

Name \_\_\_\_\_

Date \_\_\_\_\_

## 2.4 – Algebraic and Congruence Properties

Write a reason for each step.

1)  $4x - 5 = -2$  \_\_\_\_\_  
 $4x = 3$  \_\_\_\_\_  
 $x = \frac{3}{4}$  \_\_\_\_\_

2)  $15y + 7 = 12 - 20y$  \_\_\_\_\_  
 $35y + 7 = 12$  \_\_\_\_\_  
 $35y = 5$  \_\_\_\_\_  
 $y = \frac{1}{7}$  \_\_\_\_\_

3)  $\frac{2}{3}b = 8 - 2b$  \_\_\_\_\_  
 $2b = 3(8 - 2b)$  \_\_\_\_\_  
 $2b = 24 - 6b$  \_\_\_\_\_  
 $8b = 24$  \_\_\_\_\_  
 $b = 3$  \_\_\_\_\_

4)  $x - 2 = \frac{2x + 8}{5}$  \_\_\_\_\_  
 $5(x - 2) = 2x + 8$  \_\_\_\_\_  
 $5x - 10 = 2x + 8$  \_\_\_\_\_  
 $3x - 10 = 8$  \_\_\_\_\_  
 $3x = 18$  \_\_\_\_\_  
 $x = 6$  \_\_\_\_\_

Solve the equation. Write a reason for each step.

5)  $44 - 2(3x + 4) = -18x$

6)  $3(7x - 9) - 19x = -15$

**Solve the equation for  $y$ . Write a reason for each step.**

7)  $12 - 3y = 30x$

8)  $\frac{1}{2}x - \frac{3}{4}y = -2$

For #7-11, use the property to complete the statement.

7) Substitution Property of Equality      If  $AB = 20$ , then  $AB + CD =$  \_\_\_\_\_

8) Symmetric Property of Equality      If  $m\angle 1 = m\angle 2$ , then \_\_\_\_\_

9) Addition Property of Equality      If  $AB = CD$ , then \_\_\_\_\_  $+ EF =$  \_\_\_\_\_  $+ EF$

10) Distributive Property of Equality      If  $5(x + 8) = 2$ , then \_\_\_\_\_  $x +$  \_\_\_\_\_  $= 2$

11) Transitive Property of Equality      If  $m\angle 1 = m\angle 2$  and  $m\angle 2 = m\angle 3$ , then \_\_\_\_\_

12) The formula for the perimeter  $P$  of a rectangle  $P = 2l + 2w$  where  $l$  is the length and  $w$  is the width. Solve the formula for  $l$ , and write a reason for each step. Then find the length of a rectangular lawn whose perimeter is 55 meters and whose width is 11 meters.