

LESSON 32 *Variables and Evaluation*

In algebra, we often use letters as **variables** to stand for or to take the places of numbers. The letters themselves have no value. The expression

$$x + 4$$

means "a number plus 4" or "the sum of a number and 4" or "4 more than a number." The value of the whole expression depends upon the value of x . For example, if we replace x with 11, the value of the expression is 15.

$$11 + 4 = 15$$

When two variables are written together side-by-side, such as

$$xy$$

the notation means that x and y are to be multiplied. This also applies to a number written just before a letter. The expression

$$3x$$

means 3 and x are to be multiplied.

example 32.1 Evaluate: $xy + x$ if $x = 2$ and $y = 4$

solution The word **evaluate** means "find the value of." We replace x with 2 and y with 4.

$$xy + x = 2 \cdot 4 + 2$$

We remember to multiply before we add. Thus we get

$$8 + 2 = 10$$

example 32.2 Evaluate: $amy - xy$ if $x = 2$, $m = 5$, and $y = 4$

solution We replace x with 2, m with 5, and y with 4.

$$amy - xy = 2 \cdot 5 \cdot 4 - 2 \cdot 4$$

We multiply before we subtract and get

$$40 - 8 = 32$$

example 32.3 Evaluate: $mx + 4m$ if $x = \frac{2}{3}$ and $m = \frac{9}{11}$

solution First we replace m and x with $\frac{9}{11}$ and $\frac{2}{3}$, respectively.

$$mx + 4m = \frac{9}{11} \cdot \frac{2}{3} + 4 \cdot \frac{9}{11} = \frac{9}{11} \cdot \frac{2}{3} + \frac{36}{11}$$

Now we multiply and then add.

$$\frac{6}{11} + \frac{36}{11} = \frac{42}{11} = 3\frac{9}{11}$$

practice Evaluate:

a. $xy + yx$ if $x = 2$ and $y = 4$

b. $mpx + mx$ if $x = 3$, $p = 4$, and $m = 6$

problem set
32

- ⁽²⁸⁾ The mean cost of four items was \$39.96. The first item cost \$28.50, the second item cost \$41.25, and the third item cost \$50. Find the cost of the fourth item.
- ⁽²⁹⁾ The attendance at the first six home games was 10,400; 8000; 14,600; 7000; 12,000; 15,700. Make a broken-line graph that presents this information.
- ⁽³⁰⁾ Find the (a) range, (b) mode, (c) median, and (d) mean of the attendance figure in problem 2. Round any decimal results to two places.
- ⁽³¹⁾ In the first cache, Hazel uncovered 1481 dull tokens. The next cache held 1300 shin tokens, and the last cache had 300 tokens that were both shiny and dull. What was the average number of tokens per cache?
- ⁽³²⁾ Four thousand, fifty-seven screaming football fans could be seated in each section of the stadium. If the stadium had 17 sections, how many screaming football fans would it hold?

- ⁽³³⁾ What number is $\frac{4}{13}$ of 39?
- ⁽³⁴⁾ What number is $\frac{11}{6}$ of 500?

Convert each improper fraction to a mixed number:

- ⁽³⁵⁾ $\frac{93}{13}$
- ⁽³⁶⁾ $\frac{41}{7}$

Evaluate:

- ⁽³⁷⁾ $p + gp$ if $p = 1$ and $g = 22$
- ⁽³⁸⁾ $xyz + yz$ if $x = 3$, $y = 4$, and $z = 5$
- ⁽³⁹⁾ Find the least common multiple of 200, 120, and 180
- ⁽⁴⁰⁾ Find the missing number: $\frac{14}{31} + x = \frac{21}{31}$

Simplify:

- ⁽⁴¹⁾ $\frac{2}{3} + \frac{5}{8} + \frac{1}{2}$
- ⁽⁴²⁾ $\frac{6}{7} - \frac{4}{5}$
- ⁽⁴³⁾ $\frac{3}{5} + \frac{4}{7} - \frac{1}{3}$
- ⁽⁴⁴⁾ $\frac{4}{5} \cdot \frac{20}{40} \div \frac{5}{10}$
- ⁽⁴⁵⁾ $\frac{2}{8} \cdot \frac{16}{24} \div \frac{15}{8}$
- ⁽⁴⁶⁾ $(0.0023)(1.047)$
- ⁽⁴⁷⁾ Write $15\frac{1}{3}$ as a decimal.
- ⁽⁴⁸⁾ Write 16.16 as a mixed number.

- ⁽⁴⁹⁾ Twenty shillings equals 1 pound.
(a) Write the two unit multipliers implied by this comparison.
(b) Use one of these unit multipliers to convert 1000 pounds to shillings.

- ⁽⁵⁰⁾ Find the area of this figure. Dimensions are in feet.
- ⁽⁵¹⁾ Find the perimeter of this figure. Dimensions are in centimeters. All angles are right angles.

