Go the Distance!   Name:_____

Learning Goals:
- Determine the distance between two points (hypotenuse of a right triangle) on a coordinate plane.
- Explain the relationship between the slope formula, Pythagorean Theorem, and distance formula.
- Create a formula for determining the distance between two ordered pairs (without a graph).

1. **Explore** the Graphing Lines simulation for a few minutes, graphing whatever points or lines you choose. Write down 1-3 observations you have about graphing lines.

2. **Talk** with a partner: How does this relate to the Pythagorean Theorem? **Record** your thoughts below.

We think this is similar to the Pythagorean Theorem because:
_____
_____

We think this is different than the Pythagorean Theorem because:
_____
_____

3. Draw a line to match the corresponding parts.

Pythagorean Theorem	**Graphing Lines Simulation**
Leg a	line segment
Leg b	run
Hypotenuse c	rise

4. **Graph** any two points. Sketch a **diagram** (or insert a screenshot) of your graph, including the **ordered pairs** for your points below.

5. **Calculate** the length of the hypotenuse of the triangle formed in number 4, using what you know about the Pythagorean Theorem.

6. **Rewrite** the Pythagorean Theorem, **substituting** in the matched words above.

$$a^2 \qquad + \qquad b^2 = \qquad c^2$$

$$\underline{\hspace{2cm}}^2 + \underline{\hspace{2cm}}^2 = \underline{\hspace{2cm}}^2$$

7. **Rewrite** the above formula, **substituting** in parts of the slope formula to help calculate the missing values for the legs. Since you cannot accurately count the length of the line segment, leave that as a variable.

$$\underline{\hspace{2cm}}^2 + \underline{\hspace{2cm}}^2 = \underline{\hspace{2cm}}^2$$

8. What would you do to the left side of the equation above if you were trying to isolate the variable on the right (How do you get rid of the exponent?)? Hint: It's the last step when solving for the hypotenuse in the Pythagorean Theorem. Rewrite the formula with the variable isolated.

9. Using the formula you created in number 8, calculate the distance of the hypotenuse using the ordered pairs from # 4.

10. **Graph** the ordered pairs (6, 4) and (-4, 1).

11. Using the formula you created in number 8, calculate the distance of the hypotenuse. (Check your work with the original Pythagorean Theorem, if necessary).

12. Using the formula you created in number 8, calculate the distance between the ordered pairs (15, 11) and (20, 18).