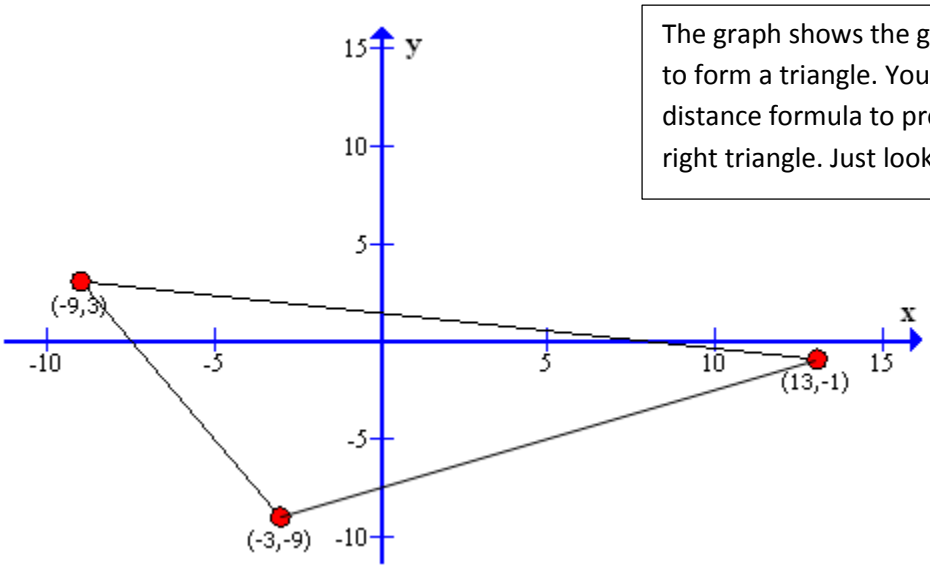
Proving Points are the Vertices of a Right Triangle

Given the points (13, -1), (-9, 3), and (-3, -9), prove that the points are that of a Right Triangle.

Using the distance formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$, find the length of each leg of the triangle.



The graph shows the given points graphed to form a triangle. You must use the distance formula to prove that it forms a right triangle. Just looking at it doesn't work.

We need to find the distance between points (-9, 3) and (13, -1); (13, -1) and (-3, -9); and (-3, -9) and (-9, 3).

$$d = \sqrt{(-9-(-3))^2 + (3-(-9))^2}$$
$$d = \sqrt{36+144}$$
$$d = \sqrt{180}$$

$$d = \sqrt{(13-(-9))^2 + (-1-3)^2}$$
$$d = \sqrt{484+16}$$
$$d = \sqrt{500}$$

$$d = \sqrt{(-9-(-1))^2 + (-3-13)^2}$$
$$d = \sqrt{64+256}$$
$$d = \sqrt{320}$$

Next use the Pythagorean Theorem $a^2 + b^2 = c^2$ to prove that the longer side is equivalent to the other two sides.

$$a^2 + b^2 = c^2$$
$$\sqrt{180}^2 + \sqrt{320}^2 = \sqrt{500}^2$$
$$180 + 320 = 500$$
$$500 = 500$$

Since both sides equal each other, the given vertices form a right triangle.

Try the following problems:

1. (6, 1), (0, 4), and (-1, -7)
2. (1, 2), (5, 4), and (-3, 0)
3. (-1, 7), (10, -4), and (12, -2)
4. (5, 4), (11, 6), and (15, -6)

Answers:

1. No
2. No
3. Yes
4. No