

Find The Distance Between (-4,-6) And (-1,-4).Give Your Answer Correct To 1 Decimal Place.

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Determining the distance between two points on a coordinate plane is a fundamental concept in geometry, often encountered in mathematics, physics, engineering, and various real-world applications. In this article, we will explore how to calculate the distance between the points (-4, -6) and (-1, -4), providing a step-by-step guide to arrive at the answer, accurate to one decimal place. Whether you're a student preparing for exams or someone interested in understanding the principles of coordinate geometry, this comprehensive guide will clarify the process.

Understanding the Distance Formula

The distance between two points in a plane can be found using the distance formula, which is derived from the Pythagorean theorem. This formula calculates the straight-line distance (also known as Euclidean distance) between two points with coordinates (x_1, y_1) and (x_2, y_2) .

The Distance Formula

The distance (d) between 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 essentially measures the hypotenuse of a right-angled triangle formed by the horizontal and vertical differences between the points.

Applying the Distance Formula to the Given Points

Let's apply this formula to our specific points: $(-4, -6)$ and $(-1, -4)$.

Step 1: Identify Coordinates

- First point: $(x_1, y_1) = (-4, -6)$
- Second point: $(x_2, y_2) = (-1, -4)$

Step 2: Calculate the Differences in Coordinates

- Horizontal difference: $(x_2 - x_1 = -1 - (-4) = -1 + 4 = 3)$

- Vertical difference: $y_2 - y_1 = -4 - (-6) = -4 + 6 = 2$

Step 3: Square the Differences

- $(x_2 - x_1)^2 = 3^2 = 9$

- $(y_2 - y_1)^2 = 2^2 = 4$

Step 4: Sum the Squares

- Sum: $9 + 4 = 13$

Step 5: Take the Square Root

- Distance: $d = \sqrt{13}$

Calculating the Final Distance

To find the numerical value of $\sqrt{13}$, use a calculator:

```
\[
\sqrt{13} \approx 3.605551275
\]
```

Rounding to one decimal place:

```
\[
d \approx 3.6
\]
```

Therefore, the distance between the points (-4, -6) and (-1, -4) is approximately 3.6 units.

Importance of Accurate Distance Calculation

Knowing how to accurately calculate the distance between points is vital in various fields. For instance:

- **Navigation and GPS:** Determining the shortest path between two locations.
- **Engineering:** Designing components that fit precisely in a given space.
- **Physics:** Calculating displacement in motion problems.
- **Computer Graphics:** Computing distances between objects for rendering and collision detection.

Understanding and applying the distance formula helps solve these practical problems efficiently and accurately.

Additional Tips for Calculating Distances

To master the concept of distance calculation, keep in mind the following tips:

1. Always Identify Coordinates Correctly

Ensure that you correctly interpret the points' x and y values before proceeding with calculations.

2. Pay Attention to Signs

The differences in coordinates can be negative or positive, but squaring them will eliminate the sign. Still, keep track to avoid errors.

3. Use a Calculator for Square Roots

For non-perfect squares, use a calculator to find the square root and ensure accuracy.

4. Round Appropriately

Round your answer to the desired decimal place—in this case, one decimal place.

Summary

Calculating the distance between two points in a coordinate plane is straightforward when you understand the distance formula. For the points $(-4, -6)$ and $(-1, -4)$, following the steps outlined above yields a distance of approximately 3.6 units, correct to one decimal place. This process not only reinforces fundamental geometric principles but also equips you with a useful skill applicable across various disciplines.

Conclusion

Accurately finding the distance between two points is an essential skill in mathematics and its applications. By understanding the distance formula and practicing its application with different points, you'll become more confident in solving similar problems. Remember to double-check your calculations and ensure correct rounding to achieve precise results. With these steps, you can confidently determine distances between any two points on the coordinate plane, making your mathematical toolkit more robust and versatile.

Frequently Asked Questions

How do I find the distance between the points (-4, -6) and (-1, -4)?

Use the distance formula: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. Plugging in the points: $\sqrt{((-1) - (-4))^2 + (-4 - (-6))^2} = \sqrt{(3)^2 + (2)^2} = \sqrt{9 + 4} = \sqrt{13} \approx 3.6$.

What is the distance between the points (-4, -6) and (-1, -4) rounded to 1 decimal place?

The distance is approximately 3.6 units.

Can you explain the steps to calculate the distance between these two points?

Yes. First, find the differences in x and y coordinates: $(-1 - (-4)) = 3$, and $(-4 - (-6)) = 2$. Then, square these differences: $3^2 = 9$, $2^2 = 4$. Sum them: $9 + 4 = 13$. Finally, take the square root: $\sqrt{13} \approx 3.6$.

Why do we use the distance formula for points in coordinate geometry?

The distance formula is derived from the Pythagorean theorem and allows us to find the straight-line distance between two points in a plane.

If I change the points to (-4, -6) and (2, 4), what would be the new distance?

Using the distance formula: $\sqrt{(2 - (-4))^2 + (4 - (-6))^2} = \sqrt{(6)^2 + (10)^2} = \sqrt{36 + 100} = \sqrt{136} \approx 11.7$ units.

Additional Resources

[Find The Distance Between \(-4, -6\) And \(-1, -4\): A Comprehensive Guide](#)

When it comes to understanding the fundamentals of coordinate geometry, one of the most essential concepts is calculating the distance between two points on the Cartesian plane. Specifically, determining the distance between points such as (-4, -6) and (-1, -4) provides a practical application of the distance formula, which is rooted in the Pythagorean theorem. This article offers an in-depth exploration of how to find this distance, complete with detailed steps, explanations, and considerations to ensure accuracy to one decimal place.

Understanding the Coordinates and the Distance Formula

Before diving into calculations, it's important to grasp the basics of the coordinate system and the mathematical tools used.

Coordinates of the Points

The two points in question are:

- Point A: (-4, -6)
- Point B: (-1, -4)

These are given in the form (x, y), representing their position along the horizontal (x) and vertical (y) axes.

What is the Distance Formula?

The distance (d) between any two points $((x_1, y_1))$ and $((x_2, y_2))$ in the plane is given by the formula:

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

This is derived from the Pythagorean theorem, which relates the lengths of the sides in a right-angled triangle.

Step-by-Step Calculation of the Distance

Let's walk through each step to compute the distance between the points (-4, -6) and (-1, -4).

Step 1: Identify the Coordinates

- $(x_1 = -4), (y_1 = -6)$
- $(x_2 = -1), (y_2 = -4)$

Step 2: Calculate the Differences in Coordinates

- Difference in x-coordinates: $\Delta x = x_2 - x_1 = -1 - (-4) = -1 + 4 = 3$
- Difference in y-coordinates: $\Delta y = y_2 - y_1 = -4 - (-6) = -4 + 6 = 2$

Step 3: Square the Differences

- $(\Delta x)^2 = 3^2 = 9$
- $(\Delta y)^2 = 2^2 = 4$

Step 4: Sum the Squares

- Sum: $9 + 4 = 13$

Step 5: Take the Square Root

- $d = \sqrt{13} \approx 3.605551275\dots$

Step 6: Round to One Decimal Place

- Rounded distance: 3.6

Therefore, the distance between the points (-4, -6) and (-1, -4) is approximately 3.6 units.

Additional Considerations and Features

Calculating distances between points on the coordinate plane is fundamental in various fields such as geometry, physics, computer graphics, and navigation. Here are some features, pros, and cons associated with this process.

Features of the Distance Calculation Method

- Universality: The formula applies to any two points in the 2D plane.
- Simplicity: Involves basic arithmetic operations—subtraction, squaring, addition, and square root.
- Accuracy: When calculated carefully, it yields precise measurements, especially when rounded appropriately.

Pros of Using the Distance Formula

- Mathematically rigorous: Based directly on the Pythagorean theorem.
- Versatile: Can be extended to three dimensions with an additional z-coordinate.
- Useful for applications: Navigation, mapping, computer graphics, and more.

Cons or Limitations

- Requires careful calculation: Mistakes in subtraction or squaring can lead to errors.
- Rounded approximation: Rounding to one decimal place may sometimes introduce slight inaccuracies, especially in sensitive calculations.
- Limited to Euclidean space: Not applicable in non-Euclidean geometries without adjustments.

Practical Applications of Distance Measurement

Understanding how to find the distance between two points is more than an academic exercise; it has real-world implications.

Navigation and GPS

- Calculating straight-line distances between locations.
- Planning shortest routes.

Computer Graphics and Gaming

- Determining object proximity.
- Collision detection.

Engineering and Physics

- Measuring displacements.
- Analyzing forces and trajectories.

Data Analysis and Clustering

- Computing Euclidean distances in multi-dimensional data for clustering algorithms.

Conclusion

In conclusion, finding the distance between two points such as $(-4, -6)$ and $(-1, -4)$ is a straightforward process rooted in the fundamental distance formula derived from the Pythagorean theorem. By carefully calculating the differences in coordinates, squaring, summing, and then taking the square root, we arrive at an accurate measure of approximately 3.6 units when rounded to one decimal place. Mastery of this technique is invaluable across various disciplines and real-world scenarios, providing a foundational skill in understanding spatial relationships on the Cartesian plane. Remember to double-check calculations and rounding to ensure precision, especially when applying these concepts to practical problems.

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