Geometry CC – Mr. Valentino Name: _____

Unit 10 Lesson 5: Proving Rectangles on the Coordinate Place Date: _____ Per: _____

It's time for...RECTANGLES on the Coordinate Plane

Do Now: Kindly list the 2 properties that prove a parallelogram is a rectangle:

1. 4 right ∠'s
2. Diagonals are ≅

And now...let's discuss how we can show the following on the **coordinate plane**:

How can we show two sides form a right angle?

Adjacent sides are ⊥ and they have negative reciprocal slopes

OR

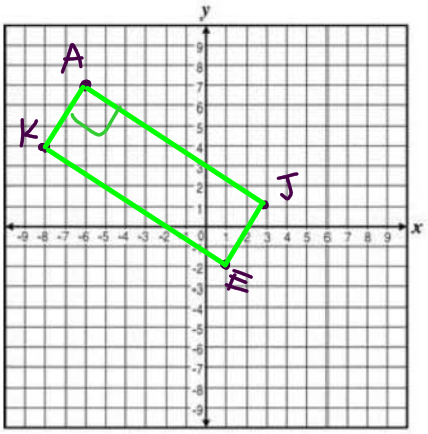
How can we show diagonals are congruent?

Show the distance is the same between points (using the distance formula)

Time to put this into practice!

1. Quadrilateral JAKE has vertices J(3,1), A(-6,7), K(-8,4), and E(1,-2).

Prove that JAKE is a rectangle.



slope JA = $\frac{\Delta y}{\Delta x} = \frac{1-7}{3+6} = \frac{-6}{9} = -\frac{2}{3}$

slope EK = $\frac{\Delta y}{\Delta x} = \frac{4+2}{-8-1} = \frac{6}{-9} = -\frac{2}{3}$

★ JA ∥ EK b/c same slope

slope AK = $\frac{\Delta y}{\Delta x} = \frac{7-4}{-6+8} = \frac{3}{2}$

slope JE = $\frac{\Delta y}{\Delta x} = \frac{1+2}{3-1} = \frac{3}{2}$

★ AK ∥ JE b/c same slope

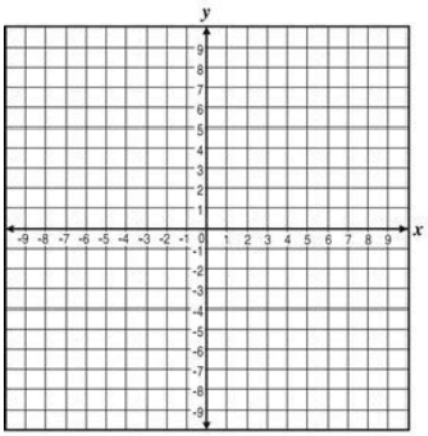
JAKE is a P b/c both pairs of opp. sides are ∥.

JA ⊥ AK b/c their slopes are negative reciprocals.

Therefore, JAKE is a R because it is a P with one pair of ⊥ sides (it has a right ∠).

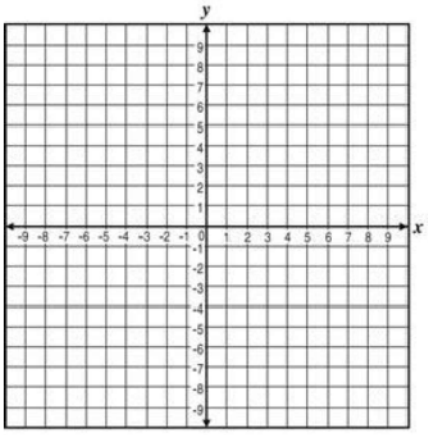
2. Quadrilateral SOPH has vertices S(4,1), O(2,7), P(-7,4), and H(-5,-2).

Prove that SOPH is a rectangle.



3. Quadrilateral RACH has vertices R(-3,5), A(5,-1), C(2,-5), and H(-6,1).

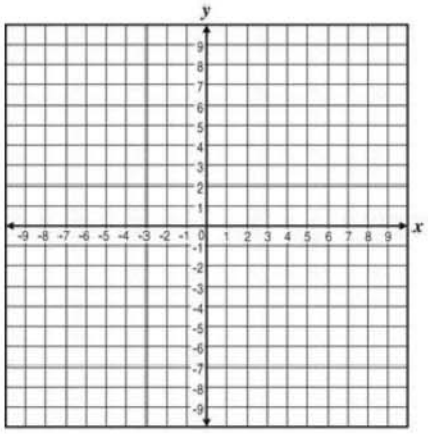
Prove that RACH is a rectangle.



4. Quadrilateral WTMC has vertices W(2,-2), T(8,-1), M(9,3), and C(3,2).

a) Prove that WTMC is a parallelogram.

b) Prove that WTMC is not a rectangle.



5.

Prove that quadrilateral PLUS with the vertices P(2,1), L(6,3), U(5,5), and S(1,3) is a rectangle.