Graphing Linear Equations Using Slope-Intercept Form

Introduction to Graphing Linear Equations

Welcome to this worksheet on graphing linear equations using slope-intercept form! This worksheet is designed to help you practice and reinforce your understanding of graphing linear equations in the slope-intercept form, y = mx + b.

The slope-intercept form of a linear equation is y = mx + b, where m is the slope and b is the y-intercept. The slope represents the rate of change of the line, while the y-intercept represents the point at which the line crosses the y-axis.

Multiple Choice Questions

Choose the correct answer for each question.

1. What is the slope-intercept form of a linear equation?
   - a) y = mx - b
   - b) y = mx + b
   - c) y = x + b
   - d) y = x - b

   Answer: b) y = mx + b
2. What is the y-intercept of the equation y = 2x + 3?
   - a) 2
   - b) 3
   - c) 4
   - d) 5

   Answer: b) 3
3. What is the slope of the equation y = -x - 2?
   - a) -1
   - b) 1
   - c) 2
   - d) -2

   Answer: a) -1

Short Answer Questions

Show your work and explain your answers.

1. Graph the equation y = x + 2 on a coordinate plane.

2. Find the y-intercept of the equation y = 3x - 2.

3. Graph the equation y = -2x + 1 on a coordinate plane.

Word Problems

Read each problem carefully and show your work.

1. Tom has been saving money for a new bike and has $120 in his savings account. He wants to buy a bike that costs $180. If he saves $12 per week, how many weeks will it take him to have enough money to buy the bike? Use a linear equation to model the situation and graph it on a coordinate plane.

2. A company is producing a new product and wants to determine the cost of production. The cost of producing x units is given by the equation y = 2x + 100. Graph the equation on a coordinate plane and find the cost of producing 10 units.

Graphing Activities

Graph each equation on a coordinate plane.

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

Challenge Questions

Show your work and explain your answers.

1. Find the equation of the line that passes through the points (2, 3) and (4, 5).
2. Graph the equation y = x^2 + 2x - 3 on a coordinate plane.

Linear Equations in Real-World Applications

Read each problem carefully and show your work.

1. A car rental company charges a base fee of $20 plus an additional $0.25 per mile driven. If a customer rents a car for a day and drives x miles, the total cost can be represented by the equation y = 0.25x + 20. Graph the equation on a coordinate plane and find the cost of driving 100 miles.

2. A bakery sells a total of 250 loaves of bread per day. They sell a combination of whole wheat and white bread. If they sell x loaves of whole wheat bread, they sell (250 - x) loaves of white bread. The profit from selling x loaves of whole wheat bread is $0.50x, and the profit from selling (250 - x) loaves of white bread is $0.25(250 - x). The total profit is given by the equation y = 0.50x + 0.25(250 - x). Graph the equation on a coordinate plane and find the profit when 150 loaves of whole wheat bread are sold.

Graphing Linear Inequalities

Graph each inequality on a coordinate plane.

1. $y > 2x - 3$

2. $y \leq -x + 2$

3. $y \geq 3x - 1$

Systems of Linear Equations

Solve each system of equations using graphing.

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

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

Word Problems Involving Systems of Equations

Read each problem carefully and show your work.

1. Tom has $120 to spend on tickets to a concert. Tickets cost $20 each, and Tom wants to buy a combination of adult and child tickets. If x is the number of adult tickets and y is the number of child tickets, the total cost can be represented by the equation 20x + 10y = 120. Tom also knows that he wants to buy a total of 6 tickets, which can be represented by the equation x + y = 6. Solve the system of equations to find the number of adult and child tickets Tom can buy.

2. A company produces two products, A and B. The profit from producing x units of product A is $10x, and the profit from producing y units of product B is $15y. The total profit is given by the equation y = 10x + 15y. The company also knows that they can produce a total of 100 units per day, which can be represented by the equation x + y = 100. Solve the system of equations to find the number of units of each product the company should produce to maximize profit.

Quadratic Equations and Functions

Graph each equation on a coordinate plane.

1. y = x^2 + 2x - 3
2. y = -x^2 + 4x - 1
3. y = 2x^2 - 5x + 1

Solving Quadratic Equations

Solve each equation using factoring, quadratic formula, or other methods.

1. x^2 + 4x + 4 = 0
2. x^2 - 7x + 12 = 0
3. 2x^2 + 5x - 3 = 0

Functions and Relations

Determine whether each relation is a function.

1. y = 2x + 1

2. x^2 + y^2 = 4

3. y = |x|

Domain and Range of Functions

Find the domain and range of each function.

1. y = 1/x

2. y = √x

3. y = |x|

Composition of Functions

Find the composition of each pair of functions.

1. f(x) = 2x + 1
   g(x) = x^2

2. f(x) = 1/x
   g(x) = x + 2

3. f(x) = |x|
   g(x) = x - 3

Inverse Functions

Find the inverse of each function.

1. y = 2x + 1

2. y = x^2

3. y = 1/x

Review and Assessment

Complete the review exercises to assess your understanding of the material.

1. Graph the equation y = x^2 + 2x - 3 on a coordinate plane.

2. Solve the system of equations using graphing:
   y = 2x + 1
   y = x - 2

3. Find the composition of the functions f(x) = 2x + 1 and g(x) = x^2.

Challenge Problems

Solve each problem to demonstrate your mastery of the material.

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