

3.8 Review

Rewrite Equations and Formulas

There are times when one form of an equation is not very useful. We must then solve the equation for a different variable (isolate the variable on one side), in order to write the equation or formula in a more useful form.

Linear Equation Example
 Recall from Algebra 1A the different forms of a linear equation. Complete the table below by solving the equation for y:

Standard Form:	Slope-Intercept Form ($y = mx + b$):	Slope m:	y-int b:
$9x + 3y = 12$	$\begin{array}{r} 9x + 3y = 12 \\ -9x \\ \hline 3y = 12 - 9x \\ \frac{3y}{3} = \frac{12 - 9x}{3} \\ y = 4 - 3x \end{array}$	-3	4

Examples

Solve each for the following formulas or equations for the given variable:

<p>1. $2 + 6y = 3x + 4$ for x:</p> $\begin{array}{r} 2 + 6y = 3x + 4 \\ -4 \\ \hline -2 + 6y = 3x \\ \frac{-2 + 6y}{3} = \frac{3x}{3} \\ -\frac{2}{3} + 2y = x \end{array}$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;"> $x = -\frac{2}{3} + 2y$ </div>	<p>2. Surface area of a prism: $S = 2B + Ph$ for h:</p> $\begin{array}{r} S = 2B + Ph \\ -2B \\ \hline S - 2B = Ph \\ \frac{S - 2B}{P} = \frac{Ph}{P} \\ \frac{S - 2B}{P} = h \end{array}$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;"> $h = \frac{S - 2B}{P}$ </div>
<p>3. Area of a trapezoid: $A = \frac{(b_1 + b_2) \cdot h}{2}$ for b_1</p> $\begin{array}{r} 2A = (b_1 + b_2) \cdot h \\ \frac{2A}{h} = \frac{(b_1 + b_2) \cdot h}{h} \\ \frac{2A}{h} = b_1 + b_2 \\ -b_2 \\ \hline \frac{2A}{h} - b_2 = b_1 \end{array}$	<p>4. Fahrenheit to Celsius conversion: $C = \frac{5}{9}(F - 32) \cdot \frac{9}{5}$ for F</p> $\begin{array}{r} 9C = \frac{45}{9}(F - 32) \\ \frac{9C}{5} = \frac{5(F - 32)}{5} \\ \frac{9C}{5} = F - 32 \\ +32 \\ \hline \frac{9C}{5} + 32 = F \end{array}$

Practice

Rewrite each of the following formulas or equations for the given variable. Show all steps clearly!

1a. $-24x - 3y = 15$ for y :

$$\begin{array}{r} -24x - 3y = 15 \\ +24x \quad +24y \\ \hline -3y = 24x + 15 \\ \hline -3 \quad -3 \quad -3 \\ \hline y = -8x - 5 \end{array}$$

1b. If $x = 0$, what is the value of y ?

$$\begin{array}{r} y = -8(0) - 5 \\ \hline y = -5 \end{array}$$

2a. distance = rate \times time equation

$$\begin{array}{r} d = r \cdot t \\ \hline r \quad r \\ \hline t = \frac{d}{r} \end{array}$$

2b. If your mom is driving at 65 mph, approximately how long will it take to go 250 miles?

$$t = \frac{250}{65}$$

$$t = 3.8 \text{ hours}$$

3. Point-slope formula

$$\frac{y - y_1}{(x - x_1)} = \frac{m(x - x_1)}{(x - x_1)} \text{ for } m:$$

$$m = \frac{y - y_1}{x - x_1}$$

4. Perimeter for a rectangle

$$P = 2L + 2W \text{ for } L:$$

$$\frac{P - 2W}{2} = \frac{2L}{2}$$

$$L = \frac{P}{2} - W$$

5. Surface area of a cone

$$S = \pi rL + \pi r^2 \text{ for } L:$$

$$\frac{S - \pi r^2}{\pi r} = \frac{\pi rL}{\pi r}$$

$$\frac{S}{\pi r} - r = L$$

6. $\frac{c}{2} = \frac{x+a}{b}$ for x :

$$c \cdot b = 2(x+a)$$

$$\begin{array}{r} c \cdot b = 2x + 2a \\ -2a \quad -2a \end{array}$$

$$\frac{c \cdot b - 2a}{2} = \frac{2x}{2}$$

$$\frac{c \cdot b}{2} - a = x$$