Plot The Points (-6, 8) And (0, 8) On Thecoordinate Plane Below.What Is The Distance Between These Twopoints?PLEASE

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Understanding how to plot points and calculate distances on the coordinate plane is a fundamental skill in geometry. Whether you're a student working on a math assignment or someone interested in spatial reasoning, knowing how to accurately plot points and determine the distance between them is essential. In this article, we'll focus on two specific points: (-6, 8) and (0, 8), and walk through the process of plotting these points and calculating the distance between them step by step.

Plotting the Points (-6, 8) and (0, 8) on the Coordinate Plane

Before calculating the distance, it's important to understand how to correctly plot points on the coordinate plane. The coordinate plane consists of two axes:

- **X-axis**: the horizontal line that runs from left to right.
- **Y-axis**: the vertical line that runs from bottom to top.

Each point on the plane is represented by an ordered pair (x, y), where:

- **x** indicates the position along the horizontal axis.

- y indicates the position along the vertical axis.

Steps to Plot the Points

1. Identify the coordinates for each point. For the first point, (-6, 8), the x-coordinate is -6, and the y-coordinate is 8. For the second point, (0, 8), the x-coordinate is 0, and the y-coordinate is 8.

2. Locate the x-coordinate on the X-axis. For (-6, 8), move 6 units to the left of the origin (0,0). For (0, 8), stay at the origin along the x-axis.

3. Locate the y-coordinate on the Y-axis. For both points, y is 8, so move 8 units upward from the x-coordinate position.

4. Plot the points by marking the positions where the x and y coordinates intersect. Label each point accordingly.

Visual Representation

While the visual is not provided here, imagine the coordinate plane:

- The point (-6, 8) is 6 units to the left of the origin and 8 units up.

- The point (0, 8) is directly above the origin at the same height, 8 units up, but directly on the y-axis.

By plotting these points, you'll notice that they both share the same y-coordinate, meaning they lie on

a horizontal line at y=8.

Calculating the Distance Between the Points

Once the points are plotted, determining the distance between them involves applying the distance formula derived from the Pythagorean theorem.

The Distance Formula

The distance d between two points (x_1, y_1) and (x_2, y_2) is given by:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

This formula calculates the straight-line distance between the two points on the plane.

Applying the Formula to Our Points

Given the points:

- $(x_1, y_1) = (-6, 8)$
- $(x_2, y_2) = (0, 8)$

Plugging into the formula:

$$d = \sqrt{(0 - (-6))^2 + (8 - 8)^2}$$

Simplify each component:

- Calculate $(x_2 - x_1) = 0 - (-6) = 6$

- Calculate $(y_2 - y_1) = 8 - 8 = 0$

So:

$$d = \sqrt{6^2 + 0^2}$$

$$d = \sqrt{36 + 0}$$

$$d = \sqrt{36}$$

$$d = 6$$

Therefore, the distance between the points (-6, 8) and (0, 8) is 6 units.

Understanding the Significance of the Results

The calculation confirms that these two points are horizontally aligned, sharing the same y-coordinate (8). The distance between them is simply the difference in their x-coordinates, which is 6 units.

Key Takeaways

- When two points share the same y-coordinate, the distance between them is the absolute difference of their x-coordinates.

- The distance formula is a versatile tool applicable to any two points on the coordinate plane, regardless of their relative positions.

- Plotting points accurately helps visualize their spatial relationship, making it easier to understand geometric concepts.

Additional Tips for Plotting and Distance Calculation

- Always double-check your coordinates before plotting to avoid errors.
- Use graph paper or digital graphing tools for precise plotting, especially for complex points.
- Remember that the distance formula is derived from the Pythagorean theorem, which is fundamental in geometry.
- Practice plotting various points and calculating distances to improve your spatial reasoning skills.

Conclusion

In summary, plotting points (-6, 8) and (0, 8) on the coordinate plane reveals that they are horizontally aligned, and the distance between them is 6 units. Using the distance formula provides an accurate measurement of the straight-line distance, which is a crucial skill in many areas of mathematics, including geometry, algebra, and coordinate geometry. Whether you're solving homework problems or exploring geometric concepts, understanding how to plot points and compute distances on the coordinate plane is an essential foundation for more advanced mathematical topics.

Frequently Asked Questions

How do you find the distance between the points (-6, 8) and (0, 8) on the coordinate plane?

Since both points have the same y-coordinate (8), the distance is the absolute difference of their x-coordinates: |0 - (-6)| = 6 units.

What is the formula to calculate the distance between two points on a coordinate plane?

The distance formula is $\sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$.

Using the distance formula, what is the distance between (-6, 8) and (0, 8)?

Plugging in the values: $\sqrt{[(0 - (-6))^2 + (8 - 8)^2]} = \sqrt{[6^2 + 0^2]} = \sqrt{36} = 6$ units.

Are the points (-6, 8) and (0, 8) horizontally aligned?

Yes, because they share the same y-coordinate (8), indicating a horizontal line segment between them.

What is the significance of the y-coordinates being the same for these points?

It means the points lie on the same horizontal line, making the distance simply the difference in their x-coordinates.

Can you describe the segment connecting (-6, 8) and (0, 8)?

Yes, it is a horizontal segment on the coordinate plane with a length of 6 units.

If you move from (-6, 8) to (0, 8), how many units do you travel?

You travel 6 units to the right along the horizontal line.

Additional Resources

Understanding the Distance Between Two Points on the Coordinate Plane

When exploring the coordinate plane, one of the fundamental concepts students and enthusiasts encounter is understanding how to find the distance between two points. This concept is essential because it lays the groundwork for more advanced topics like the Pythagorean theorem, geometry, trigonometry, and coordinate geometry. In this detailed review, we'll analyze the points (-6, 8) and (0, 8), determine the distance between them, and explore the mathematical principles behind this calculation.

Introduction to Coordinates and the Coordinate Plane

Before diving into the calculation, it's crucial to understand the basics of the coordinate plane:

- Coordinate System: A two-dimensional plane defined by an x-axis (horizontal) and a y-axis (vertical).
- Coordinates: Any point in this plane is identified by an ordered pair (x, y). For example, the point (-6, 8) has an x-coordinate of -6 and a y-coordinate of 8.
- Plotting Points: To locate a point, move horizontally along the x-axis, then vertically along the y-axis.

Understanding the coordinate system is fundamental because the distance between points is directly related to their positions on this plane.

Analyzing the Given Points: (-6, 8) and (0, 8)

Let's look closely at the two points:

- Point A: (-6, 8)
- Point B: (0, 8)

Visual Characteristics:

- Both points share the same y-coordinate (8). This indicates they are horizontally aligned.
- The x-coordinates differ: -6 and 0.

This observation simplifies the problem significantly because when two points share the same y-coordinate, their distance is simply the difference in their x-coordinates.

Understanding the Distance Formula

The general formula to find the distance d between any two points (x_1, y_1) and (x_2, y_2) in the coordinate plane is derived from the Pythagorean theorem:

$$
d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}
$$

This formula calculates the length of the hypotenuse of a right triangle formed by the horizontal and vertical differences between the points.

Why does this work?

- The differences in x and y form the legs of a right triangle.
- Applying the Pythagorean theorem yields the direct distance (hypotenuse) between the points.

Applying the Distance Formula to the Given Points

Let's assign:

- $(x_1, y_1) = (-6, 8)$
- $(x_2, y_2) = (0, 8)$

Plugging into the formula:

$$
d = \sqrt{(0 - (-6))^2 + (8 - 8)^2}
$$

Simplify step-by-step:

1. Calculate the difference in x-coordinates:

$$
0 - (-6) = 0 + 6 = 6
$$

2. Calculate the difference in y-coordinates:

$$
8 - 8 = 0
$$

3. Square both differences:

$$
6^2 = 36
$$

$$
0^2 = 0
$$

4. Sum the squares:

$$
36 + 0 = 36
$$

5. Take the square root:

$$
d = \sqrt{36} = 6
$$

Result:

The distance between the points (-6, 8) and (0, 8) is 6 units.

Interpretation and Significance of the Result

- The points lie on a horizontal line (since y-coordinates are the same), and the distance is simply the difference in x-values.
- The calculation confirms that the points are 6 units apart horizontally.
- This straightforward case exemplifies how coordinate geometry simplifies when points share the same coordinate in one dimension.

Additional Insights and Real-World Applications

Understanding the distance between points isn't just a theoretical exercise — it has practical applications:

- Navigation and GPS: Determining the straight-line distance between two locations.
- Design and Engineering: Calculating lengths of components or distances between features.
- Computer Graphics: Measuring distances between pixels or objects on a screen.
- Robotics: Planning movement paths in a coordinate space.

Let's explore some related concepts that deepen the understanding:

1. Horizontal, Vertical, and Diagonal Distances:

- When points share the same x-coordinate, the distance is vertical.
- When points share the same y-coordinate, the distance is horizontal.

- When neither coordinate matches, the distance is diagonal, calculated via the distance formula.

2. Special Cases:

- If points are on the same axis (e.g., y=8 for both), the distance is just the absolute difference in x-values.
- If points are vertically aligned (same x), the distance is the absolute difference in y-values.

Visual Representation of the Points

While the problem mentions a coordinate plane, visualizing these points enhances understanding:

- Plot point A: at (-6, 8). This is 6 units left of the y-axis, at a height of 8 units.
- Plot point B: at (0, 8). This is on the y-axis, at the same height as point A.

Connecting these points:

- The line segment between them is horizontal.
- The length of this segment is the difference in x-coordinates (6 units).

Visualizing this on a graph confirms that the points lie on a horizontal line, and the segment between them is a straight, horizontal line measuring 6 units.

Extending the Concept: Distance in Different Contexts

While this example involves points with the same y-coordinate, understanding the general distance formula allows for solving more complex problems:

- Different y-coordinates: When points are not aligned horizontally, the full formula is necessary.
- Three-dimensional space: Extending to 3D involves adding a z-coordinate and the corresponding difference.
- Manhattan Distance: In grid-based paths (like city blocks), the distance is the sum of the absolute differences in x and y, not the straight-line Euclidean distance.

Mathematical Challenges and Practice Problems

To master the concept, consider practicing with various coordinate pairs:

- Find the distance between (3, 4) and (7, 1).
- Calculate the distance between (-2, -3) and (4, 5).
- Determine the distance between (0, 0) and (-6, 8).

These exercises reinforce the application of the distance formula and improve spatial reasoning.

Conclusion: Importance of Accurate Calculation

Determining the distance between points on the coordinate plane is a fundamental skill with broad applications. In this particular case, the points (-6, 8) and (0, 8) are horizontally aligned, simplifying the calculation to a subtraction of x-coordinates, resulting in a distance of 6 units.

This example highlights:

- The significance of recognizing when points share the same coordinate.
- How the distance formula generalizes to all types of point pairs.
- The importance of visualization in understanding geometric relationships.

Mastering these concepts provides a strong foundation for further exploration in geometry, algebra, and real-world problem-solving involving spatial relationships.

Summary:

- The points (-6, 8) and (0, 8) lie on a horizontal line.
- The distance between them is calculated using the difference in x-coordinates since y-coordinates are identical.
- The computed distance is 6 units.
- Understanding the underlying principles enhances comprehension of coordinate geometry and its applications across various fields.

Final Note:

Always double-check coordinate calculations, especially when dealing with more complex points. Remember, the distance formula is a powerful tool that simplifies many geometric problems and helps visualize the relationships between points in space.

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