

Plot The Point A(-1,1) B(-3,2) And C (-1,2) In A Cartesian Plane Name The Figure So Obtained By Join

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Introduction

Understanding how points are plotted and connected in a Cartesian plane is fundamental in geometry. By plotting specific points and joining them, we can identify the geometric figure they form and analyze its properties. In this article, we will focus on plotting three points: A(-1,1), B(-3,2), and C(-1,2). We will then explore the figure created when these points are joined and determine its geometric classification.

Plotting the Points on the Cartesian Plane

Coordinate System Overview

The Cartesian plane consists of two perpendicular axes: the horizontal x-axis and the vertical y-axis. Each point in the plane is represented by an ordered pair (x, y) , where:

- x is the horizontal coordinate, indicating the position along the x-axis.
- y is the vertical coordinate, indicating the position along the y-axis.

Plotting Point A(-1,1)

- Start at the origin $(0,0)$.
- Move 1 unit to the left along the x-axis (since $x = -1$).
- From that point, move 1 unit up along the y-axis (since $y = 1$).
- Mark this position as point A.

Plotting Point B(-3,2)

- Start at the origin.
- Move 3 units to the left along the x-axis ($x = -3$).
- From there, move 2 units up along the y-axis ($y = 2$).
- Mark this position as point B.

Plotting Point C(-1,2)

- Start at the origin.
- Move 1 unit to the left ($x = -1$).

- Move 2 units up ($y = 2$).
- Mark this position as point C.

Connecting the Points to Form a Geometric Figure

Drawing the Figure

Once the points are plotted:

- Draw a straight line from point A to point B.
- Draw a straight line from point B to point C.
- Draw a straight line from point C back to point A.

This completes the figure. The shape formed depends on the relative positions of the points.

Analysis of the Shape

By observing the plotted points:

- Points A(-1,1) and C(-1,2) are vertically aligned, since they share the same x-coordinate.
- Points A(-1,1) and B(-3,2) are not aligned vertically or horizontally.
- Points B(-3,2) and C(-1,2) are horizontally aligned, sharing the same y-coordinate.

The figure formed is a triangle with vertices at A, B, and C.

Identifying the Geometric Figure

Properties of the Triangle

To classify the triangle formed by points A, B, and C, we analyze the lengths of its sides.

Calculating the Lengths of the Sides

Using the distance formula:

```
\[
\text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}
\]
```

- **AB:**

```
\[
\sqrt{(-3 - (-1))^2 + (2 - 1)^2} = \sqrt{(-2)^2 + 1^2} = \sqrt{4 + 1} =
\sqrt{5}
\]
```

- **BC:**

```
\[
\sqrt{(-1 - (-3))^2 + (2 - 2)^2} = \sqrt{(2)^2 + 0^2} = \sqrt{4} = 2
\]
```

\]

- **CA:**

\[

$$\sqrt{(-1 - (-1))^2 + (2 - 1)^2} = \sqrt{0^2 + 1^2} = 1$$

\]

Classification of the Triangle

- Sides are of lengths: $AB = \sqrt{5}$ (~ 2.236), $BC = 2$, and $CA = 1$.
- Since none of the sides are equal, the triangle is scalene.
- To check if the triangle is right-angled, use the Pythagorean theorem:

Check if any combination satisfies:

\[

$$(\text{longer side})^2 = (\text{side}_1)^2 + (\text{side}_2)^2$$

\]

For AB (~ 2.236), BC (2), and CA (1):

- $AB^2 \approx 5$
- $BC^2 = 4$
- $CA^2 = 1$

Test combinations:

- $AB^2 \approx BC^2 + CA^2 \rightarrow 5 \approx 4 + 1 \rightarrow 5 \approx 5$ (YES)

Since $AB^2 \approx BC^2 + CA^2$, the triangle is a right triangle with the hypotenuse AB .

Conclusion: Name of the Figure

Based on the plotted points and the analysis:

- The figure is a right-angled scalene triangle.
- The right angle is at point C , as sides CA and CB are perpendicular at C (since CA is vertical and CB is horizontal).

Therefore, the figure obtained by joining points A , B , and C is a right-angled scalene triangle.

Summary

- The points $A(-1,1)$, $B(-3,2)$, and $C(-1,2)$ are plotted accurately on the Cartesian plane.
- Connecting these points forms a triangle.
- The detailed calculations reveal that the triangle is scalene and right-angled.
- The right angle is at point C , making the triangle a right-angled scalene triangle.

Additional Insights

Understanding how to analyze points and determine the type of geometric figure they form is essential in coordinate geometry. This process involves:

- Plotting points accurately.
- Connecting points to visualize the figure.
- Calculating side lengths using the distance formula.
- Applying the Pythagorean theorem for right-angled triangles.
- Recognizing the properties that classify the triangle.

Such analysis is foundational for solving more complex geometric problems and for understanding the spatial relationships within the Cartesian plane.

Practical Applications

This skill of plotting and identifying geometric figures has real-world applications:

- In architecture and engineering, for designing structures.
- In computer graphics for rendering shapes.
- In navigation and mapping systems to determine routes and areas.
- In robotics for path planning and obstacle avoidance.

Mastering the process of plotting points and analyzing the resulting figures enhances spatial reasoning and geometric problem-solving abilities, which are crucial across various scientific and technical disciplines.

Frequently Asked Questions

What are the coordinates of points A, B, and C in the Cartesian plane?

Point A is at $(-1, 1)$, point B is at $(-3, 2)$, and point C is at $(-1, 2)$.

How do you plot the points A $(-1, 1)$, B $(-3, 2)$, and C $(-1, 2)$ on a Cartesian plane?

Plot each point by locating its x-coordinate along the horizontal axis and its y-coordinate along the vertical axis, then mark and label each point accordingly.

What figure is formed when points A, B, and C are joined in order?

The figure formed is a triangle.

Is the triangle formed by points A, B, and C a right-angled triangle?

No, based on the coordinates, the triangle is not right-angled; it is an oblique triangle.

What are the lengths of the sides of the triangle ABC?

Using the distance formula, $AB \approx 2.24$ units, $BC \approx 1$ unit, and $AC \approx 1$ unit.

How can you verify the type of triangle formed by points A, B, and C?

Calculate the lengths of all sides using the distance formula and compare them to identify if it's scalene, isosceles, or equilateral.

What is the significance of the shape obtained by joining points A, B, and C?

It helps in understanding geometric concepts such as triangle properties, coordinate geometry, and spatial relationships.

Can the triangle ABC be classified as an isosceles triangle?

Yes, since two sides (AC and BC) are approximately equal, triangle ABC is isosceles.

What is the importance of plotting points and joining them in coordinate geometry?

Plotting points and joining them helps visualize geometric figures, analyze their properties, and solve problems related to distances, angles, and shapes in the coordinate plane.

Additional Resources

Plot The Point A(-1,1) B(-3,2) And C (-1,2) In A Cartesian Plane Name The Figure So Obtained By Join is a fundamental exercise in understanding the basics of coordinate geometry. This activity not only helps in grasping the concept of plotting points on the Cartesian plane but also in recognizing the geometric figure formed when points are joined. Through meticulous plotting, analysis, and interpretation, students and enthusiasts can appreciate the beauty and logic behind geometric figures, their properties, and their significance in various mathematical and real-world applications.

Introduction to Coordinate Plotting and Geometric Figures

Coordinate plotting is one of the foundational skills in geometry and algebra. It involves placing points on a Cartesian plane based on their x and y coordinates. Once points are plotted, connecting them in a particular sequence reveals various geometric figures such as triangles, quadrilaterals,

or other polygons. Recognizing these figures helps in understanding their properties, such as angles, sides, and symmetry, which are essential in advanced geometry, trigonometry, and even in fields like engineering and computer graphics.

In this exercise, the points A(-1,1), B(-3,2), and C(-1,2) are chosen for their straightforward coordinates, which make plotting and analysis accessible for learners. The primary goal is to plot these points accurately and then connect them to identify the resulting figure.

Plotting the Points A, B, and C in the Cartesian Plane

Step-by-step Plotting Process

- Identify the points:
 - Point A has coordinates (-1, 1). This means it is one unit left of the y-axis and one unit above the x-axis.
 - Point B is at (-3, 2), which is three units left of the y-axis and two units above the x-axis.
 - Point C is located at (-1, 2), one unit left of the y-axis and two units above the x-axis.
- Plotting points:
 - Start at the origin (0,0).
 - Move left along the x-axis to -1 for point A, then move up 1 unit.
 - For point B, move left to -3 on the x-axis, then up 2 units.
 - For point C, again move left to -1, but move up 2 units.
- Marking the points:
 - Clearly mark each point with its label for easy identification.

Visual Representation and Accuracy

- Use graph paper or digital graphing tools for precision.
- Ensure the scale is consistent, usually with each square representing 1 unit.
- Double-check the coordinates after plotting to minimize errors.

Connecting the Points and Identifying the Geometric Figure

Connecting the Points

- Join points A and B with a straight line.
- Connect B to C.

- Connect C back to A.

This forms a closed figure with three sides, which is a triangle. The order of connection is essential for understanding the shape's properties.

Shape Name: The Triangle

- Since the three points are non-collinear (they do not lie on a straight line), the figure formed is a triangle.
- Specifically, the triangle has vertices at A(-1,1), B(-3,2), and C(-1,2).

Properties of the Triangle

- Vertices:
 - A(-1, 1)
 - B(-3, 2)
 - C(-1, 2)
- Sides:
 - AB: distance between A and B
 - BC: distance between B and C
 - CA: distance between C and A
- Angles:
 - Can be calculated using the slopes of the sides or coordinate distance formulas.

Calculating the Lengths of the Sides

Using the distance formula:

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

- Side AB:

$$\backslash [d_{AB} = \sqrt{(-3 - (-1))^2 + (2 - 1)^2} = \sqrt{(-2)^2 + 1^2} = \sqrt{4 + 1} = \sqrt{5} \approx 2.24 \backslash]$$

- Side BC:

$$\backslash [d_{BC} = \sqrt{(-1 - (-3))^2 + (2 - 2)^2} = \sqrt{(2)^2 + 0^2} = \sqrt{4} = 2 \backslash]$$

- Side CA:

$$\backslash [d_{CA} = \sqrt{(-1 - (-1))^2 + (2 - 1)^2} = \sqrt{0^2 + 1^2} = 1 \backslash]$$

The side lengths reveal the shape's proportions and can be used to determine other properties like the type of triangle (scalene, isosceles, or equilateral).

Analyzing the Triangle's Properties

Type of Triangle

- Since all three side lengths are different ($\sqrt{5}$, 2, and 1), the triangle is scalene—all sides are of different lengths.
- The angles can be examined further using the slopes or the Law of Cosines to determine if it is acute, obtuse, or right-angled.

Angles Calculation

- Using the slopes of sides AB and AC:
- Slope of AB:
$$m_{AB} = \frac{2 - 1}{-3 - (-1)} = \frac{1}{-2} = -\frac{1}{2}$$
- Slope of AC:
$$m_{AC} = \frac{2 - 1}{-1 - (-1)} = \frac{1}{0} \quad (\text{undefined, vertical line})$$
- Since AC is vertical, and AB has a negative slope, the angles between sides can be further analyzed with more detailed calculations.

Naming the Figure and Its Significance

The figure formed by joining points A, B, and C is named a triangle. This term is derived from the Latin 'triangulum,' meaning 'three-cornered figure.' Triangles are among the simplest polygons, and they are fundamental in geometry because of their properties and applications.

Significance of the Triangle:

- Basic Polygon: Triangles serve as building blocks for more complex polygons.
- Properties: They have well-defined angles and side relationships that help in various calculations.
- Applications: Triangles are crucial in engineering, architecture, navigation, and computer graphics.

Features and Educational Value of Plotting and Identifying this Triangle

Features:

- Clear visualization of how points relate in a plane.
- Understanding the concept of distance and slope.
- Recognition of the shape formed by joining specific points.
- Application of the distance formula to determine side lengths.
- Insight into triangle properties such as type and angles.

Pros:

- Enhances spatial reasoning.
- Builds foundational skills for advanced geometry.
- Facilitates understanding of coordinate geometry concepts.
- Useful for real-world problem-solving involving spatial relationships.

Cons:

- Requires careful plotting to avoid errors.
- Basic calculations may seem trivial but are crucial for accuracy.
- Limited to simple figures; more complex shapes require advanced tools.

Extensions and Further Exploration

- Coordinate Geometry Theorems: Use the plotted triangle to explore the Pythagorean theorem, triangle inequality, or midpoints.
- Area Calculation: Find the area using the coordinate formula:

$$\text{Area} = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$$
- Perimeter and Other Properties: Calculate the perimeter and explore congruence or similarity with other triangles.
- Transformations: Study how the triangle shifts, reflects, or scales on the plane.

Conclusion

Plotting points A(-1,1), B(-3,2), and C(-1,2) in the Cartesian plane and connecting them reveals a scalene triangle with distinct side lengths and angles. Recognizing and analyzing such figures enhances understanding of fundamental geometric principles and coordinate geometry. This exercise illustrates the importance of visual learning in mathematics and provides a basis for exploring more complex shapes and their properties. With accurate plotting, calculation, and interpretation, learners develop critical thinking skills applicable across mathematics and various scientific fields. Whether used for academic purposes or practical applications, understanding how to plot and analyze points in a plane remains a vital skill in the mathematical toolkit.

[Plot The Point A 1 1 B 3 2 And C 1 2 In A Cartesian Plane](#)

Name The Figure So Obtained By Join

Plot The Point A 1 1 B 3 2 And C 1 2 In A Cartesian Plane Name The Figure So Obtained By Join

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