RECAP 7

Name Date

Linear Equations with More Than One Solution

In this lesson, we

- showed that solving an equation with infinitely many solutions results in an equation that is always true.
- solved equations with only one solution or infinitely many solutions.

Examples

Find the number of solutions for the equation. If the equation has only one solution, solve the equation and check your solution.

1. $8(6m + 5) = 48m + 40$

$$8(6m + 5) = 48m + 40$$
$$48m + 40 = 48m + 40$$
$$40 = 40$$

The equation $40 = 40$ is always true.

The equation has infinitely many solutions.

The properties of equality ensure that $40 = 40$ has the same solution as the original equation. So $8(6m + 5) = 48m + 40$ must be true for any value of m.

2. $6w - 3 = 3 - 6w$

$$\begin{aligned} 6w - 3 &= 3 - 6w \\ 12w - 3 &= 3 \\ 12w &= 6 \\ w &= \frac{1}{2} \end{aligned}$$

The equation has only one solution, $\frac{1}{2}$.

Check:

Substitute $\frac{1}{2}$ for w.

Left side: $6\left(\frac{1}{2}\right) - 3 = 0$

Right side: $3 - 6\left(\frac{1}{2}\right) = 0$

Because $6\left(\frac{1}{2}\right) - 3 = 3 - 6\left(\frac{1}{2}\right)$ is a true number sentence, I know that $\frac{1}{2}$ is a solution to $6w - 3 = 3 - 6w$.

3. $\frac{2}{3}d - 8 + \frac{1}{3}d = d - 8$

$$\begin{aligned} \frac{2}{3}d - 8 + \frac{1}{3}d &= d - 8 \\ d - 8 &= d - 8 \\ -8 &= -8 \end{aligned}$$

The equation has infinitely many solutions.

After combining like terms, the expressions on both sides of the equation are equivalent. This is another way to see that the equation is true for any value of d.