# Algebra 1A

#### Lesson 3.3 Solve Multi - Step Equations

#### Warm-Up

Simplify.

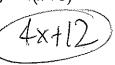
(a)



(b) 
$$4x + 3(x-2) + 1$$

(c) 
$$3x + 2(x+2)$$

(d) 
$$4(x+3)$$



## Steps for Solving

- 1. Simplify each side of the equal sign (distribute and collect like terms)
- 2. Use OPPOSITE operations in the OPPOSITE order
- 3. Give your answer as an x = (or y =, t =, etc.)

# Example 1. Solve an Equation by Combining Like Terms

Solve.

(a) 
$$9x + x - 7 = 13$$

$$\frac{10x - 7 = 13}{17 + 17}$$

$$\frac{10x = 20}{10}$$

(b) 
$$9d - 2d + 4 = 32$$



# Example 2. Solve an Equation by Using the Distributive Property

Solve.

Solve. (a) 
$$2w + 3(w + 4) = 27$$

$$2w + 3w + 12 = 27$$

$$5w + 12 = 27$$

$$-12 - 12$$

$$5w = 15$$

(b) 
$$4x + 7(x-2) = 26$$

$$4x - 7x + 14 = 26$$
 $-3x + 14 = 26$ 
 $-14 - 14$ 
 $-3x = 12$ 

#### Try It! Solve.

11v - 9 - 7v = 15(a)

(b) 
$$14 + 2(4g - 3) = 40$$
  
 $14 + 82 - 6 = 40$ 

$$6x-2x+10=46$$

$$4x+10=46$$

$$-10=10$$

6x + 2(x-5) = 46

## Example 3. Multiply by a Reciprocal to Solve

Solve 
$$\frac{3}{5}(2x-4)=18$$
.  
 $\frac{8}{3} \cdot \frac{3}{8}(2x-4)=18 \cdot \frac{5}{3}$   
 $\frac{2x-4=30}{44+4}$   $(x=17)$   
 $\frac{2x=34}{2}$ 

# Using the Distributive Property $\frac{3}{5}(2x-4)=18$ $(5)(\frac{6}{5}\times -\frac{12}{5})=(18)(5)$ $6\times -12=90$ +12 +12 +12

## **Example 4. More Multiply by a Reciprocal**

Solve 
$$-\frac{4}{5}(4a-1)=28$$

$$(-\frac{5}{4})(-\frac{4}{5}(4a-1))=(28)(-\frac{5}{4})$$

$$4a-1=-35$$

$$+1$$

$$4a=-34$$

$$4 = -34$$

$$4 = -34$$

## **Example 5. Problem Solving**

Tickets for a Pistons game can be purchased online through Ticketmaster. For one section at the Palace tickets are \$32.50 for each seat, plus a convenience charge of \$3.30 for each ticket. No matter how many tickets are ordered there is a processing fee of \$5.90. If a customer's total order costs \$220.70, how many tickets did they order?

$$x(32.50 + 3.30) + 5.90 = 220.70$$

$$35.80x + 5.90 = 220.70$$

$$-5.90$$

$$-5.90$$

$$35.80x = 214.80$$

$$35.80$$

$$x=6$$

THEY ORDERED

6 TICKETS

FOR THE

PISTONS Game.

**Assignment:** Pages 150 - 151 (4 – 32) even

#### Review:

Solve the equation. Show work.

1. 
$$8 - y = -9$$

$$8b = 5$$

$$3. \qquad \frac{3}{4}q = 24$$

- 4. The sum of three numbers is 123. The second number is 9 less than two times the first number. The third number is 6 more than three times the first number. Find the three numbers.
- 5. The bill (parts and labor) for the repair of a car was \$458. The cost of parts was \$339. The cost of labor was \$34 per hour. Write and solve an equation to find the number of hours of labor.