

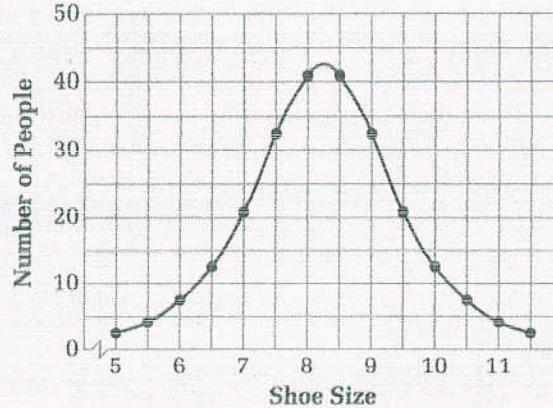
3-2

Mean, Median, and Mode

FOCUS

Find values that are typical of a set of data, identify data values that are not typical of a data set, and use equations to find missing data values.

For certain kinds of data, such as heights or shoe sizes, if you collect data for a great many people and then graph the data, you will get a curve that looks something like the one shown below.



This bell-shaped curve is called a normal curve and the distribution of data is called a normal distribution. In a normal distribution, the mean, median, and mode are all the same number.

KEY TERMS

EXAMPLE / ILLUSTRATION

<p>Mean (p. 136) the sum of the items in a set of data divided by the number of items</p>	<p>Data values: 32, 64, 64, 72, 73, 76, 80, 83, 89, 89, 92 The mean of the data is 74.</p>
<p>Median (p. 136) the middle number in a set of data after the data are put in order (If the number of data items is even, the median is the mean of the two middle numbers.)</p>	<p>The median of the data above (the data is in order) is 76.</p>
<p>Mode (p. 136) the number (or numbers) that occurs most often in a set of data (A data set may have more than one mode.)</p>	<p>There are two modes of the data above, 64 and 89.</p>
<p>Outlier (p. 137) data values that are much larger or smaller than most of the values in a data set (Outliers are <i>not</i> typical of the data set.)</p>	<p>There is one outlier in the data above, 32.</p>
<p>Range (p. 137) the difference between the smallest and largest numbers</p>	<p>The range of data above is 60.</p>

UNDERSTANDING THE MAIN IDEAS

Mean, median, and mode

One value from a set of data is often chosen as the most typical value for describing the set. This value may be the mean, which you find by adding all the values and then dividing by the number of values in the set.

However, very large or very small values, called outliers, can make the mean a misleading value for describing the data. The typical value might be the median value, which is the middle value when the values are arranged in order. (If there are two “middle” numbers, the median is the mean of these two numbers.) Or the typical value might be the mode, the value (or values) that occurs most often.

Sample

The weekly salaries of the ten sales clerks at Howard’s Book Store are \$375, \$350, \$440, \$400, \$400, \$430, \$650, \$350, \$410, and \$210.

- Find the mean, median, and mode(s) of the salaries.
- What is the salary range?
- Are there any outliers?

Sample Response

a. mean: $(375 + 350 + 440 + 400 + 400 + 430 + 650 + 350 + 410 + 210) \div 10 = 4015 \div 10 = 401.5$; \$401.50

median: The ordered list of data is \$210, \$350, \$350, \$375, \$400, \$400, \$410, \$430, \$440, and \$650. The two middle numbers are both \$400, so the median is \$400.

mode: There are two modes, \$350 and \$400.

b. salary range: $\$650 - \$210 = \$440$

c. outliers: \$210 and \$650

For Exercises 1–6, use the following test scores.

45 62 66 66 68 71 71 71 72 74 75 75 76
77 80 80 80 81 83 84 84 86 89 90 95

- What is the range of the scores?
- What is the mean of the scores?
- What is the median score?
- What are the modes of the scores?
- Are there any outliers? If so, what are they?
- Writing** Suppose the grades A, B, C, D, and F are to be assigned to the test scores. How would you group the scores to assign letter grades?

Review PREVIEW

- You want to show what percent of the people surveyed chose one of five different vegetables as their favorite vegetable. Would you use a *circle graph* or a *line graph* to display the survey results? Explain. (Section 3-1)

Write each product as a power. (Section 1-3)

8. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$

9. $y \cdot y \cdot y \cdot y$

Graph each pair of numbers on a number line. Then use the symbol $<$ to write an inequality comparing the two numbers. (Toolbox Skill 2)

10. -4 and -3

11. 0 and -5