Bell Work

Find the slope and distance between

$(-2,5)$ and $(4,7)$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{7-5}{4-(-2)} = \frac{2}{6} = \frac{1}{3}$$

$$\sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

$$\sqrt{(7-5)^2 + (4-(-2))}$$

$$\sqrt{(2)^2 + (6)^2}$$

$$\sqrt{4+36} = \sqrt{40}$$

$$\sqrt{4}\sqrt{10}$$

$$2\sqrt{10}$$

Coordinate Proofs

In a **coordinate proof**, you are proving geometric statements using algebra and the coordinate plane. Some examples of statements you might prove with a coordinate proof are:

- Prove or disprove that the quadrilateral defined by the points $(2, 4), (1, 2), (5, 1), (4, -1)$ is a parallelogram.

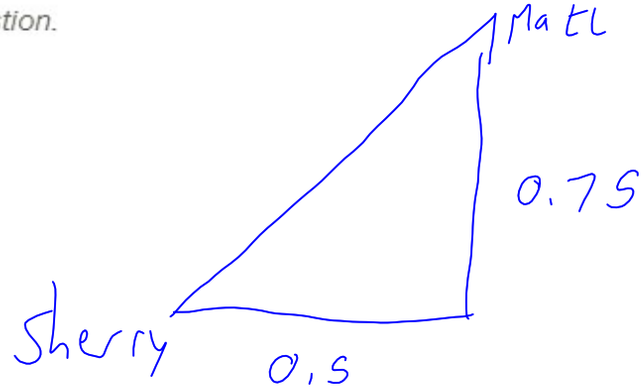
- Prove or disprove that the quadrilateral defined by the points $(8, -4), (0, 2), (-10, 2), (-6, 4)$ is a trapezoid.

I want to show that...	With the help of algebra I should...
[redacted]	[redacted] or Pythagorean Theorem to find the length of the sides and show that they are equal.
[redacted]	[redacted] (they should be opposite reciprocals).
[redacted]	[redacted] lines (they should be equal).

$$\text{Distance} = \sqrt{(y_2-y_1)^2+(x_2-x_1)^2}$$

$$\text{slope} = \frac{y_2-y_1}{x_2-x_1}$$

1) Sherry just bought some walkie talkies that have a one mile range. To get to her friend Matt's house, Sherry rides her bike half a mile east and then three quarters of a mile north. If she gives Matt one of the walkie talkies, will she be able to talk to him on her walkie talkie from her house? *Model this situation with an equation or inequality and a graph. Then, answer the question.*



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

$0.5^2 + 0.75^2 = c^2$

$0.25 + .5625 = c^2$

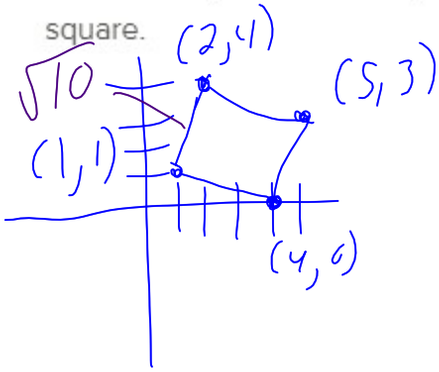
$\sqrt{0.8125} = \sqrt{c^2}$

$.90 = c$

yes

Example 2 $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

Prove or disprove that the quadrilateral defined by the points $(4,0)$, $(5,3)$, $(1,1)$, $(2,4)$ is a square.



$\frac{4-1}{2-1}=\frac{3}{1}$ $\frac{0-3}{4-5}=\frac{-3}{1}=\frac{3}{1}$

$\frac{3-4}{5-2}=\frac{-1}{3}$ $\frac{1-0}{1-4}=\frac{1}{-3}$

$\sqrt{(4-1)^2+(2-1)^2}=\sqrt{(3)^2+(1)^2}=\sqrt{9+1}=\sqrt{10}$

$\sqrt{(3-4)^2+(5-2)^2}=\sqrt{(-1)^2+(3)^2}=\sqrt{1+9}=\sqrt{10}$

$\sqrt{(0-3)^2+(4-5)^2}=\sqrt{(-3)^2+(-1)^2}$

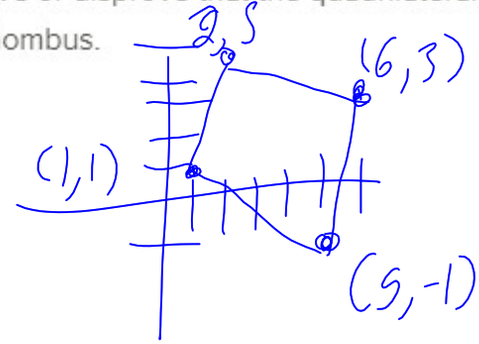
$\sqrt{9+1}=\sqrt{10}$

$\sqrt{(1-0)^2+(1-4)^2}=\sqrt{(1)^2+(-3)^2}$

$\sqrt{1+9}=\sqrt{10}$

Example 3

Prove or disprove that the quadrilateral defined by the points $(5,-1)$, $(6,3)$, $(1,1)$, $(2,5)$ is a rhombus.



$\sqrt{10}$

$\sqrt{(5-1)^2+(2-1)^2}$

$\sqrt{(4)^2+(1)^2} = \sqrt{16+1}$

$= \sqrt{17}$

$\sqrt{(3-5)^2+(6-2)^2}$

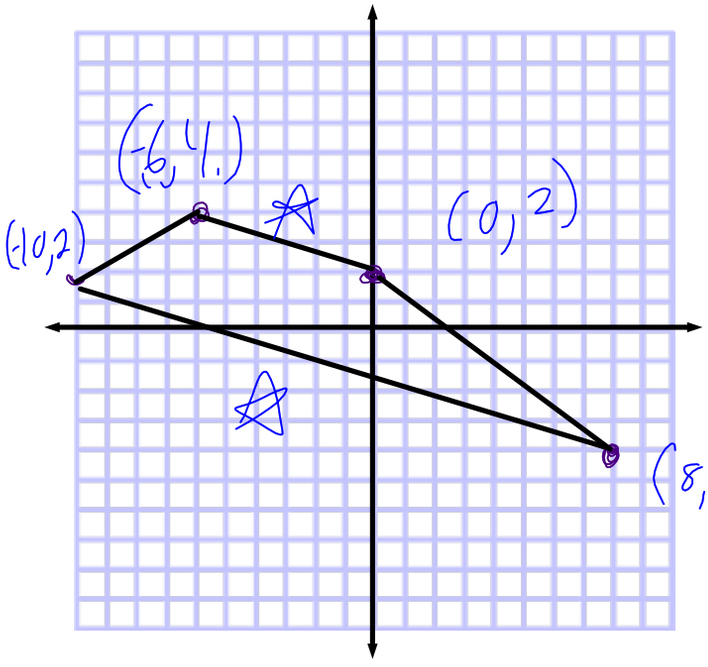
$\sqrt{(-2)^2+(4)^2} = \sqrt{4+16}$

$= \sqrt{20}$

$\frac{y_2 - y_1}{x_2 - x_1}$

Example 4

Prove or disprove that the quadrilateral defined by the points $(8, -4)$, $(0, 2)$, $(-10, 2)$, $(-6, 4)$ is a trapezoid.



YES

$\frac{2-4}{0-(-6)} = \frac{-2}{6} = \boxed{-\frac{1}{3}}$

$\frac{-4-(2)}{8-(-10)} = \frac{-6}{18} = \boxed{-\frac{1}{3}}$