**Task 1: The Distance Formula**

**Vertical Line Segments**

How long is the line segment on the graph?

units

How can the length be determined using a mathematical calculation instead of counting the number of squares?

**Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Horizontal Line Segments**

How long is the line segment on the graph?

units

How can the length be determined using a mathematical calculation instead of counting the number of squares?

**Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Diagonal Line Segments**

This line segment is more difficult to determine the length as the number of squares cannot be counted as they are on a diagonal.

**First, calculate the vertical line segment**

y2 - y1 =

c = \_\_

**Second, calculate the horizontal line segment**

x2 - x1 =

X2 - X1 = \_\_\_\_

Y2 - Y1 = \_\_\_\_

**Then**, **calculate the hypotenuse of the right triangle**

c2 = a2 + b2

=

 =

 =

 =

 =

|  |
| --- |
| **Length of a Line Segment Formula:** length =  |

**Ex**. Using the formula, find the length of the line segment D (-3, 5) and E (4,-6).

**Task 2: Practice** Complete the 5 practice examples in Discovering Distances.

**Task 3: Applications**

*What types of triangles are there?*

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = all sides unequal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = 2 equal sides*

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = 3 equal sides \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = follows the*

*Pythagorean Theorem: a2 + b2 = c2, where c is the hypotenuse (the longest side)*

1. A triangle has these vertices: D(6, 3), O(-4, 1), G(2, -5).
	1. Graph this triangle.
	2. Determine the length of each side using the formula. Leave your answers with the square root.

DO =

OG =

DG =

Therefore, ∆DOG is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *(scalene, isosceles, or equilateral?)*

1. A triangle has these vertices: C(5, -2), A(-3, 6), T(7, 0).
	1. Graph this triangle.
	2. Use the formula to determine the length of each side. Leave your answers with the square root.

 CA =

 AT =

 CT =

* 1. Therefore, ∆CAT is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *(scalene, isosceles, or equilateral?)*
	2. Use the three lengths and the Pythagorean Theorem to determine if ∆CAT is right angled.
	3. Determine the slope of each side!

 CA = AT = CT =

* 1. How can you use the slopes to determine whether ∆CAT is right angled?