

What Is The Slope Of The Line That Passes Through The Points (8, 2) And (9,3)? Write your Answer In Simplest

What Is The Slope Of The Line That Passes Through The Points (8, 2) And (9,3)? Write your Answer In Simplest

Understanding the concept of slope is fundamental in algebra and coordinate geometry. The slope of a line indicates its steepness and direction. When given two points on a line, calculating the slope helps describe how the line behaves between these points. In this article, we will explore how to find the slope of the line passing through the points (8, 2) and (9, 3), and we will simplify the answer for clarity.

Understanding the Concept of Slope

What Is Slope?

The slope of a line is a numerical measure of its inclination or steepness. It is typically represented by the letter 'm' and calculated as the ratio of the vertical change to the horizontal change between two points on the line.

Mathematically, slope (m) is given by:

$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Why Is Slope Important?

- Defines the steepness of the line.
- Indicates the direction: positive slope means the line goes up from left to right, negative slope means it goes down.
- Helps in graphing lines accurately.
- Serves as a foundation for understanding linear equations.

Given Points and Their Coordinates

Before calculating the slope, let's understand the points involved:

- Point 1: (8, 2)
- Point 2: (9, 3)

Here:

- $x_1 = 8$, $y_1 = 2$

$$- (x_2 = 9), (y_2 = 3)$$

Calculating the Slope Step-by-Step

Step 1: Find the change in y (vertical change)

$$y_2 - y_1 = 3 - 2 = 1$$

Step 2: Find the change in x (horizontal change)

$$x_2 - x_1 = 9 - 8 = 1$$

Step 3: Compute the slope

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

Therefore, the slope of the line passing through the points (8, 2) and (9, 3) is 1.

Expressing the Slope in the Simplest Form

The calculated slope $m = \frac{1}{1}$ simplifies directly to 1. Since 1 divided by 1 is 1, this is the simplest form of the slope.

Summary of the Slope Calculation:

- Change in y: 1
- Change in x: 1
- Slope: 1

This indicates that for every unit increase in x, y increases by 1 unit along the line.

Understanding the Significance of the Slope

Positive Slope

Since the slope is positive (1), the line rises as it moves from left to right.

Graphical Representation

- The line passes through the points (8, 2) and (9, 3).
- The rise over run is 1, meaning the line makes a 45-degree angle with the x-axis.

Additional Concepts Related to Slope

Equation of the Line

Using the slope and one of the points, you can find the line's equation in slope-intercept form:

$$y = mx + b$$

where:

- $m = 1$
- b is the y-intercept

Finding the Y-Intercept (b)

Using point (8, 2):

$$2 = 1 \times 8 + b$$

$$2 = 8 + b$$

$$b = 2 - 8 = -6$$

So, the equation of the line is:

$$y = x - 6$$

Visualizing the Line

- The line passes through points (8, 2) and (9, 3).
- It crosses the y-axis at $y = -6$.

Practical Applications of Slope Calculation

Understanding how to compute the slope has numerous applications:

- Engineering: designing ramps or slopes.
- Economics: analyzing trends over time.
- Physics: calculating velocity from position data.
- Mathematics: solving problems involving linear relationships.

Common Mistakes to Avoid When Calculating Slope

- Swapping points: ensure you correctly identify (x_1, y_1) and (x_2, y_2) .
- Incorrect subtraction: always subtract the coordinates in the same order.
- Dividing by zero: if $x_2 - x_1 = 0$, the line is vertical, and the slope is undefined.

Conclusion

Calculating the slope of a line passing through two points is a straightforward process that involves understanding the change in y relative to the change in x . For the points $(8, 2)$ and $(9, 3)$, the slope is 1, indicating an upward slant at a 45-degree angle. Expressed in its simplest form, the slope remains 1, making it easy to interpret and use in further calculations such as finding the equation of the line or graphing.

Mastering this fundamental concept allows students and professionals to analyze linear relationships effectively and apply these principles across various fields. Whether you're solving math problems, designing real-world structures, or analyzing data trends, understanding how to find and interpret slope is an essential skill in mathematics and beyond.

Frequently Asked Questions

What is the formula to find the slope of a line passing through two points?

The slope is calculated using the formula $(y_2 - y_1) / (x_2 - x_1)$.

How do you find the slope of the line passing through $(8, 2)$ and $(9, 3)$?

Subtract the y -coordinates: $3 - 2 = 1$, and the x -coordinates: $9 - 8 = 1$. Then, divide: $1 / 1 = 1$.

What is the slope of the line that passes through the points $(8, 2)$ and $(9, 3)$?

The slope is 1.

Is the slope of the line passing through $(8, 2)$ and $(9, 3)$ positive or negative?

The slope is positive because the y -value increases as the x -value increases.

Can the slope of the line passing through these points be simplified further?

Yes, the slope is already in its simplest form, which is 1.

Additional Resources

What Is The Slope Of The Line That Passes Through The Points (8, 2) And (9, 3)? Write Your Answer In Simplest Form

Understanding the slope of a line is fundamental in algebra and coordinate geometry. It provides insight into the line's inclination and how it behaves relative to the x-axis. When given two points, such as (8, 2) and (9, 3), calculating the slope involves a straightforward process that reveals the rate at which y changes with respect to x. This article offers an in-depth exploration of what the slope represents, how to compute it, and why expressing the answer in its simplest form is important for clarity and precision.

What Is the Slope of a Line?

The slope of a line, often represented as "m," measures the steepness or incline of the line. Geometrically, it indicates how much the y-coordinate changes for a unit increase in the x-coordinate. Mathematically, the slope is calculated as the ratio of the change in the y-values to the change in the x-values between two points on the line.

Expressed as a formula:

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

where (x_1, y_1) and (x_2, y_2) are two distinct points on the line. This ratio is also known as the "rise over run," reflecting the vertical change ("rise") over the horizontal change ("run").

Key Points About Slope:

- The slope can be positive, negative, zero, or undefined.
- A positive slope indicates the line rises as x increases.
- A negative slope indicates the line falls as x increases.
- A zero slope corresponds to a horizontal line.
- An undefined slope (division by zero) corresponds to a vertical line.

Understanding the concept of slope helps in graphing lines accurately, analyzing their behavior, and solving real-world problems involving rates of change.

Calculating the Slope Between Two Points

To find the slope of the line passing through the points (8, 2) and (9, 3), we follow the slope formula:

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

Assigning:

$$(x_1, y_1) = (8, 2)$$

$$(x_2, y_2) = (9, 3)$$

we substitute these values into the formula:

$$m = \frac{3 - 2}{9 - 8}$$

Calculating numerator and denominator:

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

which simplifies directly to:

$$m = 1$$

This means the line has a slope of 1, indicating that for each increase of 1 unit in x, the y-value increases by 1 unit as well.

Expressing the Slope in Simplest Form

Often, when calculating slope, the resulting fraction may not initially be in simplest form. For example, if the slope was $\frac{4}{8}$, it would need to be simplified to $\frac{1}{2}$. In this particular case, $\frac{1}{1}$ is already in its simplest form, as the numerator and denominator are coprime.

Interpreting the Slope of 1

A slope of 1 signifies that the line passes through the coordinate plane at a 45-degree angle relative to the x-axis. It forms a line where y increases by the same amount as x for every step along the x-axis.

Features of a Line with Slope 1:

- The line is diagonally oriented, rising from left to right.
- Its equation can be written in slope-intercept form as:

$$y = x + b$$

where b is the y-intercept.

- Given the points (8, 2) and (9, 3), the line passes through these points, and the y-intercept can be found by substituting one point into the equation.

Finding the Equation of the Line:

Using point (8, 2):

$$\begin{aligned} 2 &= 1 \times 8 + b \\ 2 &= 8 + b \\ b &= 2 - 8 = -6 \end{aligned}$$

Therefore, the equation of the line is:

$$y = x - 6$$

This confirms that the line passes through the points and has a slope of 1 in simplest form.

Why Is It Important to Write the Slope in Simplest Form?

Expressing the slope in its simplest form ensures clarity, reduces ambiguity, and makes the comparison between different lines more straightforward. Simplified fractions are easier to interpret and work with, especially when solving equations, graphing, or analyzing multiple lines.

Advantages of Simplification:

- Clarity: Simplest form provides a clear, unambiguous value.

- Ease of Calculations: Simplified fractions are easier to manipulate algebraically.
- Standardization: Facilitates comparison between slopes of different lines.
- Educational Value: Reinforces understanding of fractions and ratios.

Summary of Key Points

- The slope of a line passing through points (8, 2) and (9, 3) is calculated as $\frac{3 - 2}{9 - 8} = \frac{1}{1}$.
- The simplified form of the slope is 1.
- A slope of 1 indicates a line rising at a 45-degree angle, with equal increase in y for each increase in x.
- The equation of this line is $y = x - 6$.
- Writing the slope in simplest form is crucial for clarity, accuracy, and ease of further calculations.

Additional Considerations and Common Mistakes

When calculating slopes, students and learners should be cautious of common pitfalls:

- Swapping points: Always ensure you assign the correct points to numerator and denominator.
- Division by zero: If the two x-values are equal, the denominator becomes zero, indicating a vertical line with an undefined slope.
- Simplification errors: Always simplify fractions to their lowest terms to avoid confusion.
- Incorrect point substitution: Confirm points are correctly substituted into the formula to avoid errors.

Conclusion

In conclusion, the slope of the line passing through the points (8, 2) and (9, 3) is 1, obtained by applying the slope formula. This value is already in its simplest form, highlighting the direct and proportional relationship between x and y in this line. Recognizing the significance of the slope helps in understanding the line's behavior, graphing accurately, and solving related algebraic problems. Whether for academic purposes or practical applications, mastering the calculation and interpretation of slopes is essential in the study of geometry and algebra.

Final Note: Always remember to verify your calculations, write your answers in simplest form, and interpret the meaning of the slope in the context of the problem at hand.

What Is The Slope Of The Line That Passes Through The Points 8 2 And 9 3 Writeyour Answer In Simplest

What Is The Slope Of The Line That Passes Through The Points 8 2 And 9 3 Writeyour Answer In Simplest

Related Articles

- [Are Topics Such As Leadership, Teams, Or Motivation Considered To Be On The "industrial" Or "organizational"](#)
- [Determine The Volume Of 0.107 M NaOH Required To Reach Halfway To The Stoichiometric Point Of The Titration.](#)
- [Explain The Importance For Evaluating Governmental Financial Performance, And Distinguish Among And Describe](#)

[Back to Home](#)