Get out your homework and have it ready to check.

Classwork - Measures of Spread

1. Based on the following box and whisker plot, list the 5 number summary and the interquartile range (IQR).

Minimum = 12

1st Quartile $= 18$

Median = 20

3rd Quartile = 26

Maximum = 36

IQR = 8

$26 - 18$

For questions 2 through 4, find the 5 number summary, the interquartile range (IQR), and then construct a box and whisker plot for the data given.

$4, \underline{6, 7,} 8 \,|\,\boxed{10}\,|\, 10, 12, \underline{15, 15}$

$\frac{6+7}{2} = 6.5$

2. $8, 15, 12, 16, 7, 6, 4, 10, 15$

Minimum = 4

1st Quartile = 6.5

Median = 10

3rd Quartile = 13.5

$\frac{12+15}{2} = 13.5$

Maximum = 15

IQR = 7

$13.5 - 6.5$

$60, \underline{70,} 85, 85 \boxed{90} 92, 95, \underline{97,} 100$
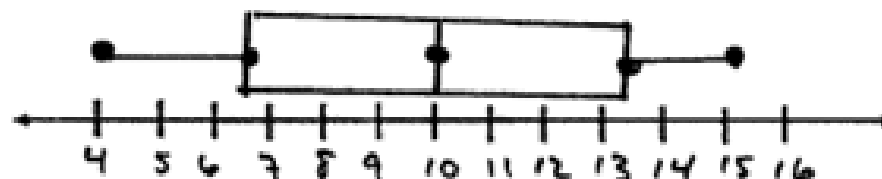
$60, 70, 85, 85 \mid \boxed{90} \mid 92, 95, 97, 100$

3. 85, 92, 97, 100, 70, 60, 85, 95, 90
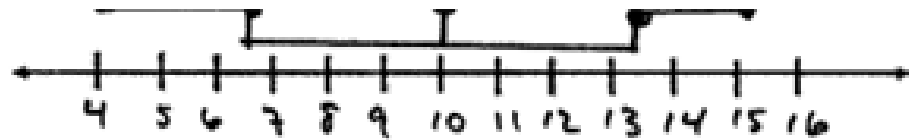
$\dfrac{70+85}{2} = 77.5$

Minimum = __60__

1st Quartile = __77.5__

Median = __90__

3rd Quartile = __96__

Maximum = __100__

IQR = __18.5__

$96 - 77.5$

$\dfrac{95+97}{2} = 96$
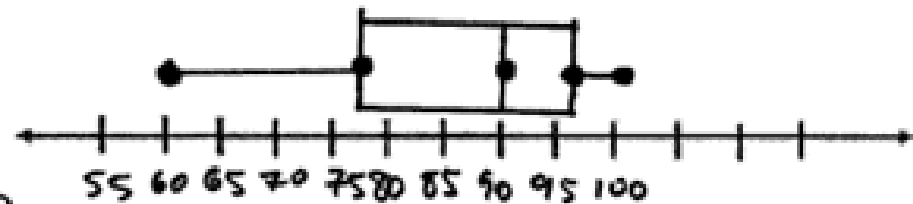
$4, 5, 8, 9, 9, 10 \mid \boxed{11} \mid 12, 12, 15, 16, 17, 20$

4. 12, 15, 9, 5, 17, 16, 10, 11, 4, 8, 9, 20, 12

$\dfrac{8+9}{2} = 8.5$
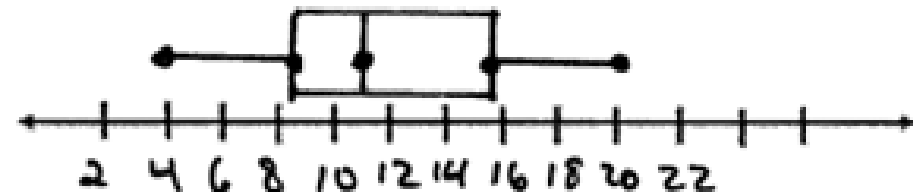
Minimum = __4__

1st Quartile = __8.5__

Median = __11__

3rd Quartile = __15.5__

Maximum = __20__

IQR = __7__

$15.5 - 8.5$

$\dfrac{15+16}{2} = 15.5$

Measures of Center

Mean – the average of the numbers in the data set.

Median – the middle number of the data set. Numbers must be put in order.

Mode – the number that occurs the most often.

Warm Up: Find the mean, median, mode, and range of the data set below.

7, 9, 5, 9, 5, 7, 2, 7, 9, 7, 2, 3

Mean = _6_

Mode = _7_

Median = _7_

Range = _7_

$$2, 2, 3, 5, 5, \boxed{7, 7,} 7, 7, 9, 9, 9$$

$$Mean = \frac{72}{12} = 6$$

$$Range = 9 - 2 = 7$$

$$Median = \frac{7+7}{2} = 7$$

Measures of Spread

Range – Difference between the maximum and minimum.

Interquartile Range (IQR) – Difference between the 3rd and 1st quartile.

Mean Absolute Deviation (MAD) – the average distance between each data value and the mean.

Example: Find the mean absolute deviation of the set of data from the warm up.

$$2, 2, 3, 5, 5, 7, 7, 7, 7, 9, 9, 9$$

$$\text{Mean} = 6$$

$$|6-2| = 4$$
$$|6-2| = 4$$
$$|6-3| = 3$$

$$|6-5| = 1$$
$$|6-5| = 1$$
$$|6-7| = 1$$
$$|6-7| = 1$$

$$|6-7| = 1$$
$$|6-7| = 1$$
$$|6-9| = 3$$
$$|6-9| = 3$$

$$|6-9| = 3$$

Description: The average distance each value is from the mean is __2.2__.

$$4 + 4 + 3 + 1 + 1 + 1 + 1 + 1 + 1 + 3 + 3 + 3 = 26$$

$$MAD = \frac{26}{12} = 2.2$$

Got It?

A) The data set below shows the heights of eight students from a class. Find the mean absolute deviation of the set of data to the nearest tenth.

52, 48, 60, 55, 59, 54, 58, 62

$Mean = \frac{448}{8} = 56$

$|56 - 52| = 4$
$|56 - 48| = 8$
$|56 - 60| = 4$
$|56 - 55| = 1$

$|56 - 55| = 3$
$|56 - 54| = 2$
$|56 - 58| = 2$
$|56 - 62| = 6$

$MAD = \frac{30}{8}$

$MAD = 3.75$

$= 3.8$

B) The data set below shows the average speeds of land animals. Find the mean absolute deviation of the set of data to the nearest tenth.

70, 40, 45, 42, 40, 36

$Mean = \frac{273}{6} = 45.5$

$|45.5 - 70| = 24.5$
$|45.5 - 40| = 5.5$
$|45.5 - 45| = 0.5$

$|45.5 - 42| = 3.5$
$|45.5 - 40| = 5.5$
$|45.5 - 36| = 9.5$

$MAD = \frac{49}{6} = 8.1\overline{6} = 8.2$

Practice Problems

1) The table below shows the total points scored by two volleyball teams.

Team 1	52	61	42	44	60	50	55	42	49	46
Team 2	47	42	42	42	17	54	52	42	29	37

A) Find the mean absolute deviation of each set of data. Round to the nearest tenth.

$$Mean = \frac{404}{10} = 40.4$$

$|40.4 - 47| = 6.6$ $\qquad$ $|40.4 - 17| = 23.4$ $\quad$ $|40.4 - 47| = 1.6$

$|40.4 - 42| = 1.6$ $\qquad$ $|40.4 - 54| = 13.6$ $\quad$ $|40.4 - 29| = 11.4$

$|40.4 - 42| = 1.6$ $\qquad$ $|40.4 - 52| = 11.6$ $\quad$ $|40.4 - 37| = 3.4$

$|40.4 - 42| = 1.6$

Team 1 MAD = **5.52** $\qquad$ Team 2 MAD = **7.64**

B) Write a few sentences comparing their variation.

$$MAD = \frac{76.4}{10} = \boxed{7.64}$$