Rewrite the equation in slope-intercept form.

1. 3x - 2y = 32. 2x + 6y = 213. 3x + 2y = 04. 7x + 2y = 135. x - 4y = 56. 7x - 8y = 19

\* remember - Slope-Intercept

y=mx+b

\*Students can practice

Slope y-Intercept

Warm Up

Determine whether the ordered pair is a solution to the equation.

**1.** 
$$(3, 2)$$
;  $4x - 3y = 6$ 

**2.** 
$$(0, -1)$$
;  $x - 6y = -9$ 

3. 
$$(5, 2)$$
;  $6x + y = 15$ 

**4.** 
$$(-2, 4)$$
;  $x - 2y = -10$ 

5. 
$$(3, -4)$$
;  $2y = x + 8$ 

**6.** 
$$(4, -2)$$
;  $y = 3x - 14$ 

Cumulative Warm Up

## **Essential Question**

How can you determine the number of solutions of a linear system?

What you will learn:

- Visualize solutions of systems of linear equations in three variables
- Solve systems of linear equations in three variables algebraically
- Solve real life problems

Consistent: If a linear

System has at least

one (1) solution

Inconsistent: when a

linear system has

No solutions

**Essential Question** 

Work with a partner. Match each linear system with its corresponding graph. Explain your reasoning. Then classify the system as consistent or inconsistent.

**a.** 
$$2x - 3y = 3$$

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

c. 
$$2x - 3y = 3$$

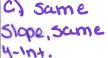
$$-4x + 6y = 6$$

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



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





Same Slope diff. y-Int. diff. \$10pes

Inconsisten!

Consistent

Exploration 1

Work with a partner. Solve each linear system by substitution or elimination. Then use the graph of the system below to check your solution.

**a.** 
$$2x + y = 5$$

**b.** 
$$x + 3y = 1$$
  
 $-x + 2y = 4$ 

**c.** x + y = 0

$$3x + 2y = 1$$







(a.1)

**Exploration 2** 

## Core Concept

## Solving a Three-Variable System

Step 1 Rewrite the linear system in three variables as a linear system in two variables by using the substitution or elimination method.

Step 2 Solve the new linear system for both of its variables.

Step 3 Substitute the values found in Step 2 into one of the original equations and solve for the remaining variable.

When you obtain a false equation, such as 0 = 1, in any of the steps, the system has no solution.

When you do not obtain a false equation, but obtain an identity such as 0 = 0, the system has infinitely many solutions.

\* where is the solution

to the system?

ax tby

Core Concept

```
Solve the system. 4x + 2y + 3z = 12 Equation 1

2x - 3y + 5z = -7 Equation 2

3x - 3y + 3z = -3 (-35 quation 3

4x + 3y + 3z = -3

13x - 3y + 5z = -3

16x + 11z = 4

Siep 3

3x - 3y + 5z = -3

-16x + 3y - 13z = 9
```

Solve the system 
$$(-5)x + y + z = 2$$
 Equation 1  
 $5x + 5y + 5z = 3$  Equation 2  
 $4x + y - 3z = -6$  Equation 3  
 $-5 \times -5y - 5z = -10$   
 $5 \times +5y + 5z = 3$   
 $0 = -7$ 

Example 2

```
Solve the system. x-y+z=-3 Equation 1

x-y-z=-3 Equation 2

5x-5y+z=-15 Equation 3

x-y-z=-3 Equation 3
```

Example 3

Step 3 16x + 112 = 4
-16x - 72 = 2
42 = 8
2 = 3
Step 4
10x+112=0
16x + 11(2) = 6
16x+32 = 6
16x = -16
x = -\
2(-1) - 34 +5 (2)=-7
5+e05 2(-1) - 34 + 5 (2) = -7 -3-34 + 10 = -7
-34 48 = -7
-3y = ·15
<u>y=5</u>
Can 0 = -7?
No solution

Since	( ) G	Juan	<b>5</b> = <b>0</b>
Lou	have	Infi	nitely
m	anu	Solut	nitely
	4	0010	

Solve the system. Check your solution, if possible.

1. x - 2y + z = -11 2. x + y - z = -1

2. x + y - z = -1 3. x + y + z = 8

3x + 2y - z = 7-x + 2y + 4z = -9

4x + 4y - 4z = -2

x - y + z = 82x + y + 2z = 16

(-1.3:4)

3x + 2y + z = 0

Infinite

 In Example 3, describe the solutions of the system using an ordered triple in terms of y.

SKip

Monitoring Progress 1-4

An amphitheater charges \$75 for each seat in Section A, \$55 for each seat in Section B, and \$30 for each lawn seat. There are three times as many seats in Section B as in Section A. The revenue from selling all 23,000 seats is \$870,000. How many seats are in each section of the amphitheater?

$$y = 3x$$
 $x + y + 2 = 23,000$ 
 $75x + 55y + 302 = 870,000$ 
 $x + y + z = 23,000$ 
 $x + 3x + z = 23,000$ 
 $x + 3x + z = 23,000$ 

Example 4

(1500, 4500, 17000) sect. A sect. B lawn seats

5. WHAT IF? On the first day, 10,000 tickets sold, generating \$356,000 in revenue. The number of seats sold in Sections A and B are the same. How many lawn seats are still available?

* Student	practic	e
-	5. v*s	1 1 1
-		
÷		2.7
<del></del>		10 T 65 SE
	4 1 6 1	

75 x + 55 y + 30 = 870,000 75 x +55 (3x) +30 = 870,000 240x +30 = 870,000

 $\frac{7120 \times -302 = -690,000}{240 \times +302 = 870,000}$   $120 \times = 180,000$   $\times = 1500$ 

y = 3(1500) y = 4500 X +y + Z < 23,000 Z = 17,000

Student practice , 8400

## **Notes 1.4 Solving Linear Systems**

What is a possible first step in solving the system? 3x + y - 4z = 12 -3x + 2y + 3z = -5 x - 2y - 6z = 4	* Use as pair an & share who seas parmers.
Closure	
Jun 12-10:03 AM	