Names: ____________________ ____________________ ____________________

Activity #1: Basic Parameters (Solutions) **Statistics**

1. Find the mean of the following list of numbers.

$$11,\ 15,\ 10,\ 5,\ 11,\ 11,\ 6,\ 11$$

Solution: Remember that to find the mean of n numbers x_1, x_2, $\ldots$, x_n, we add them up and divide by the number of numbers. In this case,

$$\begin{aligned} \frac{11+15+10+5+11+11+6+11}{8} &= \frac{80}{8} \\ &\approx 10.0. \end{aligned}$$

2. Find the mean of the following list of numbers.

$$71,\ 60,\ 90,\ 74,\ 72,\ 66,\ 84,\ 86,\ 83,\ 65$$

Solution: Remember that to find the mean of n numbers x_1, x_2, $\ldots$, x_n, we add them up and divide by the number of numbers. In this case,

$$\begin{aligned} \frac{71+60+90+74+72+66+84+86+83+65}{10} &= \frac{751}{10} \\ &\approx 75.1. \end{aligned}$$

3. Find the mean of the following list of numbers.

$$1,\ 3,\ 2,\ 1,\ 2,\ 1,\ 2,\ 4$$

Solution: Remember that to find the mean of n numbers x_1, x_2, $\ldots$, x_n, we add them up and divide by the number of numbers. In this case,

$$\begin{aligned} \frac{1+3+2+1+2+1+2+4}{8} &= \frac{16}{8} \\ &\approx 2.0. \end{aligned}$$

4. Find the mean deviation of the following list of numbers.

$$6,\ 5,\ 11,\ 14,\ 9$$

Solution: Remember that the mean deviation of x_1, x_2, …, x_n is

$$\frac{1}{n}\sum_{i=1}^{n}|x_i - \overline{x}|,$$

where $\overline{x}$ is the mean of the x_i. In this case the mean is $\overline{x} = 9.00$. Then the mean deviation is

$$\begin{aligned} & \frac{1}{5}\big(|6-9.00| + |5-9.00| + |11-9.00| + |14-9.00| + |9-9.00|\big) \\ = & \frac{1}{5}\big(3.00 + 4.00 + 2.00 + 5.00 + 0.00\big) \\ = & 2.80 \end{aligned}$$

5. Find the mean deviation of the following list of numbers.

$$4,\ 6,\ 5,\ 2,\ 5,\ 8$$

Solution: Remember that the mean deviation of x_1, x_2, …, x_n is

$$\frac{1}{n}\sum_{i=1}^{n}|x_i - \overline{x}|,$$

where $\overline{x}$ is the mean of the x_i. In this case the mean is $\overline{x} = 5.00$. Then the mean deviation is

$$\begin{aligned} & \frac{1}{6}\big(|4-5.00| + |6-5.00| + |5-5.00| + |2-5.00| + |5-5.00| + |8-5.00|\big) \\ = & \frac{1}{6}\big(1.00 + 1.00 + 0.00 + 3.00 + 0.00 + 3.00\big) \\ = & 1.33 \end{aligned}$$

6. Find the standard deviation of the following list of numbers.

$$5,\ 6,\ 5,\ 8,\ 9$$

Solution: Remember that the standard deviation of x_1, x_2, …, x_n is

$$\sqrt{\frac{\sum_{i=1}^{n}(x_i - \overline{x})^2}{n-1}},$$

where $\overline{x}$ is the mean of the x_i. In this case the mean is $\overline{x} = 6.60$. Then the standard deviation is

$$\begin{aligned} & \sqrt{\frac{1}{4}\big((5-6.60)^2 + (6-6.60)^2 + (5-6.60)^2 + (8-6.60)^2 + (9-6.60)^2\big)} \\ = & \sqrt{\frac{1}{4}\big(2.56 + 0.36 + 2.56 + 1.96 + 5.76\big)} \\ = & 1.62 \end{aligned}$$

7. Suppose we have collected the following list of numbers.

$$3, 7, 8, 9, 25, 23, 23, 25, 9, 8$$

Compute the z-scores of 2 and 25 with respect to this list.

Solution: Remember that the z-score of a particular number x with respect to a list of numbers is

$$z = \frac{x - \overline{x}}{s},$$

where $\overline{x}$ is the mean and s the standard deviation. In this case we can see that $\overline{x} = 14.0$ and $s = 8.342$, so that the z-score of 2 is

$$\frac{2 - 14.0}{8.342} = -1.438$$

and of 25 is

$$\frac{25 - 14.0}{8.342} = 1.318.$$

8. Suppose we have collected the following list of numbers.

$$7, 8, 9, 9, 5, 7, 5, 7, 3, 8$$

Compute the z-scores of 4 and 13 with respect to this list.

Solution: Remember that the z-score of a particular number x with respect to a list of numbers is

$$z = \frac{x - \overline{x}}{s},$$

where $\overline{x}$ is the mean and s the standard deviation. In this case we can see that $\overline{x} = 6.8$ and $s = 1.833$, so that the z-score of 4 is

$$\frac{4 - 6.8}{1.833} = -1.527$$

and of 13 is

$$\frac{13 - 6.8}{1.833} = 3.382.$$

9. Find the coefficient of variation of the following list of numbers.

$$18, 19, 18, 14, 20, 18$$

Solution: Remember that the coefficient of variation of a list of numbers is $100\% \cdot s/\overline{x}$, where s is the standard deviation and $\overline{x}$ the mean, expressed as a percentage. In this case the mean is $\overline{x} = 17.8$ and the standard deviation is $s = 1.86$, so the coefficient of variation is $100\% \cdot s/\overline{x} = 10\%$.

10. Find the coefficient of variation of the following list of numbers.

$$7, 4, 3, 10, 6, 7, 6$$

Solution: Remember that the coefficient of variation of a list of numbers is $100\% \cdot s/\overline{x}$, where s is the standard deviation and $\overline{x}$ the mean, expressed as a percentage. In this case the mean is $\overline{x} = 6.1$ and the standard deviation is $s = 2.09$, so the coefficient of variation is $100\% \cdot s/\overline{x} = 34\%$.