Instruction

Guided Practice 1.5.1

Example 1

Solve $6y - 12x = 18$ for y.

1. Begin isolating y by adding $12x$ to both sides.

$$6y - 12x = 18$$
$$+12x \qquad +12x$$
$$6y = 18 + 12x$$

2. Divide each term by 6.

$$\frac{6y}{6} = \frac{18}{6} + \frac{12x}{6}$$

$$y = 3 + 2x$$

Example 2

Solve $15x - 5y = 25$ for y.

1. Begin isolating y by subtracting $15x$ from both sides of the equation.

$$15x - 5y = 25$$
$$-15x \qquad -15x$$
$$-5y = 25 - 15x$$

2. To further isolate y, divide both sides of the equation by the coefficient of y. The coefficient of y is –5. Be sure that each term of the equation is divided by –5.

$$\frac{-5y}{-5} = \frac{25 - 15x}{-5}$$
$$\frac{-5y}{-5} = \frac{25}{-5} - \frac{15x}{-5}$$
$$y = -5 + 3x$$

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Example 3

Solve $4y + 3x = 16$ for y.

1. Begin isolating y by subtracting $3x$ from both sides of the equation.

$$4y+3x=16$$
$$\underline{\quad -3x \quad -3x}$$
$$4y=16-3x$$

2. To further isolate y, divide both sides of the equation by the coefficient of y. The coefficient of y is 4. Be sure that each term of the equation is divided by 4.

$$\frac{4y}{4}=\frac{16-3x}{4}$$
$$y=\frac{16}{4}-\frac{3x}{4}$$
$$y=4-\frac{3}{4}x$$

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Example 4

The formula for finding the area of a triangle is $A=\frac{1}{2}bh$, where b is the length of the base and h is the height of the triangle. Suppose you know the area and height of the triangle, but need to find the length of the base. In this case, solving the formula for b would be helpful.

1. Begin isolating b by multiplying both sides of the equation by the reciprocal of $\frac{1}{2}$, or 2.

$$A=\frac{1}{2}bh$$
$$2\bullet A=2\bullet\left(\frac{1}{2}bh\right)$$
$$2A=bh$$

Multiplying both sides of the equation by the reciprocal is the same as dividing both sides of the equation by $\frac{1}{2}$. The result will be the same.

2. To further isolate b, divide both sides of the equation by h.

$$\frac{2A}{h}=\frac{bh}{h} \text{ or } b=\frac{2A}{h}$$
$$\frac{2A}{h}=b$$

3. The formula for finding the length of the base of a triangle can be found by doubling the area and dividing the result by the height of the triangle.

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Example 5

The distance, *d*, that a train can travel is found by multiplying the rate of speed, *r*, by the amount of time that it is travelling, *t*, or $d = rt$. Solve this formula for *t* to find the amount of time the train will travel given a specific distance and rate of speed.

1. Isolate *t* by dividing both sides of the equation by *r*.

$$\frac{d}{r} = \frac{rt}{r}$$

$$t = \frac{d}{r}$$

2. The formula for finding the amount of time it will take a train to travel a given distance at a given speed is $t = \frac{d}{r}$.