

Proving Quadrilaterals are Parallelograms

Quadrilateral ABCD has vertices A(2, 5), B(3, 2), C(-1, -1) and D(-2, 2)

1.) Determine whether this quadrilateral is a parallelogram.

a.) Plot points ABCD and create your quadrilateral.

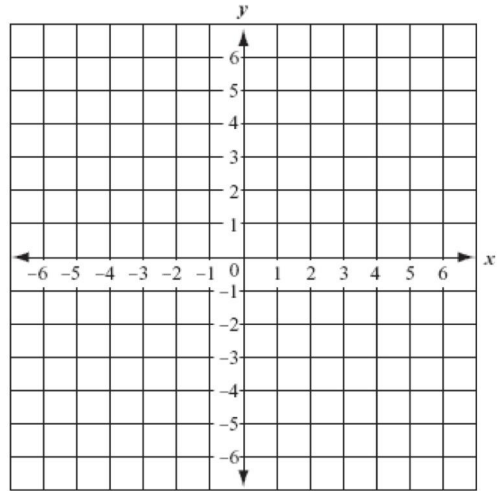
b.) Calculate slopes:

• $\overline{AB} =$ _____

• $\overline{BC} =$ _____

• $\overline{CD} =$ _____

• $\overline{DA} =$ _____



c.) Determine which sides are parallel and explain why.

d.) Conclusion:

Parallelogram PQRS has vertices P(-3, -1), Q(6, 2), R(5, 5) and S(-4, 2).

2.) Determine whether the parallelogram is a rectangle.

a.) Plot points PQRS and create your parallelogram.

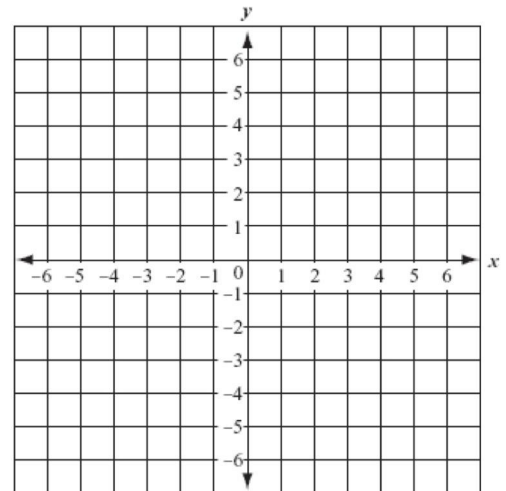
b.) Calculate slopes:

• $\overline{PQ} =$ _____

• $\overline{QR} =$ _____

• $\overline{RS} =$ _____

• $\overline{SP} =$ _____



c.) Determine which sides are perpendicular and explain why.

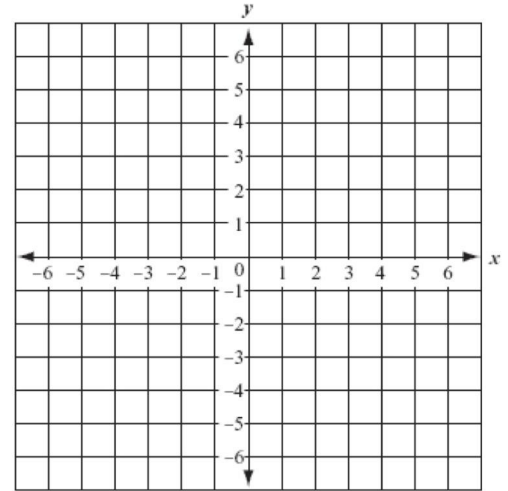
d.) Conclusion:

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Parallelogram A(1, 2), B(2, -1), C(5, 0), D(4, 3)

3.) Determine whether the parallelogram is a rhombus or a square.

a.) Plot points PQRS and create your parallelogram.



b.) Calculate slopes:

• $\overline{AB} =$ _____

• $\overline{BC} =$ _____

• $\overline{CD} =$ _____

• $\overline{AD} =$ _____

c.) Calculate the distances: (show work)

• $\overline{AB} =$ _____

• $\overline{BC} =$ _____

• $\overline{CD} =$ _____

• $\overline{AD} =$ _____

Distance Formula: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

d.) Determine which sides are perpendicular and explain why.

e.) Determine if the sides are congruent and explain why.

f.) Conclusion:

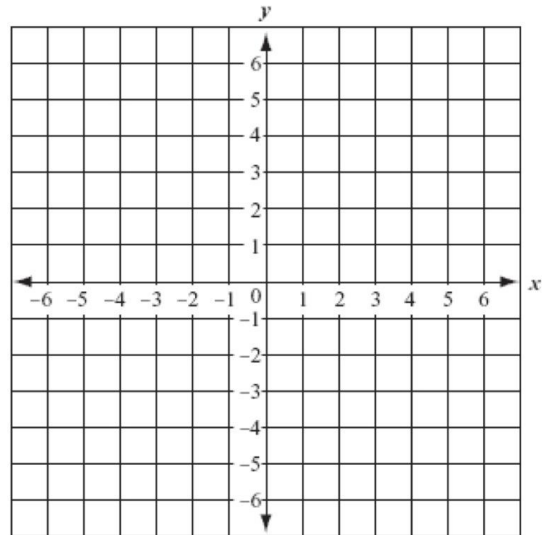
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Homework Assignment

In each of the following problems, use the method we outlined in class to prove that the quadrilateral is a parallelogram.

1. Quadrilateral ABCD has vertices A(3, 1), B(-1, -1), C(-6, 2) and D(-2, 4). Prove using coordinate geometry that ABCD is a parallelogram.

Step 1: Plot the quadrilateral on the axes shown below.



Step 2: Calculate the slopes of each line segment.

AB

BC

CD

DA

Step 3: Determine which sides are parallel and **state why**.

Step 4: Write a conclusion.