

Find The Slope Of The Line That Passes Through (81, 56) And (11, -20). 25 Points BrainlySimplify Your

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Understanding how to find the slope of a line passing through two points is a fundamental concept in coordinate geometry. Whether you're a student preparing for exams, a math enthusiast, or someone seeking to strengthen your mathematical skills, mastering this topic is essential. In this comprehensive guide, we will explore the process step-by-step, focusing on the specific problem of finding the slope of the line passing through the points (81, 56) and (11, -20). We will also discuss related concepts, tips for simplifying your calculations, and how to present your answer effectively, especially for academic platforms like Brainly that value clarity and accuracy.

Understanding the Concept of Slope in Coordinate Geometry

What Is a Slope?

- The slope of a line measures its steepness.
- It indicates how much the y-coordinate (vertical change) varies concerning the x-coordinate (horizontal change).
- Slope is often represented by the letter m .

Why Is Slope Important?

- It helps in graphing lines accurately.
- It is essential in understanding the relationship between variables.
- It plays a crucial role in solving real-world problems involving rates, trends, and linear relationships.

Basic Formula for Slope

Given two points $((x_1, y_1))$ and $((x_2, y_2))$, the slope (m) is

calculated as:

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

This ratio represents the change in y over the change in x, often called "rise over run."

Step-by-Step Process to Find the Slope for (81, 56) and (11, -20)

Identify the Coordinates

- First point: $((x_1, y_1) = (81, 56))$
- Second point: $((x_2, y_2) = (11, -20))$

Apply the Slope Formula

Using the formula:

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

Substitute the known values:

$$m = \frac{-20 - 56}{11 - 81}$$

Calculate the Numerator (Vertical Change)

$$- (-20 - 56 = -76)$$

Calculate the Denominator (Horizontal Change)

$$- (11 - 81 = -70)$$

Simplify the Fraction

$$m = \frac{-76}{-70}$$

Since both numerator and denominator are negative, the negatives cancel out:

$$m = \frac{76}{70}$$

Reduce the Fraction to Simplest Form

- Both numerator and denominator are divisible by 2:

$$\frac{76 \div 2}{70 \div 2} = \frac{38}{35}$$

- The fraction $\left(\frac{38}{35}\right)$ is in simplest form because 38 and 35 share no common factors other than 1.

Final Answer

$$\boxed{\text{The slope } m = \frac{38}{35}}$$

This indicates that for every 35 units moved horizontally, the line moves approximately 38 units vertically.

Additional Tips for Calculating and Simplifying Slopes

Check Your Calculations Carefully

- Always double-check subtraction steps.

- Confirm that you correctly identify the points.

Handling Negative Values

- Remember, dividing two negatives results in a positive.
- Be cautious with signs to avoid errors.

Reducing Fractions

- Use the greatest common divisor (GCD) to simplify fractions.
- For example, if the numerator and denominator are divisible by 2, divide both by 2.
- For larger numbers, consider prime factorization or Euclidean algorithm for GCD.

Using Calculators and Tools

- Scientific calculators or online tools can help simplify fractions rapidly.
- However, understanding the manual process reinforces your mathematical skills.

Understanding the Role of Slope in Graphing and Equations

Graphing a Line Using Slope and a Point

- To graph a line, you need a point and the slope.
- Starting from a known point, use the slope to find subsequent points.

Equation of a Line in Slope-Intercept Form

$$y = mx + b$$

- m is the slope (which we've calculated).
- b is the y-intercept, which can be found if needed.

Finding the Equation Using the Slope and a Point

- Using point $((81, 56))$:

$$\begin{aligned} 56 &= \frac{38}{35} \times 81 + b \end{aligned}$$

- Solve for (b) to get the full equation. This is optional but useful for comprehensive understanding.

Applying the Concept to Academic and Brainly-Style Problems

Answering 25-Point Questions Effectively

- Clearly state the known points.
- Show all steps logically.
- Simplify fractions to their lowest terms.
- Use proper mathematical notation.
- Verify calculations to avoid errors.
- Provide the final answer in a boxed format for clarity.

Common Mistakes to Avoid

- Mixing up points during substitution.
- Forgetting to subtract in the correct order.
- Not simplifying fractions fully.
- Ignoring negative signs.

Sample Brainly Answer Format

> To find the slope of the line passing through $(81, 56)$ and $(11, -20)$, I used the slope formula:

$$\begin{aligned} > \quad m &= \frac{y_2 - y_1}{x_2 - x_1} \end{aligned}$$

> Substituting the points:

$$\begin{aligned} > \quad m &= \frac{-20 - 56}{11 - 81} = \frac{-76}{-70} \end{aligned}$$

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> \]  
> Simplifying the fraction:  
> \[  
> m = \frac{76}{70} = \frac{38}{35}  
> \]  
> Therefore, the slope is \(\boxed{\frac{38}{35}}\).
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This approach ensures clarity, correctness, and completeness, which are vital for high-scoring answers on platforms like Brainly.

Conclusion: Mastering Slope Calculation for Academic Success

Calculating the slope of a line through two points is a vital skill in mathematics that opens the door to understanding linear equations, graphing, and solving real-world problems. The process involves identifying the points, applying the slope formula, performing subtraction carefully, and simplifying the resulting fraction to its lowest terms. For the specific problem of passing through (81, 56) and (11, -20), the slope is $\left(\frac{38}{35}\right)$. Remember, practice makes perfect—regularly solving similar problems enhances your confidence and proficiency.

By mastering these steps and tips, you will be well-equipped to tackle similar questions on exams, homework, or educational platforms like Brainly. Keep practicing, stay attentive to details, and always verify your work for accuracy. With these strategies, you'll confidently find slopes and deepen your understanding of coordinate geometry.

Keywords:

Find slope, line through points, (81, 56), (11, -20), simplify fraction, coordinate geometry, math tips, Brainly, slope formula, linear equations, graphing, math practice

Frequently Asked Questions

How do you find the slope of a line passing through two points?

To find the slope, subtract the y-coordinates and divide by the difference of the x-coordinates: $\text{slope} = (y_2 - y_1) / (x_2 - x_1)$.

What is the slope of the line passing through the points (81, 56) and (11, -20)?

The slope is $(-20 - 56) / (11 - 81) = (-76) / (-70) = 76/70$, which simplifies to $38/35$.

How can I simplify the slope 76/70?

Divide numerator and denominator by their greatest common divisor, which is 2, resulting in $38/35$.

Why is it important to find the slope of a line through two points?

The slope indicates the rate of change and the steepness of the line, which is essential for graphing and understanding the line's behavior.

What is the significance of the points (81, 56) and (11, -20) in coordinate geometry?

These points define a specific line, and calculating its slope helps analyze the relationship between the two coordinates and the line's inclination.

Can I verify the slope calculation using a graph or plotting the points?

Yes, plotting the points on a graph and drawing the line helps visually verify the slope and understand its steepness and direction.

Additional Resources

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Understanding how to determine the slope of a line passing through two points is a fundamental concept in coordinate geometry. Whether you're a student preparing for exams, a teacher clarifying the basics, or a math enthusiast exploring the intricacies of algebra, grasping how to compute the slope is essential. In this article, we will explore the process of finding the slope for the specific points (81, 56) and (11, -20), breaking down each step with clarity and precision. We will also provide a detailed explanation of the underlying principles, common pitfalls to avoid, and tips for simplifying your calculations, ensuring that the concept becomes accessible and manageable for all readers.

Understanding the Concept of Slope

What Is Slope?

The slope of a line is a measure of its steepness or inclination. It indicates how much the y-coordinate (vertical change) changes with respect to the x-coordinate (horizontal change) as you move along the line. Mathematically, slope is often denoted by the letter m and is calculated as the ratio of the "rise" over the "run."

In simple terms:

- The rise is the change in y-values between two points.
- The run is the change in x-values between those same points.

Expressed as a formula:

$$m = (y_2 - y_1) / (x_2 - x_1)$$

Here, (x_1, y_1) and (x_2, y_2) are the coordinates of the two points.

Why Is Slope Important?

The slope tells us how a line behaves:

- If the slope is positive, the line ascends from left to right.
- If the slope is negative, it descends.
- A zero slope indicates a horizontal line.
- An undefined slope (division by zero) indicates a vertical line.

Knowing the slope allows us to:

- Graph the line accurately.
- Write the equation of the line.
- Understand the relationship between variables in real-world contexts.

Calculating the Slope for (81, 56) and (11, -20)

Step 1: Identify the Coordinates

Given points:

- Point 1: $(x_1, y_1) = (81, 56)$
- Point 2: $(x_2, y_2) = (11, -20)$

It is crucial to correctly identify which point is which, although for the slope calculation, the order does not matter since the difference will be the

same in magnitude but may change sign.

Step 2: Apply the Slope Formula

Using the formula:

$$m = (y_2 - y_1) / (x_2 - x_1)$$

Substituting the known values:

$$m = (-20 - 56) / (11 - 81)$$

Step 3: Perform the Calculations

Calculate the numerator (rise):

$$-20 - 56 = -76$$

Calculate the denominator (run):

$$11 - 81 = -70$$

So,

$$m = -76 / -70$$

Step 4: Simplify the Fraction

Since both numerator and denominator are negative, their quotient is positive:

$$-76 / -70 = 76 / 70$$

To simplify:

- Both 76 and 70 are divisible by 2:

$$76 \div 2 = 38$$

$$70 \div 2 = 35$$

Thus,

$$m = 38 / 35$$

This fraction cannot be simplified further because 38 and 35 share no common factors other than 1.

Understanding and Interpreting the Result

The calculated slope is $38/35$. This is a positive value, indicating that the line passing through the points (81, 56) and (11, -20) slopes upward from left to right. The relatively large numerator and denominator suggest a gentle incline, but since it's a positive fraction, we know the line is ascending.

Numerical Approximation:

For a more intuitive understanding, you can convert the fraction to a decimal:

$$38 \div 35 \approx 1.0857$$

This means that for each unit increase in x , y increases approximately by 1.0857 units, confirming the upward trend.

Additional Insights and Applications

Graphing the Line

Using the slope and one point, you can graph the line:

- Start with either point, say (81, 56).
- Use the slope to find other points or to draw the line:
- For example, moving 35 units in x (to the left or right), y will change by approximately 38 units in the same direction.

Equation of the Line

Knowing the slope and a point, you can write the line's equation in point-slope form:

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

Using point (81, 56):

$$y - 56 = (38/35)(x - 81)$$

This form is useful for graphing or further algebraic manipulations.

Real-World Contexts

In practical applications, understanding the slope helps interpret data:

- In physics, it might represent velocity.

- In economics, it could indicate rate of change.
- In engineering, it describes inclines and gradients.

Common Pitfalls and Tips

- Sign Errors: Always pay attention to the signs of the coordinates. A mistake here can lead to an incorrect slope.
- Division by Zero: If the x-values are the same ($x_1 = x_2$), the slope is undefined, indicating a vertical line.
- Simplification: Always simplify fractions to their lowest terms for clarity.
- Units Consistency: Ensure the units for x and y are consistent to interpret the slope meaningfully.

Conclusion

Finding the slope of a line passing through two points is a straightforward yet powerful skill in mathematics. By applying the basic formula, carefully performing calculations, and simplifying the result, you can accurately determine the line's inclination. For the points (81, 56) and (11, -20), the slope is $\frac{38}{35}$, indicating a positive, steadily increasing relationship between x and y. Mastery of this process not only enhances your algebra skills but also equips you to analyze and interpret real-world data with confidence. Whether plotting a graph, writing an equation, or understanding the dynamics between variables, knowing how to find and interpret the slope is an invaluable tool in your mathematical toolkit.

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