	4
46–50	19
51–60	53
61–70	37
71–90	15
91–150	6

(*c*) Use interpolation to estimate the median Q_2, the lower quartile Q_1, and the upper quartile Q_3 of these data.

Q3) The ages of 300 houses in a village are recorded given the following table of results.

Age a (years)	Number of houses
$0 \leq a < 20$	36
$20 \leq a < 40$	92
$40 \leq a < 60$	74
$60 \leq a < 100$	39
$100 \leq a < 200$	14
$200 \leq a < 300$	27
$300 \leq a < 500$	18

Use linear interpolation to estimate the lower quartile, upper quartile and hence the interquartile range.

Q4)

A cyber-café recorded how long each user stayed during one day giving the following results.

Length of stay (minutes)	Number of houses
$0 \leq l < 30$	15
$30 \leq l < 60$	31
$60 \leq l < 90$	32
$90 \leq l < 120$	23
$120 \leq l < 240$	17
$240 \leq l < 360$	2

Use linear interpolation to estimate:

a) The lower quartile.

b) The upper quartile.

c) The 90^{th} percentile.

Q5)

Distance (to the nearest mile)	Number of commuters
0 – 9	10
10 – 19	19
20 – 29	43
30 – 39	25
40 – 49	8
50 – 59	6
60 – 69	5
70 – 79	3
80 – 89	1

Find the interquartile range for the distance travelled by commuters.