Consider the following data set:

| 11 | 11 | 12 | 14 | 17 | 19 |

1)   Find: i) the **mode**   ii) the **median**

                iii) the **mean**   iv) the **range**

                v) the **interquartile range**   vi) the **standard deviation**

2)   Each value in the original data set is increased by 50.

    a) What are the new values in the data set?

    b) Find: i) the mode   ii) the median

                iii) the mean   iv) the range

                v) the interquartile range   vi) the standard deviation

    c) Which measures have stayed the same and which have changed? Explain.

3)   Only the last value in the original data set is increased by 50. The others remain the same.

    a) What are the new values in the data set?

    b) Find: i) the mode   ii) the median

                iii) the mean   iv) the range

                v) the interquartile range   vi) the standard deviation

    c) Which measures have stayed the same and which have changed? Explain.

4)   Each value in the original data set is increased by a factor of 10.

    a) What are the new values in the data set?

    b) Find: i) the mode   ii) the median

                iii) the mean   iv) the range

                v) the interquartile range   vi) the standard deviation

    c) Which measures have stayed the same and which have changed? Explain.

Extension sheet

5) Consider the following data set:

$$x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6$$

a) Find the numerical values by comparing it to the original data set, given that:

the **mode** is 6   the **median** is 8   the **mean** is 9

the **range** is 8   the **interquartile range** is 6.

b) Find the standard deviation of this data set.

6) Consider the following data set:

$$y_1 \quad y_2 \quad y_3 \quad y_4 \quad y_5 \quad y_6$$

a) Find the numerical values by comparing it to the original data set, given that:

the **mode** is 5.5   the **median** is 6.5   the **mean** is 7

the **range** is 4   the **interquartile range** is 3

b) Find the standard deviation of this data set.

Answers

1)   i) Mode = 11   ii) Median = 13

                         iii) Mean = 14   iv) Range = 8

                         v) IQR = 6   vi) σ = 3.0550 … = 3.06

2)   a) 61, 61, 62, 64, 67, 69

        b)   i) Mode = 61   ii) Median = 63

                     iii) Mean = 64   iv) Range = 8

                     v) IQR = 6   vi) σ = 3.06

    c) The averages have all increased by 50, but the spread has not changed.

3)   a) 11, 11, 12, 14, 17, 69

        b)   i) Mode = 11   ii) Median = 13

                     iii) Mean = $22\frac{1}{3}$ iv) Range = 58

                     v) IQR = 6   vi) σ = 20.973 … = 20.97

    c) The mode, median and IQR are the only values that have remained the same, as they are not affected by extreme values.

4)   a) 110, 110, 120, 140, 170, 190

        b)   i) Mode = 110   ii) Median = 130

                     iii) Mean = 140   iv) Range = 80

                     v) IQR = 60   vi) σ = 30.550... = 30.6

    c) All values have increased by a factor of 10. Multiplying the values affected the averages and the spread.

5)   a) 6, 6, 7, 9, 12, 14 (the original set has decreased by 5.)

    b) σ = 3.06 (no need to calculate – the original spread has not changed.)

6)   a) 5.5, 5.5, 6, 7, 8.5, 9.5 (the original set has been halved)

    b) σ = 3.0550 … ÷ 2 = 1.53