Range

Range - Highest data value — The smallest data value.
minus

Interquartile Range

If we had a data set of 20 values

$$\frac{n+1}{2} = \frac{20+1}{2} = \frac{21}{2} = 10.5$$

Q1   Q2   Q3

Median = middle Q2

Lower Quartile — We find the median of the data values below Q2 the median. (Q1)

Upper Quartile — we find the median of the data values above the median Q2   (Q3)

Inter quartile Range IQR — Upper Quartile — Lower Quartile

T&T3 8.2

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PROJECT MATHS

Text & Tests

Leaving 3 Certificate

Chapter 8

Measures of Location and Spread

Section 8.2 **Range and variability**

Example 1

Jane's marks, out of 20, in ten maths tests were as follows:

8, 8, 14, 12, 12, 10, 14, 12, 18, 12

Conor's marks in the same tests were

12, 14, 12, 16, 10, 12, 10, 12, 10, 12

Find   (i)   the mean   (ii)   the range
of Jane's marks and Conor's marks and comment on the results.

Example 2

These are the test marks of 11 students:

52, 78, 61, 49, 79, 47, 54, 58, 72, 62, 73

Find   (i)   the median   (ii)   the lower quartile
          (iii) the upper quartile   (iv)   the interquartile range.

1. Find the range for each of the following sets of data:

Highest value − Lowest value

  (i) 6, 3, 8, 2, 9, 5, 10 $10 - 2 = 8$

  (ii) 21, 16, 72, 40, 67, 65, 55, 34, 17, 48, 32, 19, 44, 61, 73 $73 - 16 = 57$

  (iii) 8, 2, 9, 6, 7, 10, 12, 13, 5, 12, 10, 8, 10, 4 $13 - 2 = 11$

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2. Miss Moore gave her class a maths test.

Here are the marks for the girls:

    7, 5, 8, 5, 2, 8, 7, 4, 7, 10, 3, 7, 4, 3, 6 $10 - 2 = 8$

What is (i) the median mark **6**   median   (ii)   the range of marks?

The median mark for the boys in her class was 7 and the range of marks for the boys was 4.

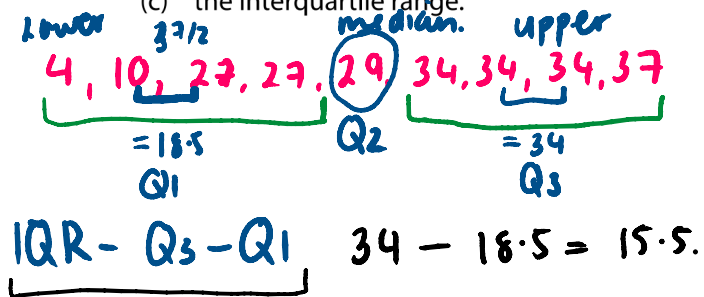By comparing the results, explain whether the boys or girls did better in the test.

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3. Nine students submitted their assignments which were marked out of 40.
The marks obtained were:

37, 34, 34, 29, 27, 27, 10, 4, 34 $\quad = 33$

(i) Write down the range of marks. $37-4$ (ii) Write down the median mark.

(iii) Find (a) the lower quartile
(b) the upper quartile
(c) the interquartile range.

lower 37/2   median.   upper

4, 10, 27, 27, (29) 34, 34, 34, 37

= 18.5
Q1

Q2

= 34
Q3

IQR = Q3 − Q1,   34 − 18.5 = 15.5.

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4. Find (i) the lower quartile
(ii) the upper quartile
(iii) the interquartile range

for this set of data:

4, 12, 7, 6, 10, 5, 11, 14, 2, 3, 9

5. Here are the times, in minutes, for a bus journey:

15, 7, 9, 12, 9, 19, 6, 11, 9, 16, 8

(i) Find the range of these times.   (ii) Find the lower quartile.

(iii) Find the upper quartile.   (iv) Write down the interquartile range.

6. A group of boys and girls took a French test. These are the marks which the boys got:

13, 14, 14, 15, 14, 14, 15, 17, 16, 14, 16, 12

(i) Find the range of the boys' marks.

(ii) Calculate the mean mark of the boys.

The mean mark for the girls in the class was 13.2 and the girls' marks had a range of 7.

(iii) Make two statements about the differences between the boys' and girls' marks in the French test.

7. Conor played nine rounds of crazy golf. Here are his scores:

   51, 53, 50, 41, 59, 64, 66, 65, 50

Find   (i)   the range   (ii)   the lower quartile
              (iii)   the upper quartile   (iv)   the interquartile range.

8. A greengrocer sold bags of apples from different countries.
   A bag contained 9 French apples.
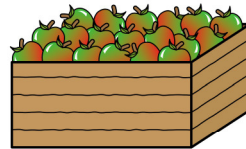
   The weight of each apple is given below, in grams.

      101, 107, 98, 109, 115, 103, 96, 112, 104

   (i)   Calculate the mean weight of a French apple.
   (ii)   Find the range of the weights of the French apples.

   Another bag contained 9 South African apples.
   Their mean weight was 107 g and their range was 19 g.
   (iii)   Make two comments on the weights of the apples in the two bags.

9. A set of cards has these numbers on them

| 3 | 3 | 4 | 5 | 6 | 6 | 7 |

  (i) Find five cards from this set with median 6 and range 4.

 (ii) Find four cards with median 6 and range 3.

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10. Solve these two problems:

In my family the ages of the three kids are 6, 10 and 16.
The mean age of the whole family is 24. The range is 41.
How old are my Mum and Dad?

(i)

There are 5 children in my family.
The youngest is 8 and I am 15.
The median child's age is 13.
The range of childrens' ages is 17.
The mean of our ages is 14.
How old are we?

(ii)

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11. The PE teacher in a school measures the time, in seconds, it takes the members of the football team and the hockey team to run 100 metres.

Football team

13   14   15   11   14   12   12   13   11   13   15

Hockey team

12   13   14   11   14   16   15   13   15   17   11

 (i) Calculate the mean, median and range for each team.
 (ii) Which group do you think is the faster?
       Give a reason for your answer.

Answers 8.2

1. (i) 8   (ii) 57   (iii) 11
2. (i) 6   (ii) 8
3. (i) 33   (ii) 29
       (iii) (a) 18.5   (b) 34   (c) 15.5
4. (i) 4   (ii) 11   (iii) 17
5. (i) 13 min   (ii) 8
       (iii) 15   (iv) 7
6. (i) 5   (ii) 14.5
7. (i) 25   (ii) 50   (iii) 64.5   (iv) 14.5
8. (i) 105 g   (ii) 19 g
9. (i)

   | 3 | 5 | 6 | 6 | 7 |

       (ii)

   | 4 | 6 | 6 | 7 |

10. (i) 41 and 47   (ii) 8, 9, 13, 15, 25
11. (i) Football: 13, 13, 4; Hockey: 13.7, 14, 6
        (ii) Football team