

Rewrite the equation in slope-intercept form.

1. $3x - 2y = 3$	2. $2x + 6y = 21$
3. $3x + 2y = 0$	4. $7x + 2y = 13$
5. $x - 4y = 5$	6. $7x - 8y = 19$

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

Essential Question

* remember - slope-intercept form

$$y = mx + b$$

Slope y-Intercept

*Students can practice and review substitution

Consistent: If a linear system has at least one (1) solution

Inconsistent: when a linear system has no solutions

Solve the system.

$4x + 2y + 3z = 12$	Equation 1
$2x - 3y + 5z = -7$	Equation 2
$6x - y + 4z = -3$	Equation 3

Step 1 (2) $6x - y + 4z = -3$ (-3)

$$\begin{array}{r} 4x + 2y + 3z = 12 \\ 12x - 2y + 8z = -6 \\ \hline 16x + 11z = 6 \end{array}$$

Step 2

$$\begin{array}{r} 2x - 3y + 5z = -7 \\ -18x + 3y - 12z = 9 \\ \hline -16x - 7z = 2 \end{array}$$

Example 1

$(-1, 5, 2)$

Solve the system

$(-5)x + y + z = 2$	Equation 1
$5x + 5y + 5z = 3$	Equation 2
$4x + y - 3z = -6$	Equation 3

$$\begin{array}{r} -5x - 5y - 5z = -10 \\ 5x + 5y + 5z = 3 \\ \hline 0 = -7 \end{array}$$

Example 2

Solve the system.

$x - y + z = -3$	Equation 1
$x - y - z = -3$	Equation 2
$5x - 5y + z = -15$	Equation 3

$$\begin{array}{r} x - y + z = -3 \\ x - y - z = -3 \\ \hline (-3) 2x - 2y = -6 \\ \hline -6x + 6y = 18 \\ 6x - 6y = -18 \\ \hline 0 = 0 \end{array}$$

Example 3

Step 3

$$\begin{array}{r} 16x + 11z = 6 \\ -16x - 7z = 2 \\ \hline 4z = 8 \\ z = 2 \end{array}$$

Step 4

$$\begin{array}{r} 16x + 11z = 6 \\ 16x + 11(2) = 6 \\ 16x + 22 = 6 \\ 16x = -16 \\ x = -1 \end{array}$$

Step 5

$$\begin{array}{r} 2(-1) - 3y + 5(2) = -7 \\ -2 - 3y + 10 = -7 \\ -3y + 8 = -7 \\ -3y = -15 \\ y = 5 \end{array}$$

Can $0 = -7$?

No solution

Since 0 always = 0
you have infinitely
many solutions

Solve the system. Check your solution, if possible.

1. $x - 2y + z = -11$ 2. $x + y - z = -1$ 3. $x + y + z = 8$
 $3x + 2y - z = 7$ $4x + 4y - 4z = -2$ $x - y + z = 8$
 $-x + 2y + 4z = -9$ $3x + 2y + z = 0$ $2x + y + 2z = 16$

$(-1, 3, -4)$ no solution ~~8~~, Infinite Solutions

4. 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?

$y = 3x$
 $x + y + z = 23,000$
 $75x + 55y + 30z = 870,000$
 $x + y + z = 23,000$
 $x + 3x + z = 23,000$
 $4x + z = 23,000$

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 practice

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

$-120x - 30z = -690,000$
 $240x + 30z = 870,000$
 $120x = 180,000$
 $x = 1500$

$y = 3(1500)$
 $y = 4500$
 $x + y + z = 23,000$
 $1500 + 4500 + z = 23,000$
 $z = 17,000$

Student practice: 8400

Monitoring Progress 5

