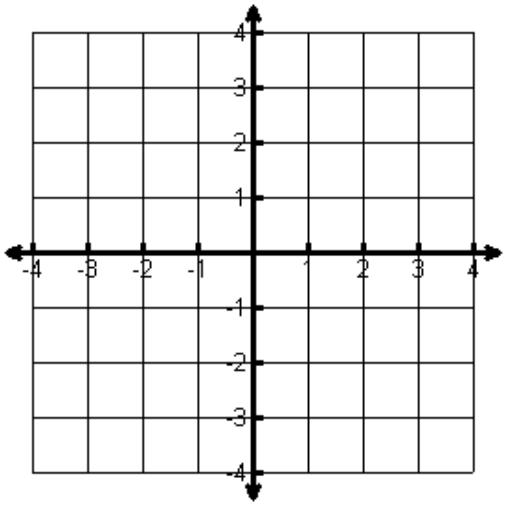
Connecting Algebra & Geometry Through Coordinates WS 2

Name: _____ Date: _____

The goal of this assignment is to use the distance and slope formulas to prove statements about geometric figures on the coordinate plane. Since the purpose is to prove a statement, you **must show work.**

1. **Quadrilateral 1:** Plot and label each point. **A(-1, 3), B(3, 1), C(1, -2),** and **D(-3, 0).**
2. *Definition*: *A parallelogram is a quadrilateral with two pair of opposite sides that are parallel*. Using the definition of a parallelogram, prove that Quadrilateral 1 is a parallelogram. **(Hint: Find the slopes of all the sides)**



AB:_____

BC:_____

CD:_____

AD:_____

3. *Definition*: *A rectangle is a parallelogram with four right angles*. Using the definition of a rectangle, prove that Quadrilateral 1 is **NOT** a rectangle. **(Hint: What do you notice about the slopes of adjacent sides)**

4. *Definition*: *A rectangle is a parallelogram with congruent diagonals*. Using the definition of a rectangle, prove that Quadrilateral 1 is **NOT** a rectangle. **(Hint : Find the lengths of the diagonals, what do you notice?)**

AC:_____

BD: _____

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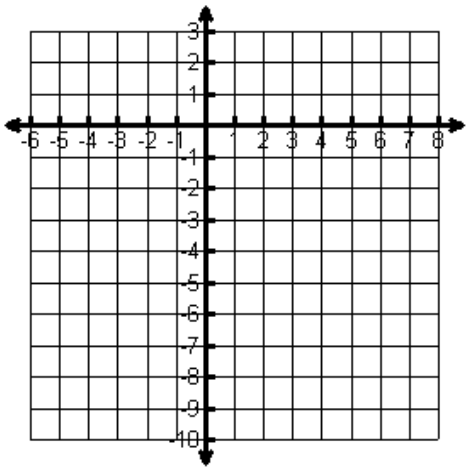
5. **Quadrilateral 2:** Plot and label each point. **A(-3, -3), B(1, 1), C(5, -3),** and **D(1, -7).**
6. *Definition*: *A parallelogram is a quadrilateral with two pairs of opposite sides that are parallel*. Using the definition of a parallelogram, prove that Quadrilateral 2 is a parallelogram. **(Hint: Find the slopes of all the sides)**

AB:_____
BC:_____
CD:_____
AD:_____



7. *Definition*: *A rectangle is a parallelogram with 4 right angles*. Using the definition, prove that Quadrilateral 2 is a rectangle. **(Hint: What do you notice about the slopes of adjacent sides?)**

8. *Definition*: *A rhombus is a parallelogram with all sides congruent*. Using the definition, prove that Quadrilateral 2 is a rhombus. **(Hint: Find the length or distance of each side.)**

AB:_____
BC:_____
CD:_____
AD:_____

9. *Definition*: *A square is a rectangle and rhombus*. Using the definition, is Quadrilateral 2 a square? Why?

10. *Theorem*: *The diagonals in a rhombus are perpendicular.* Using the theorem, is this true for Quadrilateral 2? **(Hint: Find the slopes of the diagonals.)**

AC:_____

BD:_____

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11. **Quadrilateral 3:** Plot and label each point. **A(-3, 0), B(-2, 3), C(4, 1),** and **D(3, -2).**

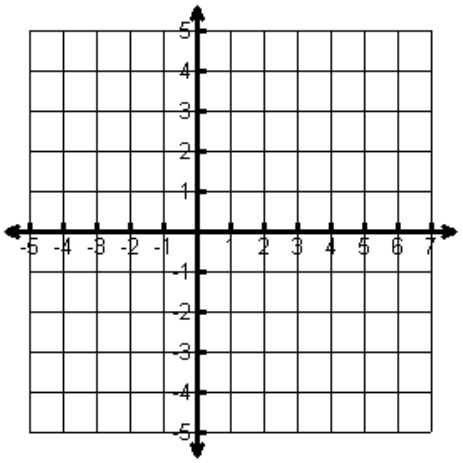
12. *Definition*: *A parallelogram is a quadrilateral with two pairs of opposite sides that are parallel*. Using the definition of a parallelogram, prove that Quadrilateral 3 is a parallelogram. **(Hint: Find the slopes of all the sides)**

AB:_____

BC:_____

CD:_____

AD:_____



13. *Definition*: *A parallelogram with 4 right angles is a rectangle*. Using the definition, prove that Quadrilateral 3 is a rectangle. **(Hint: What do you notice about the slopes of adjacent sides?)**

14. *Definition*: *The diagonals in a rectangle are congruent*. Prove that this is true for Quadrilateral 3. **(Hint: Find the length or distance of each side)**

AC:_____

BD:_____

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15. **Quadrilateral 3:** Plot and label each point. **A(-6, -13), B(-3, 3), C(4, 5**), and **D(6, -2).**

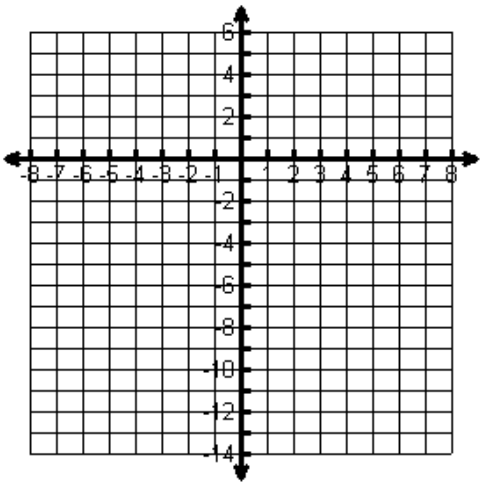
16. *Definition*: *A kite is a quadrilateral with two pair of consecutive sides that are congruent*. Using the definition of a kite, prove that Quadrilateral 3 is a kite. **(Hint: Find the length or distance of each side)**

AB:_____

BC:_____

CD:_____

AD:_____



17. *Theorem*: *The diagonals of a kite are perpendicular.* Prove that the theorem is true for Quadrilateral 3. **(Hint: Find the slopes of the diagonals, what do you notice?)**

AC:_____

BD:_____