

6.3A Review: Solving One-Step Equations

Equation:

An equation is a mathematical statement with two expressions that have the same value. The two expressions are separated by an equal sign.

For example,

$$2x = 3$$

$$\frac{a}{3} = 5$$

$$b = 4$$

In the equation

$$4y - 7 = -3$$

- the numerical coefficient is 4

- the variable is y

- the constants are 7 and -3

$$-3x + 1 = -5$$

- the numerical coefficient is -3

- the variable is x

- the constants are 1, -5

~~x~~
↑
coefficient = 1

Linear Equation:

An equation with two variables, both with an unwritten exponent of 1.

For example,

$$y = 4x$$

$$d = \frac{c}{2}$$

$$5w + 1 = t$$

~~$-x$~~
↑
coefficient = -1

To solve an equation means to find the value of the variable which satisfies the equation (makes the equation true).

Ex. Determine if each given variable value solves the given equation:

$$x + 5 = 7; \quad x = 3$$

↓
 $3 + 5$
 $8 \neq 7$
is not a solution

$$3x = -12; \quad x = -4$$

↓ $3(-4)$
 $-12 = -12$ ✓
is a sol'n

$$\frac{x}{-2} = -12; \quad x = 24$$

↓ $\frac{24}{-2}$
 $-12 = -12$ ✓
is a sol'n

Isolate the variable means to get the variable by itself on one side of the equation.

We will isolate the variable to solve an equation.

Ex. Solve each equation & check.

$$x - 5 = 12$$

*perform the opposite operation to isolate the variable

* both sides for balance

$$x = 17$$

$$q + 3 = -5$$

check

$$17 - 5 = 12$$

$$x \cdot \frac{x}{4} = 7 \cdot 4$$

$$+3y = -36$$

$$q = -8$$

$$k = -9$$

$$x = 28$$

$$y = 12$$

$$-8 + 3$$

$$-5 = -5 \checkmark$$

$$2(-9)$$

$$-18 = -18 \checkmark$$

$$\frac{28}{4}$$

$$7 = 7 \checkmark$$

$$-3(12)$$

$$-36 = -36 \checkmark$$

$$\frac{d}{-5} = 3 \cdot (-5)$$

$$\boxed{d = -15}$$

$$\begin{array}{r} ch \\ -15 \\ -5 \\ \hline +3 = 3 \checkmark \end{array}$$

$$+4 + x = 3$$

$$\begin{array}{r} -4 \\ \hline \end{array}$$

$$\begin{array}{r} ch \\ 4 + (-4) \\ \hline 3 = 3 \checkmark \end{array}$$

$$\frac{-x}{3} = -10$$

$$\cancel{3} \cdot \frac{x}{\cancel{3}} = -10 \cdot (-3)$$

$$\boxed{x = 30}$$

$$\begin{array}{r} ch \\ -30 \\ 3 \\ \hline -10 = -10 \checkmark \end{array}$$

$$* \quad \frac{-x}{3} = \left(\frac{x}{-3} \right) = -\frac{x}{3}$$

$$OR \quad \cancel{3} \cdot \frac{-x}{\cancel{3}} = -10 \cdot 3$$

$$\cancel{-x} = \frac{-30}{-1}$$

$$x = 30$$

Ex. For the month of January, the average afternoon temperature in Edmonton is $\frac{1}{3}$ the average afternoon temperature in Yellowknife. If the average afternoon temperature in Edmonton is -8°C , what is the average afternoon temperature in Yellowknife?

Let $y = \text{temp. in Yellowknife} \checkmark$

$$\frac{1}{3}y = -8$$

$$OR \quad \cancel{3} \cdot \frac{y}{\cancel{3}} = -8 \cdot 3 \checkmark$$

$$y = -24$$

The avg. temp.
in Yellowknife
is -24°C

Ex. John is twice as tall as his little sister Mary. If John is 136 cm tall, how tall is Mary?

Let $T = \text{Mary's height}$

$$\frac{2T}{2} = \frac{136}{2}$$

$$T = 68$$

Mary is 68 cm tall