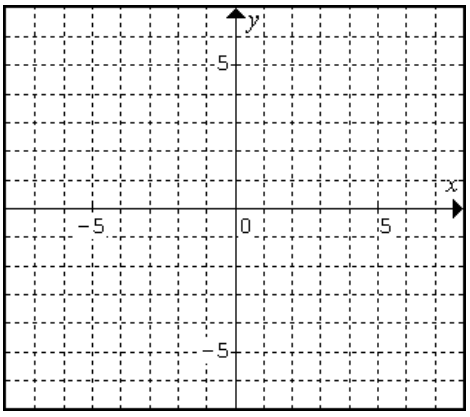
CCSS Geometry **Name** _____

G5: Triangle and Quadrilateral Application and Proof

Pythagorean Theorem: $a^2 + b^2 = c^2$	Distance: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	Slope: $m = \frac{(y_1 - y_2)}{(x_1 - x_2)}$

1. Plot the points X (-4, -1), Y(-3, 2) and Z(-1, 0)



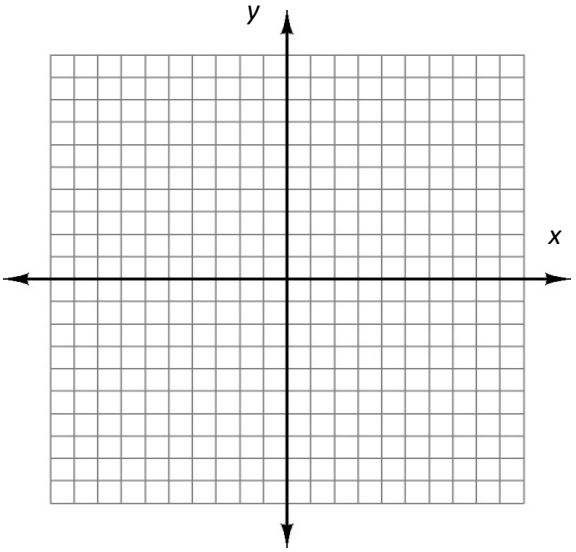
   a. What is the length of the segment $\overline{XY}$?

   b. What is the length of the segment $\overline{YZ}$?

   c. What is the length of the segment $\overline{ZX}$?

   d. What type of triangle is ΔXYZ? How do you know?

2. ***Plot the points A(1, 3), B(7, 0), C (5, -4) and D (-1, -1)***



   a. Find the distance between points A and B. Show your work.

   b. Find the length of segment$\overline{BC}$. Show your work.

   c. Find the slope of the line through points A and B.

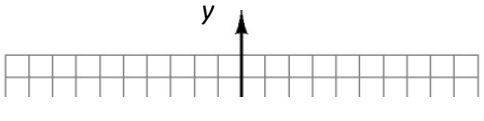
   d. Find the slope of the line through points B and C.

   e. What shape does ABCD look like? State all the ways you can justify your conclusion.

If the angle between two lines is 90 degrees the lines are called _____.

The slope between the lines will be _____ _____, like the slopes of $\overline{AB}$ and $\overline{BC}$.

3. ***Plot the points E(-2, 3), F(5, 2), G (3, -2) and H (-3, 0)***



a. *Find the slope of the lines connecting points E and F.*

b. *Find the slope of the lines connecting points E and H.*

c. *Are $\overline{EF}$ and $\overline{EH}$ perpendicular? If yes, how do you know? If not, why not?*

d. *IS EFGH a rectangle? If yes, how do you know? If not, why not?*

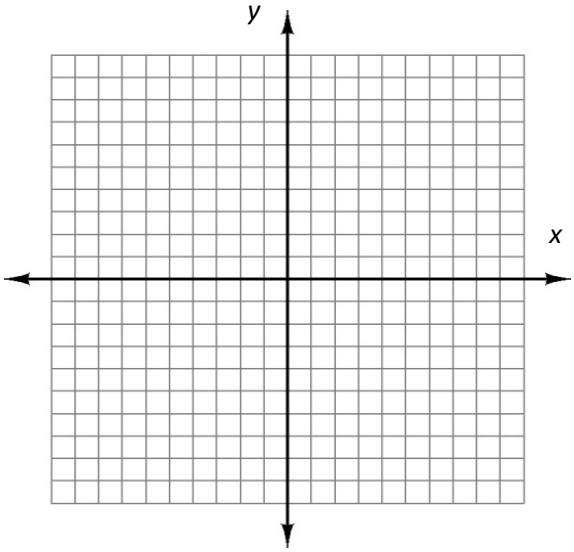
4. *Plot points I (-2, 2), J(1, 3), K (5, 1) and L (-1, -1).*

a. *Find the slope of the lines connecting points I and J.*

b. *Find the slope of the lines connecting points L and K.*

c. *What is the relationship between line segments $\overline{IJ}$ and $\overline{LK}$?*

d. *What type of shape is IJKL? How do you know?*



If lines have the same slope they are _____. This means they will never intersect.

***Challenge**: Prove the pairs of opposite sides in quadrilateral MNOP are parallel (ie, MNOP is a parallelogram) without knowing the slopes. (Hint: It may be helpful to turn MNOP into two triangles)*