LESSON
16-1

Measures of Center
Reteach

When calculating the mean, you can use *compatible numbers* to find the sum of the data values. Compatible numbers make calculations easier. For example, adding multiples of 5 or 10 is easier than adding all of the individual data values.

A group of students are asked how many hours they spend watching television during one week. Their responses are: 15, 7, 12, 8, 4, 13, 11. What is the mean?

$$4 + 11 = 15$$

15   7   12   8   4   13   11

Group numbers that have sums which are multiples of 5 or 10.

$$12 + 8 = 20$$

$$7 + 13 = 20$$

$$15 + 20 + 20 + 15 = 70$$

Find the sum of the numbers.

$$\frac{70}{7} = 10$$

Divide the sum by the number of data values.

The mean is 10 hours.

Use compatible numbers to find the mean.

1. The costs (in dollars) of items on a lunch menu are 9, 14, 11, 6, 16, 10.

   Mean: _____

2. The numbers of students in Mr. Silva's math classes are 19, 18, 22, 24, 20, 18, 26.

   Mean: _____

3. In the television viewing data above, is there more than one way to pair the data values to form compatible numbers? Explain.

   _____

   _____

LESSON 16-2	**Mean Absolute Deviation**
	Reteach

The *mean absolute deviation*, or *MAD*, is the average of how far the elements in a data set are from the *mean* of the data set.

If you think of MAD as a distance, it will always be a positive number. For two or more comparable data sets, the larger the MAD is, the more "spread out" the elements of a data set are, such as in the example.

Example

Step 1 Find the mean.

The mean of these two data sets of the number of eggs in 10 nests of two birds of the same species over several breeding cycles:

• Bird *A*: 3, 3, 4, 2, 3, 4, 5, 1, 2, and 2

• Bird *B*: 1, 1, 3, 6, 2, 2, 3, 5, 4, and 1

For Bird *A*: mean = 29 ÷ 10 = 2.9 or about 3 eggs
For Bird *B*: mean = 28 ÷ 10 = 2.8 or about 3 eggs

Step 2 Find the mean absolute deviation. First, find the deviation of each element from the mean by subtracting the element's value from the mean or vice versa. This gives these deviations for the 10 elements in each data set.

Bird *A*: 0.1, 0.1, 1.1, 0.9, 0.1, 1.1, 2.1, 1.9, 0.9, and 0.9
Bird *B*: 1.8, 1.8, 0.2, 3.2, 0.8, 0.8, 0.2, 2.2, 1.2, and 1.8

Then add the deviations for each bird and divide by the number of breeding cycles.

For Bird *A*: MAD = 9.2 ÷ 10 = 0.92
For Bird *B*: MAD = 14 ÷ 10 = 1.4

In this example, the mean number of eggs in each bird's nest is almost the same. However, the mean absolute deviations, or MAD, of the two data sets are different. The number of eggs in Bird *B*'s nests over 10 breeding cycles show more **variability**, or the "number of eggs varied more" than did the number of eggs in Bird *A*'s nests over 10 cycles.

Notice that both MAD values round to one egg. What do you think will happen to these MAD values over a larger number of breeding cycles?

Find the mean absolute deviation by hand calculations or with a spreadsheet program.

1. Data:

   0.1, 0.15, 0.09, 0.11, and 0.13

   MAD: _____

2. Data:

   250, 249, 251, 253, and 253

   MAD: _____