Please I Will Give BrainlistWhat Is He Equation Of The Line Passing Through The Points (2/5,19/20)

Please I Will Give BrainlistWhat Is He Equation Of The Line Passing Through The Points (2/5,19/20)

Understanding the equation of a line passing through specific points is a fundamental concept in coordinate geometry. Whether you're a student preparing for exams, a teacher designing lesson plans, or someone interested in mathematical applications, grasping how to find the equation of a line through given points is essential. In this article, we will explore the detailed process of determining the equation of a line passing through the point (2/5, 19/20), including the necessary formulas, step-by-step calculations, and practical examples to solidify your understanding.

Introduction to the Equation of a Line

The equation of a line in a coordinate plane describes all the points that lie on that line. It provides a mathematical way to represent the line's position and slope. The most common forms of the line's equation include:

- Slope-Intercept Form: $y = mx + b$
- Point-Slope Form: $y - y_1 = m(x - x_1)$
- Standard Form: $Ax + By = C$

To find the equation of a line passing through two points, the most straightforward approach is usually the slope-intercept or point-slope form, depending on the information available.

Understanding the Given Points

The problem provides a point with fractional coordinates:

- Point P: (2/5, 19/20)

In decimal form, these are:

- $x = 0.4$
- $y = 0.95$

Knowing these coordinates, our goal is to find the equation of the line that passes through this point, but typically, to define a unique line, you need two points. Since only one point is provided, we need either:

- An additional point on the line, or
- The slope (m) of the line.

Assuming that in the original problem, the second point is given or can be inferred, or that the slope is provided, we can proceed accordingly.

In case the second point is not provided, but the problem implies finding the line passing through (2/5, 19/20) with a specified slope, or perhaps the line's equation is to be expressed in terms of the known point and a given slope.

Steps to Find the Equation of a Line Passing Through a Point

Let's consider the general scenario:

- You are given a point, say (x_1, y_1)
- You are given or can find the slope m

The goal is to derive the line's equation.

Step 1: Find the Slope (if not provided)

If two points are given, say (x_1, y_1) and (x_2, y_2), then:

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

Step 2: Use the Point-Slope Equation

Once the slope m is known, the equation of the line passing through (x_1, y_1) is:

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

Step 3: Convert to Slope-Intercept Form (Optional)

You can expand and rearrange to get:

$$
y = mx + (b)
$$

where $b = y_1 - m x_1$

Applying the Concept: Line Passing Through (2/5, 19/20)

Suppose the second point is given as (x_2, y_2). Let's illustrate the process assuming that the second point is (x_2, y_2) and that the slope m is known or can be calculated.

Case 1: Slope is Known

Suppose the slope m is known. For example, let's assume $m = \frac{3}{4}$.

Step 1: Write the point-slope form:

$$
y - \frac{19}{20} = \frac{3}{4} \left(x - \frac{2}{5} \right)
$$

Step 2: Simplify the right side:

$$
y - \frac{19}{20} = \frac{3}{4} x - \frac{3}{4} \times \frac{2}{5}
$$
$$
= \frac{3}{4} x - \frac{3 \times 2}{4 \times 5}
$$
$$
= \frac{3}{4} x - \frac{6}{20}
$$
$$
= \frac{3}{4} x - \frac{3}{10}
$$

Step 3: Express the full equation:

$$
y = \frac{3}{4} x - \frac{3}{10} + \frac{19}{20}
$$

Step 4: Combine constants:

Convert $\frac{19}{20}$ to tenths:

$$
\frac{19}{20} = \frac{19 \times 1}{20} = \frac{19}{20}
$$

Express both with denominator 20:

$$
-\frac{3}{10} = -\frac{6}{20}
$$

Sum:

$$
-\frac{6}{20} + \frac{19}{20} = \frac{13}{20}
$$

Final Equation:

$$
y = \frac{3}{4} x + \frac{13}{20}
$$

This is the line passing through the point (2/5, 19/20) with slope 3/4.

Case 2: Finding the Slope from Two Points

Suppose you are given two points:

- $P_1 = \left(\frac{2}{5}, \frac{19}{20} \right)$
- $P_2 = (x_2, y_2)$

The slope m is:

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

Once you compute m, you can follow the previous steps to find the line's equation.

Handling Fractions in Calculations

Dealing with fractional coordinates requires careful handling to avoid errors. Here are tips:

- Convert fractions to decimals for easier calculations, then convert back if necessary.
- Use common denominators to simplify addition or subtraction.
- Keep track of numerator and denominator separately to preserve exactness.

Special Cases and Additional Considerations

When the Second Point is Unknown

If only one point is given, and the slope is not specified, the line's equation cannot be uniquely determined. In such cases, the line can be expressed in terms of the slope:

$$
y - \frac{19}{20} = m \left(x - \frac{2}{5} \right)
$$

where m is a parameter, representing an infinite family of lines passing through the point.

Vertical and Horizontal Lines

- Vertical line: passes through (x_0, y) with an undefined slope. Equation: $x = x_0$.
- Horizontal line: passes through (x, y_0) with slope 0. Equation: $y = y_0$.

Practical Examples of Line Equations Through Fractional Points

Let's consider some real-world scenarios where such calculations are applicable.

Example 1: Engineering Design

Suppose an engineer needs to design a beam passing through two points with fractional coordinates, such as (2/5, 19/20) and another point. Calculating the line's equation helps determine the beam's path and placement.

Example 2: Computer Graphics

In digital image processing, lines are often defined through fractional pixel coordinates. Calculating the line's equation allows for precise rendering of lines, edges, or paths.

Further Tips for Calculating Equation of a Line through Fractions

- Always simplify fractions to their lowest terms.
- When performing calculations involving fractions, consider cross-multiplying to avoid decimal inaccuracies.
- Use algebraic software or calculators to handle complex fractional arithmetic efficiently.
- Remember to verify your final equation by substituting the known points to ensure correctness.

Summary and Conclusion

Finding the equation of a line passing through a specific point like (2/5, 19/20) involves understanding the basic formulas of coordinate geometry, especially the point-slope and slope-intercept forms. The key steps include:

1. Determining the slope \(m\) if two points are available.
2. Applying the point-slope formula with the known point.
3. Simplifying the resulting expression into the preferred form.

Handling fractional coordinates requires attention to detail but can be managed effectively through careful algebraic manipulation. Remember, the exact form of the line's equation depends on the additional information available, particularly the second point or the slope.

By mastering these techniques, you'll be well-equipped to analyze and derive line equations for a wide range of mathematical and real-world applications involving fractional data points.

Keywords for SEO Optimization:

- Equation of a line passing through a point
- Line through fractional coordinates
- Find line equation with fractions
- Slope-intercept form with fractional points
- Coordinate geometry fractional points
- How to calculate line equation from points

Frequently Asked Questions

How do I find the equation of a line passing through the

points (2/5, 19/20)?

To find the equation of a line through a single point, you need at least two points. If you have only one point, additional information like the slope is required. If you have the slope, you can use the point-slope form: $y - y_1 = m(x - x_1)$.

What additional information is needed to determine the equation of a line through (2/5, 19/20)?

You need the slope of the line or a second point that the line passes through to uniquely determine its equation.

How can I calculate the slope if given two points, for example, (x_1, y_1) and (x_2, y_2)?

The slope m is calculated as $(y_2 - y_1) / (x_2 - x_1)$. Plug in the coordinates of the two points to find the slope.

Can you give an example of finding the line equation passing through (2/5, 19/20) and another point?

Yes. Suppose the second point is (a, b). First, find the slope m = (b - 19/20) / (a - 2/5). Then, use the point-slope form: y - 19/20 = m(x - 2/5).

Is there a standard form to write the equation of a line after finding the slope and point?

Yes, after finding the slope m and using a point (x_1, y_1), the line's equation can be written in point-slope form: $y - y_1 = m(x - x_1)$, which can then be rearranged into slope-intercept or standard form.

Additional Resources

Please I Will Give BrainlistWhat Is He Equation Of The Line Passing Through The Points (2/5,19/20)

Understanding the equation of a line passing through two points is a fundamental concept in coordinate geometry, often encountered in various mathematical and real-world applications. Whether you're a student striving to grasp the basics or a professional looking to refresh your knowledge, this article provides a comprehensive, clear, and technically detailed explanation of how to find the equation of a line passing through the specific points (2/5, 19/20). We'll explore the underlying principles, step-by-step calculations, and practical implications to ensure you gain a solid grasp of this essential mathematical skill.

Introduction to the Equation of a Line in Coordinate Geometry

Before diving into the specifics of the points (2/5, 19/20), it's important to understand the general framework for the equation of a straight line in a Cartesian coordinate plane.

The Slope-Intercept Form

The most common form used to express the equation of a line is the slope-intercept form:

$$ y = mx + c $$

where:
- m is the slope of the line, indicating its steepness and direction.
- c is the y-intercept, the point where the line crosses the y-axis.

The Point-Slope Form

Another useful form, especially when passing through a known point, is:

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

where (x_1, y_1) is a point on the line, and m is the slope.

Finding the Equation from Two Points

Given two points, (x_1, y_1) and (x_2, y_2), the process involves:
1. Calculating the slope m.
2. Using one of the points and the slope in the point-slope form to derive the full equation.

Understanding the Given Points: (2/5, 19/20)

In our case, the points are given as fractional coordinates:

- $(x_1, y_1) = \left(\frac{2}{5}, \frac{19}{20} \right)$

However, the problem statement mentions "passing through the points" but only provides one point explicitly. Typically, a line passing through two points requires both points. Since only one is supplied, we can explore the scenario assuming the second point is either missing or needs to be identified, or that the question might be about finding the line passing through this point and another point.

Assumption for Clarity:
Let's assume the second point is given or known elsewhere. For demonstration, suppose the second point is $(x_2, y_2) = (a, b)$. If the second point isn't provided, the question might be incomplete, but generally, the process is the same once both points are known.

Alternatively, if the question is about the line passing through this point and the origin, or some other specific point, the method remains similar.
For the purposes of this article, we'll proceed with an example where the second point is $(1, 1)$, and demonstrate how to derive the line's equation passing through $(2/5, 19/20)$ and $(1, 1)$.

Calculating the Slope (m)

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

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

Given:

- $(x_1, y_1) = \left(\frac{2}{5}, \frac{19}{20} \right)$
- $(x_2, y_2) = (1, 1)$

Calculations:

$$m = \frac{1 - \frac{19}{20}}{1 - \frac{2}{5}}$$

Simplify numerator:

$$1 - \frac{19}{20} = \frac{20}{20} - \frac{19}{20} = \frac{1}{20}$$

Simplify denominator:

$$1 - \frac{2}{5} = \frac{5}{5} - \frac{2}{5} = \frac{3}{5}$$

Now, divide:

$$m = \frac{\frac{1}{20}}{\frac{3}{5}}$$

Dividing fractions:

$$m = \frac{1}{20} \times \frac{5}{3} = \frac{1 \times 5}{20 \times 3} = \frac{5}{60} = \frac{1}{12}$$

Result:
The slope of the line passing through the two points is $\boxed{\frac{1}{12}}$.

Deriving the Equation of the Line

With the slope $m = \frac{1}{12}$, the next step is to write the equation in point-slope form, choosing one of the points—here, the point $(2/5, 19/20)$:

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

Substitute the values:

$$ y - \frac{19}{20} = \frac{1}{12} \left(x - \frac{2}{5} \right) $$

To proceed, it's often convenient to clear fractions for easier interpretation:

Step 1: Express all terms with common denominators or eliminate fractions.

- Rewrite $x - \frac{2}{5}$:

Since $\frac{2}{5} = \frac{24}{60}$, and x can be written as $x = \frac{60x}{60}$, the difference:

$$ x - \frac{2}{5} = \frac{60x}{60} - \frac{24}{60} = \frac{60x - 24}{60} $$

Similarly, rewrite $y - \frac{19}{20}$:

$$ y - \frac{19}{20} = y - \frac{57}{60} $$

Step 2: Write the entire equation with common denominators:

$$ y - \frac{57}{60} = \frac{1}{12} \times \frac{60x - 24}{60} $$

Note that $\frac{1}{12} = \frac{5}{60}$.

Therefore:

$$ y - \frac{57}{60} = \frac{5}{60} \times \frac{60x - 24}{60} $$

Multiply numerator and denominator:

$$ y - \frac{57}{60} = \frac{5(60x - 24)}{60 \times 60} = \frac{5(60x - 24)}{3600} $$

Calculate numerator:

$$ 5 \times 60x = 300x $$
$$ 5 \times (-24) = -120 $$

Thus:

$$ y - \frac{57}{60} = \frac{300x - 120}{3600} $$

Simplify numerator and denominator:

$$ y - \frac{57}{60} = \frac{300x - 120}{3600} $$

Divide numerator and denominator by 60:

$$ y - \frac{57}{60} = \frac{5x - 2}{60} $$

Expressed more simply:

$$ y - \frac{57}{60} = \frac{5x - 2}{60} $$

Step 3: Express y explicitly:

$$ y = \frac{57}{60} + \frac{5x - 2}{60} $$

Combine over common denominator:

$$ y = \frac{57 + 5x - 2}{60} = \frac{5x + 55}{60} $$

Simplify numerator and denominator:

$$ y = \frac{5x + 55}{60} $$

Divide numerator and denominator by 5:

$$ y = \frac{x + 11}{12} $$

Final Equation of the Line

The simplified form of the line passing through the points $\left(\frac{2}{5}, \frac{19}{20} \right)$ and $(1, 1)$ is:

$$ y = \frac{x + 11}{12} $$

or equivalently,

$$ 12y = x + 11 $$

which is the standard form:

$$ x - 12y + 11 = 0 $$

Implications and Practical Uses

Understanding the equation of a line passing through two points isn't just an academic exercise; it has numerous practical applications:

- Engineering and Physics: Calculating trajectories, designing structures, or analyzing motion.
- Data Analysis: Fitting lines to data points in regression analysis.
- Navigation and Mapping: Determining straight-line paths between locations.
- Economics: Modeling relationships between variables.

Knowing how to derive these equations allows professionals and students to interpret data, make predictions

Please I Will Give Brainlistwhat Is He Equation Of The Line Passing Through The Points 2 5 19 20

Please I Will Give Brainlistwhat Is He Equation Of The Line Passing Through The Points 2 5 19 20

Related Articles

- Select The Correct Answer From Each Drop-down Menu. A Triangle ABC With Base AC Is Shown. A Line DE,
- Tang Company Accumulates The Following Data Concerning Raw Materials In Making Its Finished Product:
- Suppose We Use An Implementation Of Kruskal's Algorithm That Uses A Priority Queue (implemented As A

Back to Home