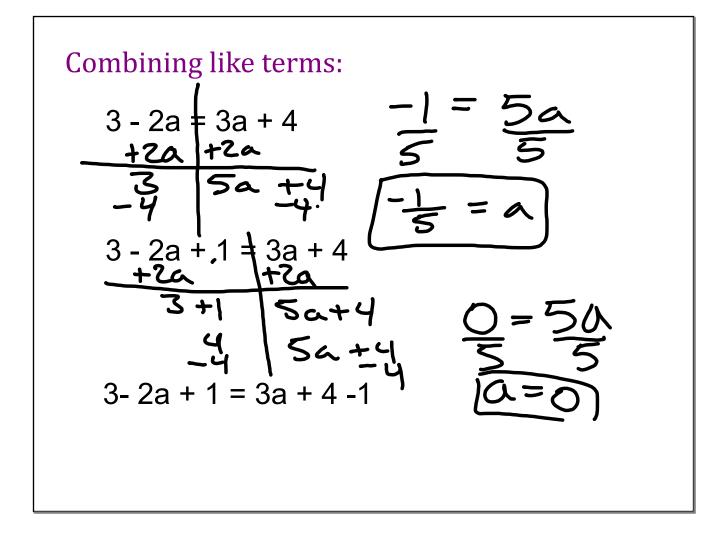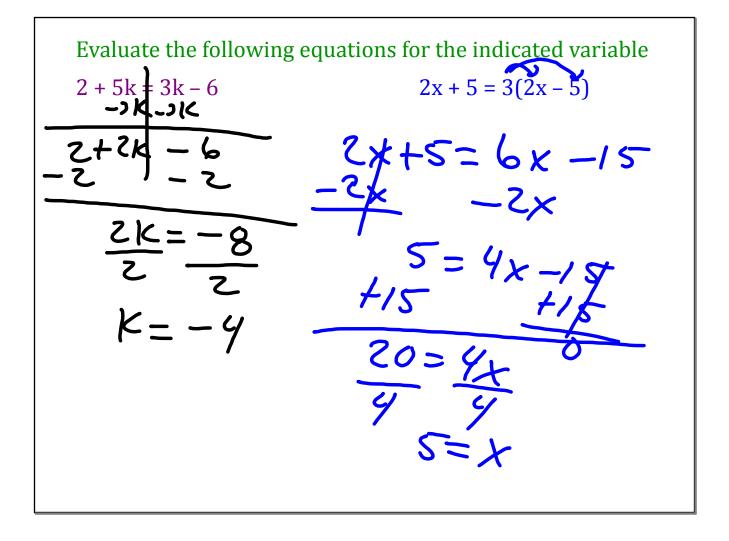# 1-3 Variable on Both Sides

**Objectives:**
 **-** I can combine like terms from opposite sides of an equation
 - I can solve an equation with variables on both sides

**Vocabulary:** like terms, distribute, inverse operations

## Combining like terms:

$$3 - 2a = 3a + 4$$
$$\underline{+2a \quad | \quad +2a}$$
$$\begin{array}{c|c} 3 & 5a + 4 \\ -4 & -4 \end{array}$$

$$3 - 2a + 1 = 3a + 4$$
$$\underline{+2a \qquad +2a}$$
$$\begin{array}{c|c} 3 + 1 & 5a + 4 \\ -4 & 5a + 4 \\ & -4 \end{array}$$

$$3 - 2a + 1 = 3a + 4 - 1$$

$$\frac{-1}{5} = \frac{5a}{5}$$

$$\boxed{\frac{-1}{5} = a}$$

$$\frac{0}{5} = \frac{5a}{5}$$

$$\boxed{a = 0}$$

Evaluate the following equations for the indicated variable

$2 + 5k = 3k - 6$                                $2x + 5 = 3(2x - 5)$

$$-3k - 3k$$

$$\dfrac{2 + 2k \quad - 6}{-2 \qquad -2}$$

$$\dfrac{2k}{2} = \dfrac{-8}{2}$$

$$k = -4$$

$$2x + 5 = 6x - 15$$

$$-2x \qquad -2x$$

$$5 = 4x - 15$$

$$+15 \qquad\qquad +15$$

$$\dfrac{20}{4} = \dfrac{4x}{4}$$

$$5 = x$$

Bonnie and Clyde both solved the same equation but got different answers. Which student did the problem correctly? For the student that did not get the right answer, what was their mistake?

Bonnie

$$-2(m+5)-m=6+m \;\checkmark$$
$$-2m-10-m=6+m \;\checkmark$$
$$-3m-10=6+m \;\checkmark$$
$$-10=6+4m$$
$$-16=4m$$
$$m=-4$$

Clyde

$$-2(m+5)-m=6+m \;\checkmark$$
$$-2m-10-m=6+m \;\checkmark$$
$$-m-10=6+m \;\times$$
$$-10=6+2m$$
$$-16=2m$$
$$m=-8$$

A candy company spends $2000 per day in building rental plus $.40 per candy bar made. If the candy bars sell for $.80 per candy bar, how many candy bars must the company sell each day to make a profit?

$$-7x + 16 = 58$$
$$\phantom{-7x}\ -16\ -16$$
$$\overline{\phantom{-7x+16=58aa}}$$
$$\frac{-7x}{-7} = \frac{42}{-7}$$
$$x = -6$$