(-3,6) (-2,9) Write The Equation In Slope Intercept Form

(-3,6) (-2,9) Write The Equation In Slope Intercept Form is a common problem encountered in algebra when students are tasked with finding the linear equation that passes through two given points. Understanding how to derive this equation in slope-intercept form, which is expressed as y = mx + b, is fundamental in algebra and useful in various real-world applications such as physics, economics, and engineering. This article provides an in-depth guide on how to find the equation of a line passing through two points, with a focus on the points (-3,6) and (-2,9). We'll explore the concepts of slope, the significance of the slope-intercept form, and step-by-step instructions to accurately derive the equation.

Understanding the Basics: Points, Slope, and Line Equations

What Are Coordinates and Points?

In coordinate geometry, points are represented as ordered pairs (x, y), where 'x' indicates the position along the horizontal axis, and 'y' indicates the position along the vertical axis. For example, the point (-3,6) is located 3 units to the left of the origin along the x-axis and 6 units above the x-axis.

The Concept of Slope

The slope of a line, denoted as 'm,' measures how steep the line is. It is calculated as the ratio of the change in y-values to the change in x-values between two points on the line:

$$
m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}
$$

A positive slope indicates the line rises from left to right, whereas a negative slope indicates it falls.

Line Equations in Different Forms

The most common forms of line equations are:
- Slope-Intercept Form: $y = mx + b$
- Point-Slope Form: $y - y_1 = m(x - x_1)$
- Standard Form: $Ax + By = C$

For this guide, we'll focus on deriving the slope-intercept form, which clearly shows the slope and y-intercept.

Calculating the Slope for the Points (-3,6) and (-2,9)

Step 1: Identify the Coordinates

Given points:
- Point 1: $(-3, 6)$
- Point 2: $(-2, 9)$

Step 2: Use the Slope Formula

Applying the slope formula:
$$
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 6}{-2 - (-3)} = \frac{3}{-2 + 3} = \frac{3}{1} = 3
$$
Thus, the slope of the line passing through these points is 3.

Finding the Equation in Slope-Intercept Form

Step 3: Use the Point-Slope Formula

The point-slope form is:
$$
y - y_1 = m(x - x_1)
$$
Choose either point to substitute into the formula; here, we'll use $(-3, 6)$.

Substituting:
$$
y - 6 = 3(x - (-3))
$$
which simplifies to:
$$
y - 6 = 3(x + 3)
$$

Step 4: Expand and Simplify

Distribute the slope:
$$
y - 6 = 3x + 9
$$
Add 6 to both sides:
$$
y = 3x + 9 + 6

$$
y = 3x + 15
$$

Final Equation:

$$
\boxed{y = 3x + 15}
$$

This is the slope-intercept form of the line passing through the points (-3,6) and (-2,9).

Verifying the Equation

Check with the Second Point (-2, 9)

Substitute $x = -2$ into the equation:

$$
y = 3(-2) + 15 = -6 + 15 = 9
$$

Since the y-value matches the point's y-coordinate, the equation is correct.

Key Takeaways and Tips for Writing the Equation in Slope-Intercept Form

- **Always find the slope first:** The slope is crucial for defining the line's steepness.
- **Choose a point to substitute:** Either point works, but consistency and accuracy are important.
- **Use the point-slope formula:** It simplifies the process of deriving the slope-intercept form.
- **Simplify carefully:** Expand and combine like terms to achieve the final form y = mx + b.
- **Verify your equation:** Substitute the second point or other points to ensure accuracy.

Additional Tips and Common Mistakes to Avoid

Beware of Sign Errors

Always pay close attention to the signs of your points and calculations. For example, subtracting negative numbers can be tricky.

Double-Check the Slope Calculation

Incorrectly calculating the slope can lead to a wrong equation. Reconfirm the differences in y and x.

Ensure the Final Equation is in the Correct Form

The slope-intercept form should explicitly show y as a function of x. Simplify your expression fully.

Practice Problems for Mastery

To solidify your understanding, try deriving equations for these points:

1. (2, 4) and (5, 10)
2. (-1, -2) and (3, 8)
3. (0, 0) and (4, 16)

Remember to find the slope first, then use the point-slope formula, and simplify to slope-intercept form.

Conclusion

Understanding how to write the equation of a line passing through two points in slope-intercept form is a fundamental skill in algebra. For the points (-3,6) and (-2,9), we've seen that the slope is 3, leading to the equation y = 3x + 15. This process involves calculating the slope, selecting a point, applying the point-slope formula, and simplifying the expression. Mastery of these steps enables students to analyze linear relationships efficiently and lays the groundwork for more complex algebraic concepts. Practice regularly, verify your work, and you'll become proficient in deriving line equations with confidence.

Frequently Asked Questions

What is the slope of the line passing through the points (-3, 6) and (-2, 9)?

The slope is (9 - 6) / (-2 - (-3)) = 3 / 1 = 3.

How do I find the slope between two points (-3, 6) and (-2, 9)?

Use the formula: slope m = $(y_2 - y_1) / (x_2 - x_1)$. Substituting gives m = (9 - 6) / (-2 - (-3)) = 3 / 1 = 3.

What is the slope-intercept form of the line passing through (-3, 6) and (-2, 9)?

First, find the slope m = 3. Then, use point-slope form with one point, for example (-3, 6): y - 6 = 3(x + 3). Simplify to get y = 3x + 15.

Can you show the step-by-step process to write the equation in slope-intercept form for the points (-3, 6) and (-2, 9)?

Yes. Step 1: Find the slope m = (9 - 6)/(-2 + 3) = 3/1 = 3. Step 2: Use point-slope form with point (-3, 6): y - 6 = 3(x + 3). Step 3: Expand: y - 6 = 3x + 9. Step 4: Add 6 to both sides: y = 3x + 15.

What is the slope of the line through points (-3, 6) and (-2, 9), and what does it represent?

The slope is 3, which indicates the line rises 3 units vertically for every 1 unit it moves horizontally.

How do I verify that the equation y = 3x + 15 passes through both points (-3, 6) and (-2, 9)?

Plug in x = -3: y = 3(-3) + 15 = -9 + 15 = 6, matching the first point. Plug in x = -2: y = 3(-2) + 15 = -6 + 15 = 9, matching the second point.

What is the significance of the slope-intercept form y = 3x + 15 in this context?

It provides a straightforward way to understand and graph the line, showing its slope (3) and y-intercept (15).

Can the line passing through (-3, 6) and (-2, 9) be written in any other forms?

Yes, it can be written in point-slope form (y - 6 = 3(x + 3)) or standard form (3x - y = -15).

Why is it important to write the equation in slope-intercept form?

Because it easily reveals the slope and y-intercept, making graphing and understanding the line's behavior more intuitive.

Additional Resources

(-3,6) (-2,9) Write The Equation In Slope Intercept Form

In the world of algebra and coordinate geometry, understanding how to derive the equation of a line from a set of points is a foundational skill. Whether you're a student preparing for exams or a teacher designing lesson plans, mastering this process equips you with the tools to analyze and interpret linear relationships effectively. Today, we will focus on a specific example: given the points (-3, 6) and (-2, 9), how can we write the equation of the line that passes through these points in slope-intercept form? This article offers a comprehensive, step-by-step guide to this task, exploring the core concepts, calculation methods, and practical applications involved.

Understanding the Basics: Coordinates and the Slope-Intercept Form

Before diving into calculations, it's essential to clarify some key concepts:

- Coordinate Points: Points on a plane are expressed as ordered pairs (x, y). For example, (-3, 6) indicates a point located 3 units left of the origin and 6 units above it.

- Line Equation in Slope-Intercept Form: The most common form of a straight line is $y = mx + b$, where:
- m represents the slope of the line.
- b indicates the y-intercept, the point where the line crosses the y-axis.

Understanding these components allows us to formulate the line's equation once we determine the slope and the y-intercept.

Step 1: Calculating the Slope (m)

The slope of a line indicates its steepness and is calculated as the ratio of the change in y-values to the change in x-values between two points:

$$
m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}
$$

Given the points (-3, 6) and (-2, 9):

- Assign:
- $(x_1, y_1) = (-3, 6)$
- $(x_2, y_2) = (-2, 9)$

- Calculate the differences:
- $y_2 - y_1 = 9 - 6 = 3$
- $x_2 - x_1 = -2 - (-3) = -2 + 3 = 1$

- Compute the slope:

$$
m = \frac{3}{1} = 3
$$

Interpretation: The line has a slope of 3, meaning for each one-unit increase in x, y increases by 3 units.

Step 2: Finding the Y-Intercept (b)

Once the slope is known, the next step is to find the y-intercept. To do this, we use the slope and one of the given points in the line equation y = mx + b, and then solve for b:

$$
b = y - mx
$$

Choosing the point (-3, 6):

$$
b = 6 - (3)(-3) = 6 - (-9) = 6 + 9 = 15
$$

Result: The y-intercept is 15, indicating that the line crosses the y-axis at (0, 15).

Step 3: Writing the Equation in Slope-Intercept Form

With the slope $m = 3$ and y-intercept $b = 15$, the line's equation becomes:

$$
\boxed{y = 3x + 15}
$$

This is the slope-intercept form of the line passing through the points (-3,6) and (-2,9).

Confirming the Equation: Verifying with the Second Point

To ensure the accuracy of our derived equation, substitute the coordinates of the second point (-2, 9):

$$
y = 3x + 15
$$
$$
9 = 3(-2) + 15
$$
\[

$$
9 = -6 + 15
$$

$$
9 = 9
$$

The equality holds, confirming that the equation correctly represents the line passing through both points.

Practical Implications and Applications

Understanding how to derive the equation of a line from two points has numerous applications across fields:

- Graphing and Visualization: Plotting lines based on points is fundamental in data visualization, engineering, and scientific research.

- Predictive Modeling: In economics or social sciences, lines often represent trends; calculating their equations helps in making predictions.

- Engineering Design: Designing physical structures or systems often involves defining linear relationships between variables.

- Education and Testing: These skills are frequently tested in standardized exams, emphasizing the importance of mastering the process.

Advanced Considerations: When to Use Slope-Intercept Form

While the slope-intercept form is straightforward, there are scenarios where alternative forms are more appropriate:

- Point-Slope Form: Used when a point on the line and the slope are known, expressed as:

$$
y - y_1 = m(x - x_1)
$$

- Standard Form: Useful for certain algebraic manipulations, expressed as:

$$
Ax + By = C
$$

Choosing the appropriate form depends on the problem context and the available data.

Summary: From Points to Equation

To encapsulate the process:

1. Calculate the slope (m) using the difference in y-values divided by the difference in x-values.
2. Select one point to substitute into the slope-intercept formula $y = mx + b$.
3. Solve for b to find the y-intercept.
4. Write the final equation in the form $y = mx + b$.

Applying this systematic approach ensures accuracy and clarity in deriving line equations from coordinate points.

Conclusion

The ability to derive the equation of a line from given points is a critical skill in mathematics, with broad applications across various disciplines. Using the example of points (-3, 6) and (-2, 9), we demonstrated a clear, step-by-step method to find the slope, compute the y-intercept, and write the equation in slope-intercept form as $y = 3x + 15$. This process not only reinforces algebraic proficiency but also enhances spatial understanding of how points relate to lines in a coordinate plane. Mastery of these techniques empowers students, educators, and professionals alike to analyze linear relationships with confidence and precision.

3 6 2 9 Write The Equation In Slope Intercept Form

3 6 2 9 Write The Equation In Slope Intercept Form

Related Articles

- I NEED ANSWER NOW PLEASE IT'S FINALS WILL BE MARK BRAINIEST
- The Propaganda Posters Contributed To The Development Of The
- Any Help Someone....(solve Triangles Using The Law Of Sines)

Back to Home