

## Worksheet Distance Formula Questions and Answers PDF

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### Part 1: Building a Foundation

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**What is the formula for calculating the distance between two points in a coordinate plane?**

*Hint: Think about the Pythagorean Theorem.*

- A)  $d = (x_2 - x_1) + (y_2 - y_1)$
- B)  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$  ✓
- C)  $d = (x_2 + x_1)^2 + (y_2 + y_1)^2$
- D)  $d = \sqrt{(x_2 + x_1)^2 + (y_2 + y_1)^2}$

The correct formula is derived from the Pythagorean Theorem, which is used to calculate the distance between two points.

**Which of the following statements are true about the Distance Formula?**

*Hint: Consider the properties and applications of the formula.*

- A) It is derived from the Pythagorean Theorem. ✓
- B) It can only be used in two-dimensional space.
- C) It calculates the distance between two points. ✓
- D) It requires the coordinates of the points. ✓

The Distance Formula is derived from the Pythagorean Theorem, calculates distance, and requires coordinates.

**Explain how the Distance Formula is related to the Pythagorean Theorem.**

*Hint: Think about how the formula is derived.*

**The Distance Formula is derived from the Pythagorean Theorem, which relates the lengths of the sides of a right triangle to the distance between two points.**

**List the steps involved in calculating the distance between two points using the Distance Formula.**

*Hint: Think about the order of operations.*

1. Step 1: Identify the coordinates of the two points.

Let the points be  $(x_1, y_1)$  and  $(x_2, y_2)$ .

2. Step 2: Calculate the differences in x and y coordinates.

Find  $(x_2 - x_1)$  and  $(y_2 - y_1)$ .

3. Step 3: Square the differences.

Calculate  $(x_2 - x_1)^2$  and  $(y_2 - y_1)^2$ .

4. Step 4: Sum the squared differences.

Add the results from Step 3.

5. Step 5: Take the square root of the sum.

Find the square root of the result from Step 4.

The steps include identifying the coordinates, calculating the differences, squaring the differences, summation, and taking the square root.

## Part 2: Understanding and Interpretation

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**In the coordinate plane, what do the variables  $x_1$ ,  $y_1$ ,  $x_2$ ,  $y_2$  represent in the Distance Formula?**

*Hint: Consider the meaning of coordinates.*

- A) The angles of a triangle
- B) The coordinates of two points ✓
- C) The midpoints of a line segment
- D) The slopes of a line

The variables represent the coordinates of two points in the coordinate plane.

**Why is it important to correctly identify the coordinates of points when using the Distance Formula?**

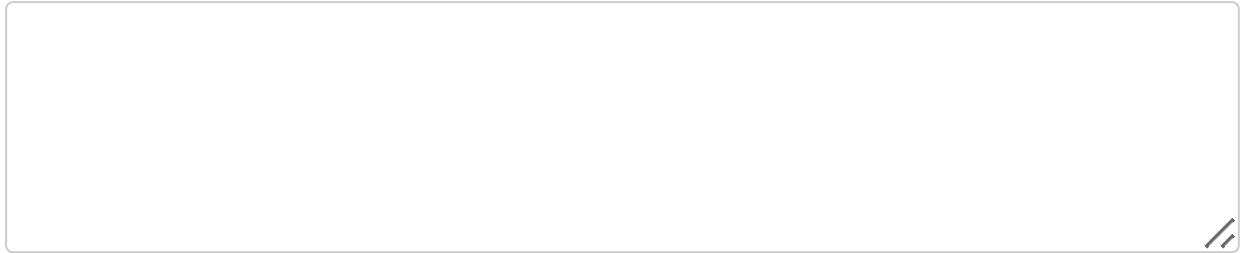
*Hint: Think about the consequences of incorrect coordinates.*

- A) To ensure accurate calculation of distance ✓
- B) To determine the direction of the line segment
- C) To avoid errors in squaring differences
- D) To find the midpoint of the segment

Correctly identifying coordinates ensures accurate distance calculations and avoids errors.

**Describe a real-world scenario where the Distance Formula might be used.**

*Hint: Think about situations involving distance measurement.*



The Distance Formula can be used in various real-world scenarios, such as navigation, architecture, and urban planning.

### Part 3: Application and Analysis

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If point A is at (3, 4) and point B is at (7, 1), what is the distance between these two points?

Hint: Use the Distance Formula to calculate.

- A) 5 ✓
- B) 6
- C) 7
- D) 8

The distance can be calculated using the Distance Formula, resulting in a specific numerical value.

Which of the following are correct steps to solve for the distance between points (2, 3) and (5, 7)?

Hint: Think about the order of operations in the Distance Formula.

- A) Calculate  $(5 - 2)^2$  ✓
- B) Calculate  $(7 - 3)^2$  ✓
- C) Add the results of the squared differences ✓
- D) Take the square root of the sum ✓

The correct steps involve calculating the differences, squaring them, summation, and taking the square root.

Given the points (1, 2) and (4, 6), calculate the distance between them and explain each step.

Hint: Use the Distance Formula and describe your process.

The distance can be calculated step-by-step using the Distance Formula, explaining each calculation.

**How does changing the coordinates of one point affect the distance calculated using the Distance Formula?**

*Hint: Consider the impact of coordinate changes.*

- A) It does not affect the distance.
- B) It only affects the distance if both points are changed.
- C) It can increase or decrease the distance. ✓
- D) It always increases the distance.

Changing the coordinates of one point can either increase or decrease the calculated distance.

**Discuss how the Distance Formula can be used to verify if three points form a right triangle.**

*Hint: Think about the properties of right triangles.*

The Distance Formula can be used to calculate the lengths of the sides of a triangle, and if the Pythagorean Theorem holds, the points form a right triangle.

## Part 4: Evaluation and Creation

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**Which of the following best evaluates the effectiveness of using the Distance Formula in a three-dimensional space?**

*Hint: Consider how the formula can be adapted.*

- A) It is not effective because it only works in two dimensions.
- B) It can be adapted by adding a z-coordinate component. ✓
- C) It is effective without any changes.
- D) It requires converting to polar coordinates.

The Distance Formula can be adapted for three-dimensional space by including a z-coordinate component.

**Create a scenario where calculating the distance between points is crucial. Which of the following elements would you include?**

*Hint: Think about practical applications of distance measurement.*

- A) A map with coordinates ✓
- B) A need to find the shortest path ✓
- C) Coordinates of various landmarks ✓
- D) A comparison of distances between multiple points ✓

A scenario could involve navigation, mapping, or logistics, including elements like coordinates and paths.

**Design a real-world problem that involves using the Distance Formula, and explain how you would solve it.**

*Hint: Think about practical applications of the formula.*

A real-world problem could involve navigation or logistics, and the solution would involve applying the Distance Formula step-by-step.