When you are done with your 4.2 homework you should be able to…

π Solve linear systems by the substitution method
π Use the substitution method to identify systems with no solution or infinitely many solutions
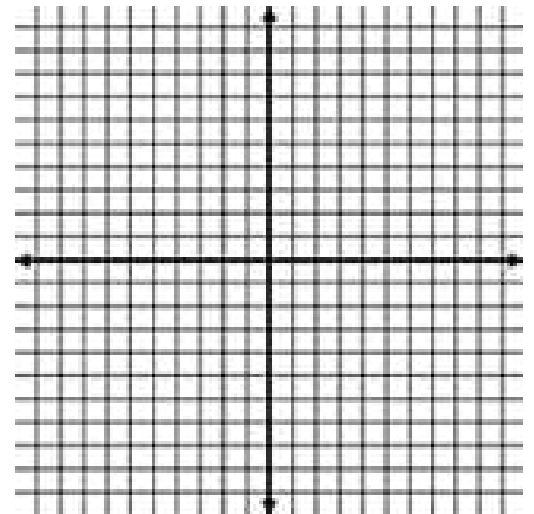π Solve problems using the substitution method

WARM-UP:

1. Solve.

$$-5x+3(2x-7)=x-21$$

2. Solve the following system of linear equations by graphing. State whether the system is consistent or inconsistent. For those systems that are consistent, state whether the equations are dependent or independent.

$$y=-4x+6$$
$$y=-2x$$

Steps for Solving a System of Two Linear Equations Containing Two Variables by Substitution

1. Solve one of the equations for one of the unknowns.
2. Substitute the expression solved for in Step 1 into the **other** equation. The

    result will be a _____ equation in _____ variable.

3. _____ the linear equation in one variable found in Step 2.

4. _____ the value of the variable found in Step 3 into one of

    the **original** equations to find the _____ of the other

    _____.
5. Check your answer by _____ the _____

    _____ into _____ of the original equations.

Example 1: Solve the following systems of linear equations by substitution. State whether the system is consistent or inconsistent. For those systems that are consistent, state whether the equations are dependent or independent.

a.
$$5x + 2y = -5$$
$$3x - y = -14$$

b.

$$y = 5x - 3$$

$$y = 2x - \frac{21}{5}$$

π Suppose you are solving a system of equations and you end up with 5 = 0. This

is a _____ and yields a result of _____ or _____.

This system consists of two _____ lines which never

_____.

π Suppose you are solving a system of equations and you end up with 5 = 5 or

x = x. This is an _____ and yields a result of all _____

_____ which are on the _____. In other words, the

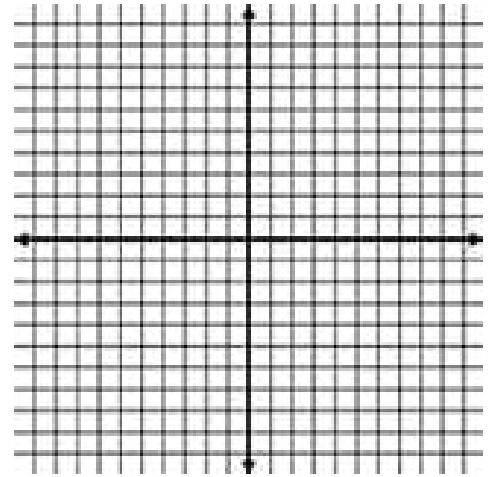system would have _____ _____ solutions.

This system consists of two lines which are _____.

Example 2: Solve the following systems of linear equations by substitution. State whether the system is consistent or inconsistent. For those systems that are consistent, state whether the equations are dependent or independent. Graph the system.
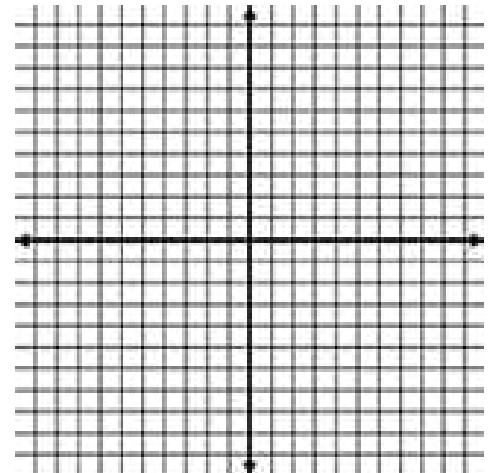
a.
$$-x+3y=4$$
$$2x-6y=-8$$

b.
$$x - 5y=3$$
$$-2x+10y=8$$

Example 3: Write a system of equations that has infinitely many solutions.

APPLICATIONS

1. Christa is a waitress and collects her tips at the table. At the end of the shift she has 68 bills in her tip wallet, all ones and fives. If the total value of her tips is $172, how many of each bill does she have?

2. Melody wishes to enclose a rectangular garden with fencing, using the side of her garage as one side of the rectangle. A neighbor gave her 30 feet of fencing, and Melody wants the length of the garden along the garage to be 3 feet more than the width. What are the dimensions of the garden?