Topic: Central tendency: mean, median, and mode

Question: Heather built 7 buildings with her toy blocks and measured their heights in millimeters. The heights of her block buildings were 750 mm, 850 mm, 700 mm, 650 mm, 750 mm, 900 mm, and 950 mm. What is the mean height of the buildings?

Answer choices:

A 750 mm

B 793 mm

C 250 mm

D 4,735 mm

Solution: B

To find the mean, add the heights of each building, and then divide by the number of buildings.

$$\mu = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$\mu = \frac{750 + 850 + 700 + 650 + 750 + 900 + 950}{7}$$

$$\mu \approx 793 \text{ mm}$$

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Question: Which statement is a true statement about the data set?

2, 2, 2, 4, 4, 6, 6, 7, 8, 9, 10, 10, 10

Answer choices:

A The data is bi-modal.

B The mean is larger than the median.

C Both A and B are true.

D Both A and B are false.

Solution: C

The mode is the number that appears most often in a data set. This data has two modes, 2 and 10, because they both appear three times in the data set. This means the data is bi-modal.

To find the median, find the middle number. One way to do this is to cross off numbers on the right and left until you find the middle number. Here you can see the median is 6.

$$\cancel{2}, \cancel{2}, \cancel{2}, \cancel{4}, \cancel{4}, \cancel{6}, 6, \cancel{7}, \cancel{8}, \cancel{9}, \cancel{10}, \cancel{10}, \cancel{10}$$

To find the mean, add all of the numbers in the data set together and divide by how many there are.

$$\mu = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$\mu = \frac{2+2+2+4+4+6+6+7+8+9+10+10+10}{13}$$

$$\mu \approx 6.15$$

Since $6.15 > 6$, the mean is larger than the median. This means answer choices A and B are both true statements.

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Question: Given the data set and its mean, what is the value of x?

$$61,\ 80,\ x,\ 91$$

$$\mu = 78$$

Answer choices:

A 78

B 77.25

C 80

D 85.6

Solution: C

The mean of the data set is $\mu = 78$, and the data set contains the four numbers 61, 80, x, 91.

To find the mean, add all of the numbers in the data set together and divide by how many data points are in the set. This time we know the mean is 78, so we can set up the equation:

$$\mu = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$78 = \frac{61 + 80 + x + 91}{4}$$

When we solve for x we get:

$$78(4) = 61 + 80 + x + 91$$

$$312 = 61 + 80 + x + 91$$

$$312 - 61 - 80 - 91 = x$$

$$x = 80$$