Geometry CC – Mr. Valentino   Name: _____
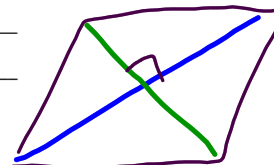
Unit 10 Lesson 6: Proving Rhombuses on the Coordinate Plane   Date: _____   Per: _____

You guessed it...<u>Proving RHOMBUSES on the Coordinate Plane</u>!

DO NOW: Please list below the 3 properties that help us to prove that a parallelogram is a rhombus:

1. Diagonals are $\perp$

2. 4 $\cong$ sides

3. Diagonals bisect $\angle$'s

Great. Now let's talk about how we can do the above on the **coordinate plane**.

- How can we show the diagonals of a rhombus form a right angle?

  slopes are negative reciprocals

- How can we show that adjacent sides of a rhombus are congruent?

  sides are $\cong$ using the distance formula

Time for some practice.

$$d = \sqrt{(\Delta x)^2 + (\Delta y)^2}$$

1. The vertices of quadrilateral JILA are J(2,3), I(7,3), L(4,7), and A(-1,7).

Prove that quadrilateral JILA is a rhombus.
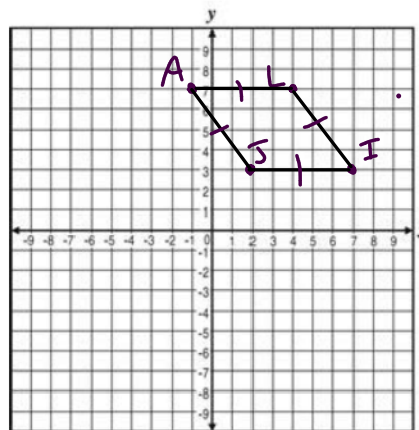
$$AL = 5$$
$$JI = 5$$
$$AJ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$\quad = \sqrt{(2+1)^2 + (3-7)^2}$$
$$\quad = \sqrt{(3)^2 + (-4)^2} = \sqrt{9+16} = \sqrt{25} = 5$$
$$LI = \sqrt{(4-7)^2 + (7-3)^2}$$
$$\quad = \sqrt{(-3)^2 + (4)^2} = \sqrt{9+16} = \sqrt{25} = 5$$

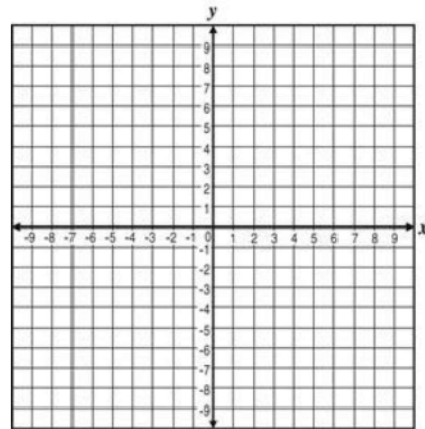JILA is a $\boxed{\diagup\!P\!\diagup}$ b/c it has 2 pairs of opp. $\cong$ sides.

JILA is a rhombus b/c all sides are $\cong$.

So, as you can see, it is within our best interest to use the ___*distance*___ formula ___4___ times in order to prove rhombuses on the coordinate plane.
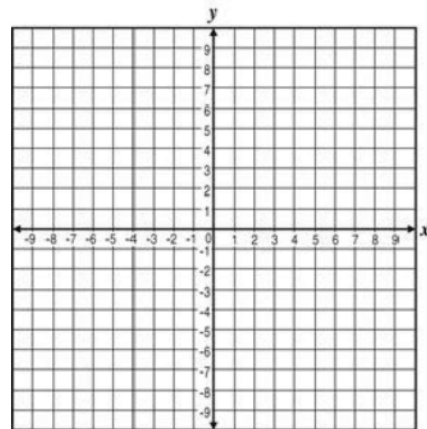
2. The vertices of quadrilateral TASM are T(-5,2), A(3,4), S(1,-4), and M(-7,-6).

Prove that quadrilateral TASM is a rhombus.

3. The vertices of quadrilateral SPOT are S(1,3), P(3,-4), O(-4,-2), and T(-6,5).

Prove that quadrilateral SPOT is a rhombus.

4. The vertices of quadrilateral ISLE are I(1,2), S(3,-1), L(4,2), and E(2,5).

Prove that quadrilateral ISLE is a parallelogram but **not** a rhombus.