Lesson 1-6

Example 1

Find the following for the data.

Mass (grams):   19   32   51   42   22   26   39   40   15   55

a. median   **b.** first quartile   **c.** third quartile   **d.** interquartile range

Solution

Write the masses in order from least to greatest.

median of all data, or
second quartile
↓

15 19 22 26 32 39 40 42 51 55
      ↑   ↑
first quartile   *third quartile*
lower half   *upper half*
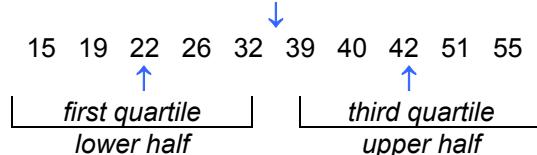
a. The median mass is 35.5 grams, halfway between the two middle masses.

b. There are five masses below 35.5 grams. The middle of these is 22, so the first quartile is 22 grams.

c. There are five masses above 35.5 grams. The middle of these is 42, so the third quartile is 42 grams.

d. The interquartile range is the difference between the first quartile and the third quartile, $42 - 22 = 20$. So the interquartile range is 20 grams.

Example 2

Make a box-and-whisker plot for the data.

Number of Sit-Ups
65   40   52   88   94   66   73   58   76

Solution

40   52   58   65   66   73   76   88   94   Write the data in order from least to greatest.

Find the quartile values.
    Q_2: The median of the data is 66.
    Q_1: The median of the lower half of the data is the midpoint of 52 and 58.
       $(52 + 58) \div 2 = 55$
    Q3: The median of the upper half of the data is the midpoint of 76 and 88.
       $(76 + 88) \div 2 = 82$

Use points to mark these values below a number line. Complete the box and whiskers. No data is far from the rest of the data, so there are no outliers.

Number of Sit-ups

40   55   66   82   94
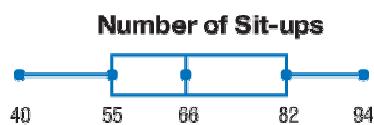
Example 3

SAFETY A total of 640 employees at a manufacturing plant took a safety certification test. Kathy earned a score that was 25th from the highest score earned on the test. Find the percentile rank that Kathy achieved.

Solution

The total number of employees who took the test was 640. Kathy was 25th. So there were 24 employees who had higher scores than she did. The number of employees who scored equal to or less than he did was 640 - 24 = 616.

$$\frac{\text{number of scores less than or equal to given score}}{\text{total number of scores}} = \frac{616}{640} = 0.9625$$

So, Kathy's ranking is in the 96th percentile.