UNIT 3 LESSON 2 – FINDING DISTANCE USING PYTHAGOREAN THEOREM

To find the distance between two points on a coordinate plane, you can use the Pythagorean Theorem.

In a right triangle, you calculated the vertical height (a) and the horizontal height (b).

These lengths were then substituted into Pythagorean Theorem $a^2 + b^2 = c^2$ and the result was the distance between the two points.

Using Pythagorean Theorem to find Distance

- Step 1) Find the length of **a**: $y_1 - y_2$
- Step 2) Find the length of **b**: $x_1 - x_2$
- Step 3) Substitute the values of a and b into Pythagorean $a^2 + b^2 = c^2$

Example 1) Calculate the distance between the points (4, 9) and (−2, 6) using the Pythagorean Theorem.

Using Pythagorean Theorem

Step 1: Subtract x-coordinates (side a)

$4 - (-2) = 6$

Step 2: Subtract y-coordinates (side b)

$9 - 6 = 3$

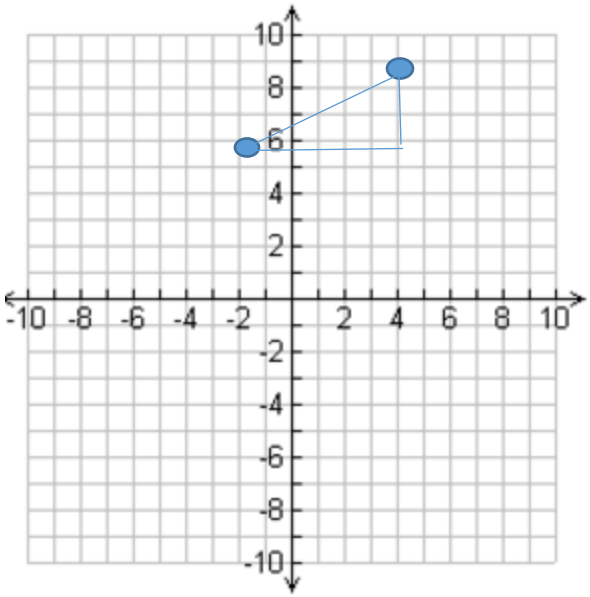
Step 3: Use Pythagorean Theorem to find distance

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

$6^2 + 3^2 = c^2$

$36 + 9 = c^2$

$\sqrt{45} = c$



Example 2) Graph the following points A (−4, 8), B (−1, 2) and C (7, 6). Then find the perimeter of the triangle.

Find the distance between each set of vertices.

AB = $(-3)^2 + (6)^2 = c^2$

$= 9 + 36 = c^2$

$= 45 = c^2$

$\sqrt{45} = c$

BC = $(-8)^2 + (-4)^2 = c^2$

$= 64 + 16 = c^2$

$= 80 = c^2$

$\sqrt{80} = c$

AC = $(-11)^2 + (2)^2 = c^2$

$= 121 + 4 = c^2$

$= 125 = c^2$

$\sqrt{125} = c$

YOU TRY!!!

Example 3) What is the distance between $(-2, 1)$ and $(1, 5)$?

Example 4) What is the distance between $(-6, 6)$ and $(1, -4)$?