Tutorial: Identifying a Parallelogram with Coordinates of Vertices Given

Slide 1:

In this tutorial, you are going to find the distances between pairs of vertices; this is the length of the given side. You are also going to find the slopes between vertices. You will then use the lengths and slopes to determine what type of quadrilateral the vertices make.

Slide 2:

Let's review quickly what makes a square, a rectangle, and a rhombus.

A square has consecutive sides that are perpendicular. It also has all four sides of equal length.

A rectangle also has consecutive sides that are perpendicular, but only each pair of opposite sides is congruent. They are not congruent to the other pair of sides.

A rhombus has all four sides congruent, but consecutive sides are not perpendicular.

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There are four steps we will go through to solve these problems.

Step one is to plot the points and draw the quadrilateral made.

Step two is to find the slope between each pair of vertices.

Step three is to find the distance, or the side length, between each pair of vertices.

And step four is to decide what type of quadrilateral we created.

Slide 4:

Let's do an example.
What type of quadrilateral is ABCD if the points are A one two, B five four, C six two, and D two zero?

The first step is to plot these points. Once the points are plotted, connect them to make a quadrilateral. If your graph is accurate, you may already have an idea of what this is.

The next step is to find the slope between each pair of vertices. The slope of AB equals 4 minus 2, divided by 5 minus 1. This equals one-half.

The slope of BC equals 2 minus 4, divided by 6 minus 5. This equals negative 2.

The slope of CD equals 0 minus 2, divided by 2 minus 6. This equals one-half.

The slope of AD equals 0 minus 2, divided by 2 minus 1. This equals negative 2.

Mark these slopes on your graph.

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Now find the distances between each pair of vertices. To do this, we will use each pair of vertices and the distance formula.

The distance AB equals the square root of 5 minus 1 quantity squared plus 4 minus 2 quantity squared. This equals 4 point 4 7.

The distance BC equals the square root of 6 minus 5 quantity squared plus 2 minus 4 quantity squared. This equals 2 point 2 4.

The distance CD equals the square root of 2 minus 6 quantity squared plus 0 minus 2 quantity squared. This equals 4 point 4 7.

The distance AD equals the square root of 2 minus 1 quantity squared plus 0 minus 2 quantity squared. This equals 2 point 2 4.

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The last step is to decide what type of quadrilateral we created.

This quadrilateral has consecutive sides that are perpendicular. We know this because the slopes are negative reciprocals.

It also has opposite sides that are congruent.

This is a rectangle.

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Now you try.
Answer the following problem. Click on solution to check your work.

What type of quadrilateral is WXYZ if the points are W(0, 2), X(3, 4), Y(1, 1) and Z(negative 2, negative 1).

Solution
Sides are all congruent with length 3.61, but sides are not perpendicular. Two sides have slope Three-halves and two sides have slope two-thirds.

A quadrilateral with four congruent sides, but not perpendicular is a **rhombus**.

Slide 8:

Remember the steps we used:
Step one: Plot the points and draw the quadrilateral made.
Step two: Find the slope between each pair of vertices.
Step three: Find the distance, or the side length, between each pair of vertices.
Step four: Decide what type of quadrilateral it is.