2-5 Reteaching

Literal Equations and Formulas

A literal equation is an equation that involves two or more variables. When you work with literal equations, you can use the methods you have learned in this chapter to isolate any particular variable. To solve for specific values of a variable, simply substitute the values into your equation and simplify.

Problem

What is the solution of $4x - 5y = 3$ for y? What is the value of y when $x = 10$?

$4x - 5y - 4x = 3 - 4x$ — To get the y-term by itself on the left side, subtract $4x$ from each side.

$-5y = -4x + 3$ — Simplify.

$\frac{-5y}{-5} = \frac{-4x+3}{-5}$ — Divide each side by -5 since y is being multiplied by -5 on the left side. This isolates y.

$y = \frac{4}{5}x - \frac{3}{5}$ — Simplify by dividing each term by -5. Notice, this changes the sign of each term.

$y = \frac{4}{5}(10) - \frac{3}{5}$ — To find the value of y when $x = 10$, substitute 10 in for x.

$y = 7\frac{2}{5}$ — Simplify by multiplying first, then subtracting.

When you rewrite literal equations, you may have to divide by a variable or variable expression. When you do so in this lesson, assume that the variable or variable expression is not equal to zero because division by zero is not defined.

Problem

Solve the equation $ab - bc = cd$ for b.

$b(a - c) = cd$ — Since b is a factor of each term on the left side, it can factored out using the Distributive Property.

$\frac{b(a-c)}{a-c} = \frac{cd}{a-c}$ — To get b by itself, divide each side by $a - c$ since b is being multiplied by $a - c$. Remember $a - c \neq 0$.

$b = \frac{cd}{a-c}$ — Simplify.

Solve each equation for y. Then find the value of y for each value of x.

1. $y + 5x = 2; -1, 0, 1$

$y = -5x + 2$; $\{7, 2, -3\}$

2. $6x = 2y - 4; 1, 2, 4$

$y = 3x + 2$; $\{5, 8, 14\}$

3. $6x - 3y = -9; -2, 0, 2$

$y = 2x + 3$; $\{-1, 3, 7\}$

4. $4y = 5x - 8; -2, -1, 0$

$y = \frac{5}{4}x - 2$; $\{-\frac{9}{2}, -\frac{13}{4}, -2\}$

5. $3y + 2x = -5; 0, 2, 3$

$\{-\frac{5}{3}, -3, -\frac{11}{3}\}$

$y = -\frac{2}{3}x - 5$

6. $5x = 8y - 6; -1, 0, 1$

$\{\frac{1}{8}, \frac{3}{4}, \frac{11}{8}\}$

$y = \frac{5}{8}x + \frac{3}{4}$

7. $3(y - 2) + x = 1; -1, 0, 1$

$y = -\frac{1}{3}x + \frac{7}{3}$; $\{\frac{8}{3}, \frac{7}{3}, 2\}$

8. $\frac{x+2}{y-3} = 1; -1, 0, 1$

$y = x + 5$; $\{4, 5, 6\}$

9. $\frac{y+4}{x-5} = -3; -2, 2, 4$

$y = -3x + 11$; $\{17, 5, -1\}$

Lesson 2-5

Solve each equation for y. Then find the value of y for each value of x.

1. $y + 3x = 8; x = -2, 0, 2$

$y = -3x + 8$; $\{14, 8, 2\}$

2. $4x - 2y = 14; x = 2, 4, 6$

$y = 2x - 7$; $\{-3, 1, 5\}$

3. $x = 9 - 3y; x = -3, 6, 12$

$y = -\frac{1}{3}x + 3$; $\{4, 1, -1\}$

Solve each equation for x.

4. $c = b - bx$

$x = 1 - \frac{c}{b}$

5. $\frac{x-3}{y} = \frac{1}{2}$

$x = \frac{1}{2}y + 3$

6. $px + qx = r$

$x = \frac{r}{p+q}$

Solve each problem. Round to the nearest tenth, if necessary. Use 3.14 for π.

7. What is the radius of a circle with a circumference of 15 cm?

The radius is about 2.4 cm.

8. What is the height of a triangle that has a base of 8 in. and an area of 28 in.^{2} ?

The height of the triangle is 7 in.

9. How long does it take to travel 150 miles at a rate of 60 mi/h?

It takes 2.5 hours.

Answers: $y = -3x + 8$ $\{14, 8, 2\}$, $y = 2x - 7$ $\{-3, 1, 5\}$, $y = 3 - \frac{1}{3}x$ $\{4, 1, -1\}$, $x = 1 - \frac{c}{b}$, $x = \frac{1}{2}y + 3$, $x = \frac{r}{p+q}$, 2.4 cm, 7 in, 2.5 hr