What Is The Slope Of The Line Passing Through The Points (-3, 4) And (2, 1)?3/51-5/3. -1

What Is The Slope Of The Line Passing Through The Points (-3, 4) And (2, 1)?3/51-5/3. -1

Understanding the concept of slope is fundamental in algebra and coordinate geometry. When analyzing the relationship between two points on a line, calculating the slope provides insight into the line's steepness and direction. In this article, we will explore how to find the slope of the line passing through the points (-3, 4) and (2, 1), interpret the meaning of the slope, and review related concepts with examples. We will also clarify the significance of the expressions "3/51-5/3" and "-1" in this context.

What Is The Slope Of A Line?

The slope of a line measures how much the y-coordinate (vertical change) changes relative to the x-coordinate (horizontal change) between two points on that line. It is often denoted by the letter m.

Definition:

The slope between two points (x_1, y_1) and (x_2, y_2) is calculated as:

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

This ratio indicates whether the line rises or falls as it moves from left to right:

- Positive slope: The line rises.
- Negative slope: The line falls.
- Zero slope: The line is horizontal.
- Undefined slope: The line is vertical (division by zero issue).

Calculating the Slope for the Given Points

Given two points:

- $(-3, 4)$
- $(2, 1)$

To find the slope, plug these into the formula:

$$
m = \frac{1 - 4}{2 - (-3)} = \frac{-3}{2 + 3} = \frac{-3}{5}
$$

Therefore, the slope of the line passing through these points is:

$$
\boxed{-\frac{3}{5}}
$$

This means the line decreases by 3 units vertically for every 5 units it moves horizontally to the right.

Interpreting the Slope $-\frac{3}{5}$

Understanding what this slope indicates:

- Negative sign: The line descends from left to right.
- Magnitude ($\frac{3}{5}$): For every 5 units moved horizontally to the right, the line drops 3 units vertically.

Implications:

- The line has a gentle downward tilt.
- The slope can be used to write the equation of the line or analyze the relationship between the variables.

Expressing the Slope as a Fraction and Simplification

The slope $-\frac{3}{5}$ is already in its simplest form. However, sometimes you may encounter expressions like "3/51-5/3" or "-1" in context with slopes, which can seem confusing. Let's clarify these.

Handling the expression "3/51-5/3"

This expression appears to combine fractions and subtraction:

$$
\frac{3}{51} - \frac{5}{3}
$$

Let's simplify step by step:

1. Simplify $\frac{3}{51}$:

$$
\frac{3}{51} = \frac{1}{17}
$$

2. Find a common denominator for $\frac{1}{17}$ and $\frac{5}{3}$:

- The least common denominator (LCD) of 17 and 3 is 51.

3. Convert both fractions to denominator 51:

$$
\frac{1}{17} = \frac{3}{51}
$$
$$
\frac{5}{3} = \frac{85}{51}
$$

4. Subtract:

$$
\frac{3}{51} - \frac{85}{51} = \frac{3 - 85}{51} = \frac{-82}{51}
$$

So,

$$
\frac{3}{51} - \frac{5}{3} = -\frac{82}{51}
$$

The value "-1"

The number "-1" could represent several things depending on context:

- A slope of -1 indicates a line that descends at a 45-degree angle, with equal magnitude of vertical and horizontal change.
- Alternatively, it might be a placeholder or a simplified form related to previous calculations.

In the context of our points, the slope is $-\frac{3}{5}$, which is different from -1. The expressions may be part of an example problem or additional data.

How to Find the Equation of the Line Passing Through Two Points

Knowing the slope, you can write the equation of the line in various forms.

Point-Slope Form

Using point $(-3, 4)$ and slope $-\frac{3}{5}$:

$$
y - y_1 = m(x - x_1)
$$
$$
y - 4 = -\frac{3}{5}(x + 3)
$$

Slope-Intercept Form

Simplify to get $y = mx + b$:

$$
y - 4 = -\frac{3}{5}x - \frac{3}{5} \times 3
$$
$$
y - 4 = -\frac{3}{5}x - \frac{9}{5}
$$
$$
y = -\frac{3}{5}x - \frac{9}{5} + 4
$$

Express 4 as $\frac{20}{5}$:

$$
y = -\frac{3}{5}x - \frac{9}{5} + \frac{20}{5}
$$
$$
y = -\frac{3}{5}x + \frac{11}{5}
$$

Thus, the line’s equation in slope-intercept form is:

$$

$$
\boxed{y = -\frac{3}{5}x + \frac{11}{5}}
$$

Applications of Slope in Real-World Contexts

Understanding and calculating slope is essential in many fields:

- Physics: To determine velocity or acceleration.
- Economics: To analyze cost or revenue functions.
- Engineering: For designing roads, ramps, or structural components.
- Statistics: To compute correlations and regression lines.

Key Points:

- Slope indicates the rate of change.
- It helps in predicting values and understanding relationships.
- Accurate calculation of slope is critical for modeling real-world phenomena.

Common Mistakes to Avoid When Calculating Slope

While computing the slope, watch out for:

- Mixing up the points: Always subtract corresponding y-values and x-values.
- Dividing by zero: If $x_2 - x_1 = 0$, the slope is undefined, indicating a vertical line.
- Misinterpreting signs: Remember that the sign of the slope indicates the line’s direction.
- Simplification errors: Always reduce fractions to simplest form.

Summary

Calculating the slope of a line passing through two points is straightforward once you understand the formula:

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

Applying this to the points $(-3, 4)$ and $(2, 1)$, the slope is:

$$
m = \frac{1 - 4}{2 - (-3)} = -\frac{3}{5}
$$

This slope indicates a line that descends gently from left to right. The slope can be used to find the equation of the line, analyze relationships, and apply in various scientific and mathematical contexts.

The additional expressions, such as "3/51-5/3" and "-1," serve as examples of fraction operations and potential slope values, highlighting the importance of careful calculation and interpretation.

Conclusion

Understanding how to find and interpret the slope of a line is a vital skill in mathematics. Whether you’re working on algebra problems, graphing lines, or analyzing data, mastering slope calculations enables you to understand the behavior of linear functions effectively. Remember to carefully perform your calculations, simplify your fractions, and interpret your results in context to make the most of this fundamental concept.

Meta Description:
Learn how to calculate the slope of a line passing through points (-3, 4) and (2, 1). Discover step-by-step methods, interpretations, and applications of slope in algebra and beyond.

Frequently Asked Questions

How do you find the slope of a line passing through the points (-3, 4) and (2, 1)?

To find the slope, use the formula $(y_2 - y_1) / (x_2 - x_1)$. So, (1 - 4) / (2 - (-3)) = (-3) / (5) = -3/5.

What is the value of the slope of the line passing through (-3, 4) and (2, 1)?

The slope is -3/5.

Is the slope of the line passing through (-3, 4) and (2, 1) positive or negative?

The slope is negative, specifically -3/5.

How does the slope relate to the steepness of the line between the points (-3, 4) and (2, 1)?

Since the slope is -3/5, the line slopes downward from left to right, indicating a moderate downward incline.

What are the simplified forms of the fractions 3/5, 1 - 5/3, and -1, and how do they relate to the slope calculation?

3/5 is already simplified. 1 - 5/3 equals (3/3) - (5/3) = -2/3, which is not the slope between the points. The slope between (-3, 4) and (2, 1) is -3/5, which is different from these fractions. The -1 is also not directly related to this particular slope calculation.

Additional Resources

What Is The Slope Of The Line Passing Through The Points (-3, 4) And (2, 1)? is a fundamental question in coordinate geometry that helps us understand the behavior and orientation of lines on the Cartesian plane. Calculating the slope between two points provides insights into whether the line rises or falls as it moves from left to right, and it forms the backbone of many algebraic and geometric concepts. Whether you're a student preparing for exams, a teacher designing lesson plans, or a math enthusiast exploring the intricacies of line equations, understanding how to find the slope is an essential skill. This guide will walk you through the process step-by-step, explain the underlying principles, and clarify common misconceptions.

Understanding the Concept of Slope

Before diving into the specific problem, let's clarify what the slope of a line actually means. In simple terms, the slope measures the steepness and direction of a line.

- A positive slope indicates that as you move from left to right along the line, the line rises.
- A negative slope indicates the line falls as you move from left to right.
- A zero slope corresponds to a horizontal line.
- An undefined slope reflects a vertical line, which has no "run" to measure.

Mathematically, the slope m between two points (x_1, y_1) and (x_2, y_2) is given by the difference quotient:

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

This ratio describes how much the y-coordinate changes relative to the change in the x-coordinate.

Step-by-Step Calculation of the Slope for the Given Points

Given the points:

- $P_1 = (-3, 4)$
- $P_2 = (2, 1)$

We want to find the slope m of the line passing through these points.

Step 1: Identify the coordinates

- $x_1 = -3$, $y_1 = 4$
- $x_2 = 2$, $y_2 = 1$

Step 2: Apply the slope formula

$$
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 4}{2 - (-3)}
$$

Note that subtracting a negative is equivalent to addition:

$$
m = \frac{1 - 4}{2 + 3} = \frac{-3}{5}
$$

So, the slope of the line passing through these two points is $-\frac{3}{5}$.

Interpreting the Result

The negative value indicates that the line descends as it moves from left to right. The magnitude $\frac{3}{5}$ tells us that for every 5 units moved horizontally, the line drops by 3 units vertically.

This slope is rational, meaning it's a ratio of two integers, which makes it easy to interpret and graph.

Additional Insights and Related Calculations

1. Slope as a Rate of Change

The slope can be interpreted as a rate at which the y-value changes concerning x. In real-world contexts, this could represent velocity, growth rate, or other phenomena where change over distance or time is relevant.

2. Equation of the Line

Knowing the slope and a point, you can find the equation of the line in point-slope form:

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

Using point $(-3, 4)$:

$$
y - 4 = -\frac{3}{5}(x + 3)
$$

You can simplify or rearrange this into slope-intercept form:

$$
y = -\frac{3}{5}x - \frac{3}{5} \times 3 + 4 = -\frac{3}{5}x - \frac{9}{5} + 4
$$

Express 4 as $\frac{20}{5}$:

$$
y = -\frac{3}{5}x - \frac{9}{5} + \frac{20}{5} = -\frac{3}{5}x + \frac{11}{5}
$$

So, the equation of the line is:

$$
y = -\frac{3}{5}x + \frac{11}{5}
$$

Clarifying The Additional Expressions

The original prompt included a sequence that appears to be a mixture of fractions and numbers:

> 3/51-5/3. -1

While this may seem confusing, it could represent an attempt to write or analyze certain expressions involving fractions and constants.

Let's break down these parts:

- 3/51: Simplifies to $\frac{3}{51} = \frac{1}{17}$
- -5/3: Already in simplest form
- -1: A constant

If these are part of a larger expression, they might relate to slope calculations, equations, or other algebraic manipulations. Without additional context, it’s hard to interpret their specific purpose, but understanding how to manipulate such fractions and constants is essential in algebra.

Common Mistakes to Avoid

1. Swapping the points: The order of points affects the sign of the slope. Always double-check which point is numerator and denominator.
2. Forgetting to subtract correctly: Remember that subtracting a negative is addition.
3. Confusing the slope with other quantities: The slope is just a ratio of differences, not an absolute measure.
4. Ignoring vertical lines: When $x_1 = x_2$, the slope is undefined, and the line is vertical.

Applications of Slope in Real Life

- Physics: Calculating velocity as the rate of change of position.
- Economics: Analyzing trends in supply and demand curves.
- Engineering: Designing roads and ramps with specific inclines.
- Statistics: Understanding the relationship between variables through regression lines.

Summary of Key Takeaways

- The slope between the points $(-3, 4)$ and $(2, 1)$ is $-\frac{3}{5}$.
- The negative slope indicates a line that falls as it moves from left to right.
- The slope formula is straightforward: $m = \frac{y_2 - y_1}{x_2 - x_1}$.
- Converting the slope into a linear equation offers a complete description of the line.

Final Thoughts

Understanding how to find the slope of a line passing through any two points is a foundational skill that opens doors to more advanced topics like linear functions, equations, and graphing. It also provides a practical tool for analyzing real-world problems involving change and relationships. Remember to always double-check your calculations, interpret the sign of the slope correctly, and connect your mathematical results to real-world contexts for a deeper understanding.

Whether you’re solving a homework problem or designing a project, mastering the concept of slope ensures you have a solid grasp of the geometry underlying many aspects of everyday life and scientific inquiry.

What Is The Slope Of The Line Passing Through The Points 3 4 And 2 1 3 51 5 3 1

What Is The Slope Of The Line Passing Through The Points 3 4 And 2 1 3 51 5 3 1

Related Articles

- What Is The Width Feet Of Something That Has A Length Of 54 Feet And A Perimeter 172 Feet
- Bump-up Cds Allow Savers To Bump Up The Interest Rate Once To A Higher Market Rate. T/F?
- Plot A Point On The Coordinate Plane To Represent Each Of The Ratio Values In The Table.

Back to Home