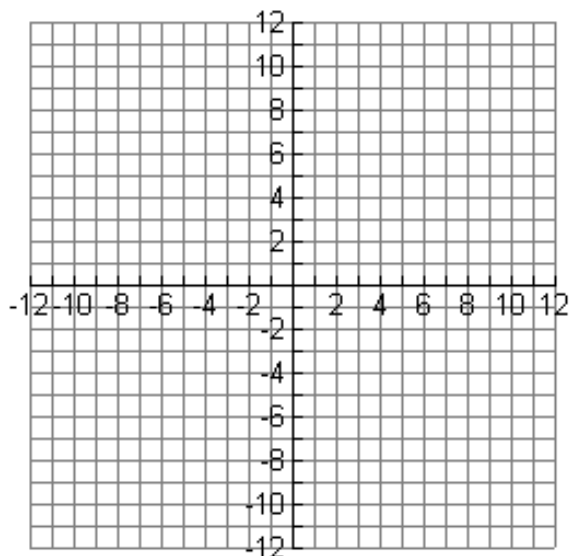


Quadrilaterals and Coordinate Geometry (pp. 1 of 6)

Part A

Draw figure ABCD using the following ordered pairs: A(0, 0), B(3, 4), C(-1, 7), and D(-4, 3). Complete the table below.



Length of the four sides: AB = CD = BC = DA =	Slope of the four sides: Slope of AB = Slope of CD = Slope of BC = Slope of DA =
Length of the diagonals: AC ≈ BD ≈	Slope of the diagonals: Slope of AC = Slope of BD =
Angle measures at each vertex: $m\angle DAB =$ $m\angle BCD =$ $m\angle ABC =$ $m\angle CDA =$	Point of intersection of the diagonals (Point E)
Length of the diagonal segments: AE ≈ BE ≈ EC ≈ ED ≈	Angle measures of angles formed by diagonals: $m\angle AEB =$ $m\angle CED =$ $m\angle BEC =$ $m\angle DEA =$

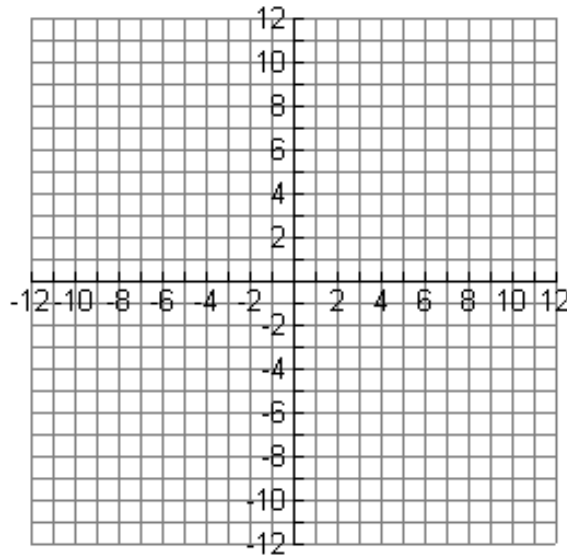
How do you know that figure ABCD is a square?

Quadrilaterals and Coordinate Geometry (pp. 2 of 6)

Squares

- Write some conjectures you have about properties of squares and how the data you collected supports those conjectures.

- Create a square on the coordinate grid below that satisfies the following two conditions:
 - The origin is not a vertex.
 - No side is parallel to a coordinate axis.

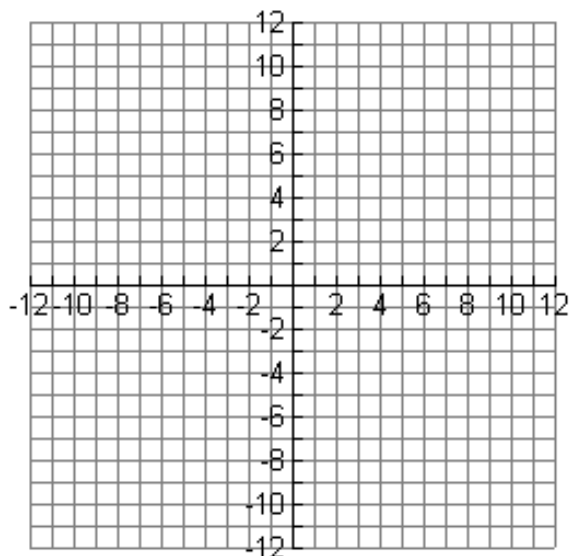


- How do you know that this figure is a square?

Quadrilaterals and Coordinate Geometry (pp. 3 of 6)

Part B

Draw figure ABCD using the following ordered pairs: A(0, 0), B(6, 8), C(2, 11), and D(-4, 3). Complete the table below.



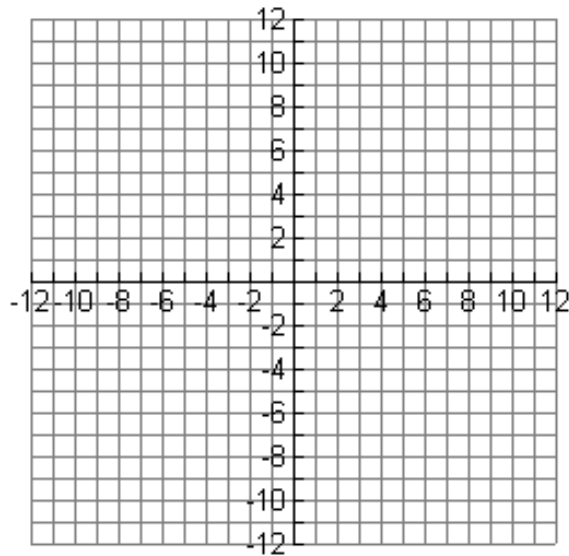
Length of the four sides: AB = CD = BC = DA =	Slope of the four sides: Slope of AB = Slope of CD = Slope of BC = Slope of DA =
Length of the diagonals: AC ≈ BD ≈	Slope of the diagonals: Slope of AC = Slope of BD =
Angle measures at each vertex: $m\angle DAB =$ $m\angle BCD =$ $m\angle ABC =$ $m\angle CDA =$	Point of intersection of the diagonals (Point E)
Length of the diagonal segments: AE ≈ BE ≈ EC ≈ ED ≈	Angle measures of angles formed by diagonals: $m\angle AEB \approx$ $m\angle CED \approx$ $m\angle BEC \approx$ $m\angle DEA \approx$

How do you know that figure ABCD is a rectangle and not a square?

Quadrilaterals and Coordinate Geometry (pp. 4 of 6)

Rectangles

4. Write some conjectures you have about properties of rectangles and how the data you collected supports those conjectures.
5. Create a rectangle on the coordinate grid below that satisfies the following three conditions:
- c. The origin is not a vertex.
 - d. No side is parallel to a coordinate axis.
 - e. The figure is not a square.

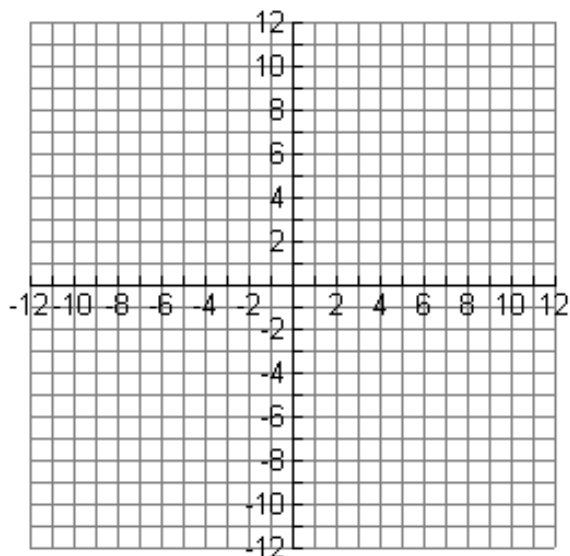


6. How do you know that this figure is a rectangle?

Quadrilaterals and Coordinate Geometry (pp. 5 of 6)

Part C

Draw figure ABCD using the following ordered pairs: A(0, 0), B(5, 5), C(6, 12), and D(1, 7). Complete the table below.



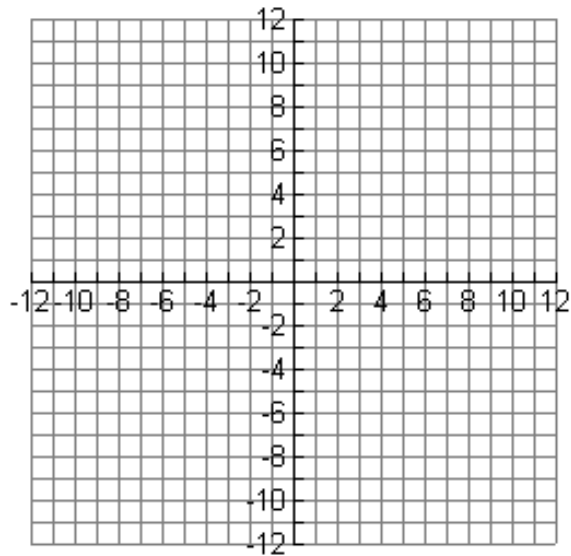
Length of the four sides: AB \approx CD \approx BC \approx DA \approx	Slope of the four sides: Slope of AB = Slope of CD = Slope of BC = Slope of DA =
Length of the diagonals: AC \approx BD \approx	Slope of the diagonals: Slope of AC = Slope of BD =
Angle measures at each vertex $m\angle DAB \approx$ $m\angle BCD \approx$ $m\angle ABC \approx$ $m\angle CDA \approx$	Point of intersection of the diagonals (Point E)
Length of the diagonal segments: AE \approx BE \approx EC \approx ED \approx	Angle measures of angles formed by diagonals: $m\angle AEB =$ $m\angle CED =$ $m\angle BEC =$ $m\angle DEA =$

How do you know that figure ABCD is a rhombus and not a square?

Quadrilaterals and Coordinate Geometry (pp. 6 of 6)

Rhombi

7. Write some conjectures you have about properties of rhombi and how the data you collected supports those conjectures.
8. Create a rhombus on the coordinate grid below that satisfies the following three conditions:
- The origin is not a vertex.
 - No side is parallel to a coordinate axis.
 - The figure is not a square.

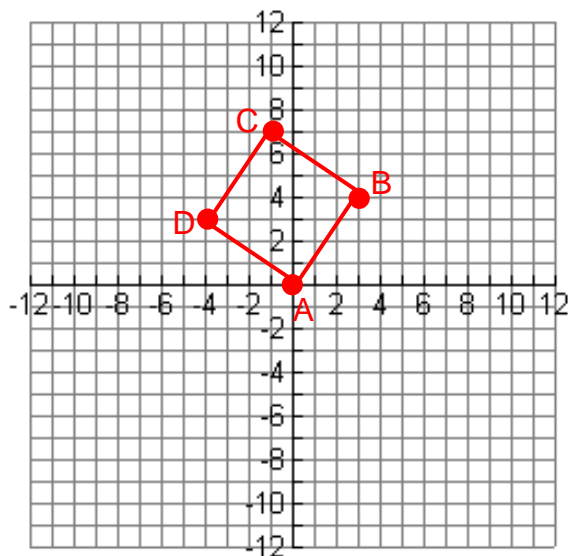


9. How do you know that this figure is a rhombus?

Quadrilaterals and Coordinate Geometry (pp. 1 of 6) **KEY**

Part A

Draw figure ABCD using the following ordered pairs: A(0, 0), B(3, 4), C(-1, 7), and D(-4, 3). Complete the table below.



Length of the four sides: $AB = 5$ $CD = 5$ $BC = 5$ $DA = 5$	Slope of the four sides: Slope of $AB = 4/3$ Slope of $CD = 4/3$ Slope of $BC = -3/4$ Slope of $DA = -3/4$
Length of the diagonals: $AC \approx 7.07 (5\sqrt{2})$ $BD \approx 7.07 (5\sqrt{2})$	Slope of the diagonals: Slope of $AC = -7/1$ Slope of $BD = 1/7$
Angle measures at each vertex: $m\angle DAB = 90^\circ$ $m\angle BCD = 90^\circ$ $m\angle ABC = 90^\circ$ $m\angle CDA = 90^\circ$	Point of intersection of the diagonals (Point E) $(-0.5, 3.5)$
Length of the diagonal segments: $AE \approx 3.54 (2.5\sqrt{2})$ $BE \approx 3.54 (2.5\sqrt{2})$ $EC \approx 3.54 (2.5\sqrt{2})$ $ED \approx 3.54 (2.5\sqrt{2})$	Angle measures of angles formed by diagonals: $m\angle AEB = 90^\circ$ $m\angle CED = 90^\circ$ $m\angle BEC = 90^\circ$ $m\angle DEA = 90^\circ$

How do you know that figure ABCD is a square?

It has 4 right angles and 4 congruent sides.

Quadrilaterals and Coordinate Geometry (pp. 2 of 6) **KEY**

Squares

1. Write some conjectures you have about properties of squares and how the data you collected supports those conjectures.

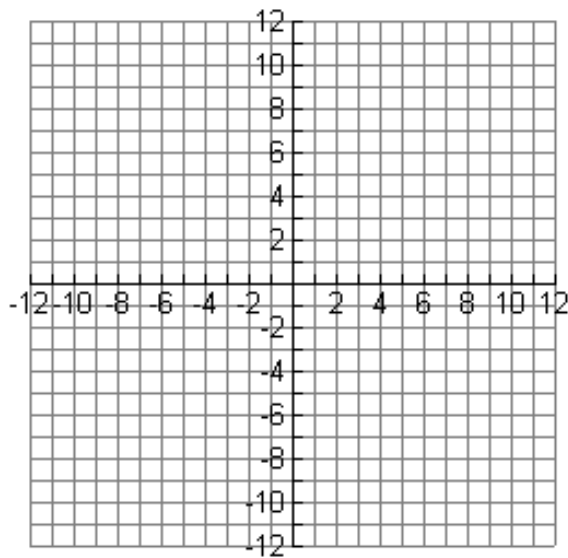
Opposite reciprocal slopes of sides verify right angles of the square.

Opposite reciprocal slopes of diagonals verify that the diagonals are perpendicular.

Length of diagonal segments are half the length of the diagonals, therefore, the diagonals bisect each other.

2. Create a square on the coordinate grid below that satisfies the following two conditions:
 - a. The origin is not a vertex.
 - b. No side is parallel to a coordinate axis.

See student samples.

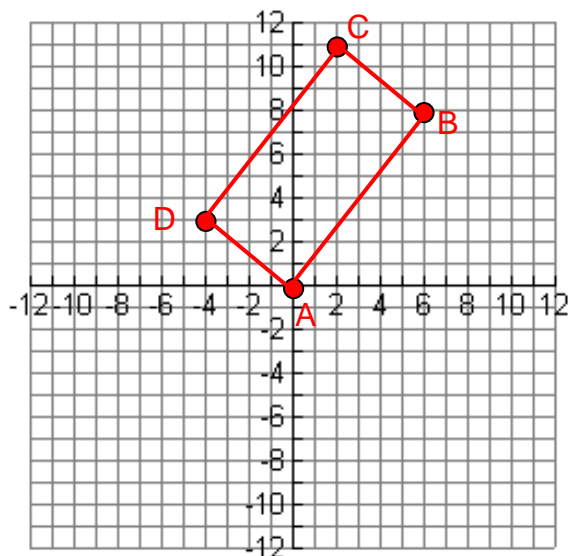


3. How do you know that this figure is a square?
It has 4 right angles and 4 congruent sides.

Quadrilaterals and Coordinate Geometry (pp. 3 of 6) **KEY**

Part B

Draw figure ABCD using the following ordered pairs: A(0, 0), B(6, 8), C(2, 11), and D(-4, 3). Complete the table below.



Length of the four sides: $AB = 10$ $CD = 10$ $BC = 5$ $DA = 5$	Slope of the four sides: Slope of $AB = 4/3$ Slope of $CD = 4/3$ Slope of $BC = -3/4$ Slope of $DA = -3/4$
Length of the diagonals: $AC \approx 11.18 (5\sqrt{5})$ $BD \approx 11.18 (5\sqrt{5})$	Slope of the diagonals: Slope of $AC = 11/2$ Slope of $BD = 5/10$
Angle measures at each vertex: $m\angle DAB = 90^\circ$ $m\angle BCD = 90^\circ$ $m\angle ABC = 90^\circ$ $m\angle CDA = 90^\circ$	Point of intersection of the diagonals (Point E) $(1, 5.5)$
Length of the diagonal segments: $AE \approx 5.59 (2.5\sqrt{5})$ $BE \approx 5.59 (2.5\sqrt{5})$ $EC \approx 5.59 (2.5\sqrt{5})$ $ED \approx 5.59 (2.5\sqrt{5})$	Angle measures of angles formed by diagonals: (approx.) $m\angle AEB \approx 127^\circ$ $m\angle CED \approx 127^\circ$ $m\angle BEC \approx 53^\circ$ $m\angle DEA \approx 53^\circ$

How do you know that figure ABCD is a rectangle and not a square?

It has 4 right angles but does not have 4 congruent sides.

Quadrilaterals and Coordinate Geometry (pp. 4 of 6) **KEY**

Rectangles

4. Write some conjectures you have about properties of rectangles and how the data you collected supports those conjectures.

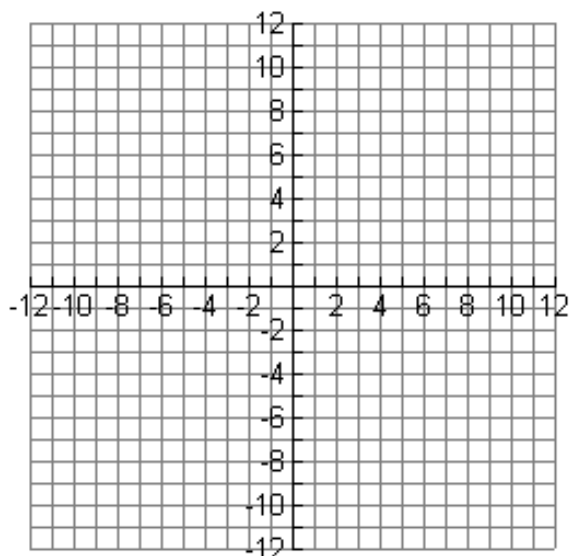
Opposite reciprocal slopes of sides verify right angles of the rectangle.

The data shows that the lengths of the diagonals of a rectangle are equal.

Length of diagonal segments are half the length of the diagonals, therefore the diagonals bisect each other.

5. Create a rectangle on the coordinate grid below that satisfies the following three conditions:
- The origin is not a vertex.
 - No side is parallel to a coordinate axis.
 - The figure is not a square.

See student samples.



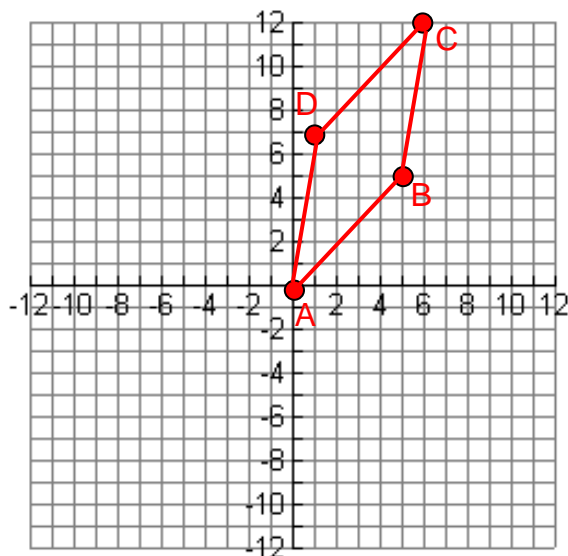
6. How do you know that this figure is a rectangle?

The figure has 4 right angles.

Quadrilaterals and Coordinate Geometry (pp. 5 of 6) **KEY**

Part C

Draw figure ABCD using the following ordered pairs: A(0, 0), B(5, 5), C(6, 12), and D(1, 7). Complete the table below.



Length of the four sides: $AB \approx 7.07 (5\sqrt{2})$ $CD \approx 7.07 (5\sqrt{2})$ $BC \approx 7.07 (5\sqrt{2})$ $DA \approx 7.07 (5\sqrt{2})$	Slope of the four sides: Slope of AB = $1/1$ Slope of CD = $1/1$ Slope of BC = $7/1$ Slope of DA = $7/1$
Length of the diagonals: $AC \approx 13.42 (6\sqrt{5})$ $BD \approx 4.47 (2\sqrt{5})$	Slope of the diagonals: Slope of AC = 2 Slope of BD = $-1/2$
Angle measures at each vertex approx. $m\angle DAB \approx 36.9^\circ$ $m\angle BCD \approx 36.9^\circ$ $m\angle ABC \approx 143.1^\circ$ $m\angle CDA \approx 143.1^\circ$	Point of intersection of the diagonals (Point E) $(3, 6)$
Length of the diagonal segments: $AE \approx 6.71 (3\sqrt{5})$ $BE \approx 2.24 (\sqrt{5})$ $EC \approx 6.71 (3\sqrt{5})$ $ED \approx 2.24 (\sqrt{5})$	Angle measures of angles formed by diagonals: $m\angle AEB = 90^\circ$ $m\angle CED = 90^\circ$ $m\angle BEC = 90^\circ$ $m\angle DEA = 90^\circ$

How do you know that figure ABCD is a rhombus and not a square?
It has 4 congruent sides but does not have four right angles.

Quadrilaterals and Coordinate Geometry (pp. 6 of 6) **KEY**

Rhombi

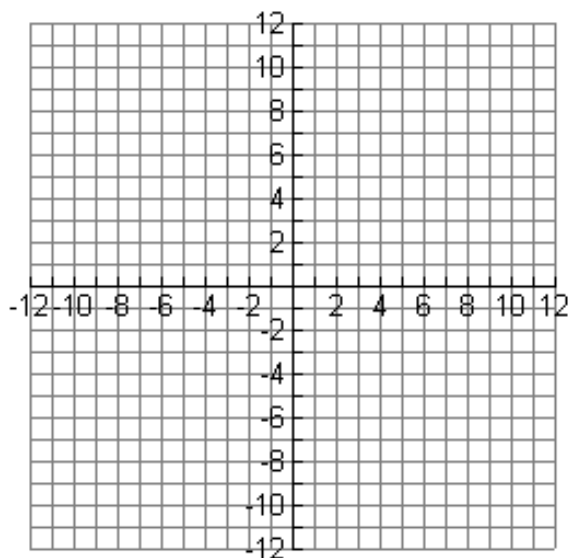
7. Write some conjectures you have about properties of rhombi and how the data you collected supports those conjectures.

The slopes of the diagonals are opposite reciprocals verifies that the diagonals are perpendicular.

The lengths of the diagonal segments are half the length of the diagonals verifies that the diagonals bisect each other.

8. Create a rhombus on the coordinate grid below that satisfies the following three conditions:
- The origin is not a vertex.
 - No side is parallel to a coordinate axis.
 - The figure is not a square.

See student samples.



9. How do you know that this figure is a rhombus?

The figure has four congruent sides.