

Day 18

3.3 Notes: Solving Equations with Variables on Both Sides

Move all variable terms to one side of the eq. and all constants to the opposite ~~the~~ side of the eq. using addition + subtraction.

Examples:

$$\textcircled{1} \quad -6d = 1d + 4$$

$$\quad \quad \quad -1d \quad -1d$$

$$\frac{-7d}{-7} = \frac{4}{-7}$$

$$1d = -\frac{4}{7}$$

$$d = -\frac{4}{7}$$

$$\textcircled{2} \quad m - 5 = 3m$$

$$\quad \quad \quad -m \quad \quad \quad -1m$$

$$\frac{-5}{2} = \frac{2m}{2}$$

$$\text{or } -2\frac{1}{2} = m$$

$$\frac{-5}{2} \text{ or } -2.5$$

$$\textcircled{3} \quad 2(c-6) = 9c+2$$

$$2 \cdot c - 2 \cdot 6 = 9c + 2$$

$$2c - 12 = 9c + 2$$

$$\quad \quad \quad -2c \quad \quad \quad -2c$$

$$\frac{-12}{-2} = \frac{7c + 2}{-2}$$

$$\frac{-14}{7} = \frac{7c}{7} \rightarrow c = -2$$

$$\textcircled{4} \quad \begin{array}{r} 7K - 4 = 5K + 16 \\ -5K \quad \quad -5K \end{array}$$

$$\begin{array}{r} 2K - 4 = 16 \\ +4 \quad +4 \end{array}$$

$$\frac{2K}{2} = \frac{20}{2}$$

$$\boxed{K = 10}$$

$$8 + (9 + a)$$

$$8 + 1(9 + a)$$

$$\textcircled{5} \quad a - 6 = 8 - (9 + a)$$

$$a - 6 = 8 + 1(9 + a)$$

$$a - 6 = 8 + 1 \cdot 9 + 1 \cdot a$$

$$a - 6 = 8 + 9 + 1a$$

$$a - 6 = 8 + 9 + a$$

$$\begin{array}{r} 1a - 6 = 17 + a \\ +1a \quad \quad \quad +a \end{array}$$

$$\begin{array}{r} 2a - 6 = 17 \\ +6 \quad +6 \end{array}$$

$$\frac{2a}{2} = \frac{23}{2}$$

$$a = \frac{23}{2} \text{ OR } 2\frac{1}{2} \text{ OR } 2.5$$

$$\textcircled{6} \quad 10 - 8a = 2(5 - 4a)$$

$$10 - 8a = 2 \cdot 5 - 2 \cdot 4a$$
$$\begin{array}{r} 10 - 8a \\ + 8a \end{array} = \begin{array}{r} 10 - 8a \\ + 8a \end{array}$$

$10 = 10$
(true statement)

Identity

An equation that is true for every value of the variable is an identity.

$$\textcircled{7} \quad 6m - 5 = 7m + 7 - m$$

$$\begin{array}{r} 6m - 5 \\ - 6m \end{array} = \begin{array}{r} 6m + 7 \\ - 6m \end{array}$$

$$-5 \neq 7$$

False statement **No Solution**

3 cases: $\textcircled{1}$ 1 solution **$X = \#$**

$\textcircled{2}$ **Identity** (any # will work)
true statement $\textcircled{\text{ex}}$ $5 = 5$

$\textcircled{3}$ **No Solution**
False statement $\textcircled{\text{ex}}$ $5 \neq 6$