

11-4 Mean Absolute Deviation

Mean absolute deviation – the average distance between each data value and the mean in a set of data.

Steps to find the mean absolute deviation

1. Find the mean of the set of data
2. Find the absolute value of differences between each value and the mean
3. Find the average of the differences from step 2.

Examples:

The table shows the number of miles that Katie jogged in five days. Find the mean absolute deviation of the set of data. Describe what the mean absolute deviation represents.

Miles Jogged				
3	5	2	6	5

Step by Step:

1.) $\frac{3 + 5 + 2 + 6 + 5}{5} = \frac{21}{5} = 4.2$

2.) $4.2 - 2 = 2.2$
 $4.2 - 3 = 1.2$
 $4.2 - 5 = 0.8$ (absolute value of -0.8 is 0.8)
 $4.2 - 5 = 0.8$ (absolute value of -0.8 is 0.8)
 $4.2 - 6 = 1.8$ (absolute value of -1.8 is 1.8)

3.) $\frac{2.2 + 1.2 + 0.8 + 0.8 + 1.8}{5} = \frac{6.8}{5} = 1.36$

Mean Absolute Deviation = 1.36 miles
Represents the average distance each value is from the mean.

The table shows speeds of ten birds. Find the mean absolute deviation of the data. Round to the nearest hundredth. Describe what the mean absolute deviation represents.

Speeds of Top Ten Fastest Birds (mph)				
88	77	65	70	65
72	95	80	106	68

$$1) \frac{88+77+65+70+65+72+95+80+106+68}{10}$$

$$786 \div 10 = 78.6$$

$$2) \begin{array}{l} 78.6 - 88 = 9.4 \\ 78.6 - 77 = 1.6 \\ 78.6 - 65 = 13.6 \\ 78.6 - 70 = 8.6 \\ 78.6 - 65 = 13.6 \\ 78.6 - 72 = 6.6 \\ 78.6 - 95 = 16.4 \\ 78.6 - 80 = 1.4 \\ 78.6 - 106 = 27.4 \\ 78.6 - 68 = 10.6 \end{array}$$

10.92 represents the average distance each value is from the mean.

$$3) \frac{9.4+1.6+13.6+8.6+13.6+6.6+16.4+1.4+27.4+10.6}{10} = \frac{109.2}{10} = 10.92$$

The table shows the running time in minutes for two kinds of movies. Find the mean absolute deviation for each set of data. Round to the nearest hundredth. Then write a few sentences comparing their variation.

Running Time for Movies (min)									
Comedy					Drama				
90	95	88	100	98	115	120	150	135	144

Comedy

$$1) \frac{90+95+88+100+98}{5} = \frac{471}{5} = 94.2$$

$$2) \begin{array}{l} 94.2 - 90 = 4.2 \\ 94.2 - 95 = 0.8 \\ 94.2 - 88 = 6.2 \\ 94.2 - 100 = 5.8 \\ 94.2 - 98 = 3.8 \end{array}$$

$$3) \frac{4.2+0.8+6.2+5.8+3.8}{5} = \frac{20.8}{5} = 4.16$$

drama

$$1) \frac{115+120+150+135+144}{5} = \frac{664}{5} = 132.8$$

$$2) \begin{array}{l} 132.8 - 115 = 17.8 \\ 132.8 - 120 = 12.8 \\ 132.8 - 150 = 17.2 \\ 132.8 - 135 = 2.2 \\ 132.8 - 144 = 11.2 \end{array}$$

$$3) \frac{17.8+12.8+17.2+2.2+11.2}{5} = \frac{61.2}{5} = 12.24$$

The mean absolute deviation of the comedy movies is 4.16 minutes. The mean absolute deviation of the drama movies is 12.24 minutes. The comedy deviation is less than the drama.