

## 5.1 Solutions of Equations

### \*\*KEY WORDS\*\*

Equations  $\rightarrow$  a statement that uses an equal sign to show that two mathematical expressions are equivalent

No equal sign ( $\neq$ )  $\rightarrow$  shows that two expressions are not equivalent

Solution to an Equation  $\rightarrow$  a value that makes the equation true

**Example:** Olivia volunteers at an animal shelter and ordered 50 bags of cat food for \$1399.50. Now she cannot remember if she chose the brand that costs \$29.99 for each bag or \$27.99 for each bag. Determine which price makes the equation  $50x = \$1399.50$  true to identify which brand Olivia chose.

$$50x = 1399.5$$

$$50 \cdot 29.99 \stackrel{?}{=} 1399.5$$

$$1499.5 \neq 1399.5$$

$$50 \cdot 27.99 \stackrel{?}{=} 1399.5$$

$$1399.5 = 1399.5$$

$$\begin{array}{r} 444 \\ 2999 \\ \times \quad 50 \\ \hline 0000 \\ 149950 \\ \hline 149950 \end{array}$$

$$\begin{array}{r} 344 \\ 2799 \\ \times \quad 50 \\ \hline 0000 \\ 139950 \\ \hline 139950 \end{array}$$

The \$27.99 brand is the solution.

**Example:** Determine whether the statement is true or false.

1.)  $50 - 10 \stackrel{?}{=} 5$

$40 \neq 5$

**FALSE**

2.)  $7 \times 3 \stackrel{?}{=} 21$

$21 \checkmark = 21$

**TRUE**

3.)  $1.5 + 10 \stackrel{?}{=} 15$

$11.5 \neq 15$

**FALSE**

**Example:** Determine which value of  $x$ , if any, is a solution to each equation. Write "none" if none of the choices are a solution to the equation.

4.)  $x + 2.5 = 13$   
 $9.5 + 2.5 \stackrel{?}{=} 13$   
 $12 \neq 13$

~~$x = 9.5$~~   ~~$x = 10$~~   
 $10 + 2.5 \stackrel{?}{=} 13$   
 $12.5 \neq 13$

$x = 10.5$   
 $10.5 + 2.5 \stackrel{?}{=} 13$   
 $13 = 13$

5.)  $3x + 2 = 44$   
 $3 \cdot 12 + 2 \stackrel{?}{=} 44$   
 $36 + 2$   
 $38 \neq 44$

~~$x = 12$~~   ~~$x = 8$~~   
 $3 \cdot 8 + 2 \stackrel{?}{=} 44$   
 $24 + 2$   
 $26 \neq 44$

$x = 14$   
 $3 \cdot 14 + 2 \stackrel{?}{=} 44$   
 $42 + 2$   
 $44 = 44 \checkmark$

6.)  $2(x - 10) = 10$   
 $2(15 - 10) \stackrel{?}{=} 10$   
 $2 \cdot 5$   
 $10 = 10 \checkmark$

$x = 15$   ~~$x = 10$~~   
 $2(10 - 10) \stackrel{?}{=} 10$   
 $2 \cdot 0$   
 $0 \neq 10$

7.)  $4x = 13 - 5$   $8$   
 $4 \cdot 1 \stackrel{?}{=} 8$   
 $4 \neq 8$

~~$x = 1$~~   $x = 2$   ~~$x = 3$~~   
 $4 \cdot 2 \stackrel{?}{=} 8$   
 $8 = 8 \checkmark$

$4 \cdot 3 \stackrel{?}{=} 8$   
 $12 \neq 8$