THE CARTESIAN PLANE

The *xy*-plane is also called the ___Cartesian___ plane and is named after the mathematician ___René De Cartes___.

The horizontal axis is called the __X__ - axis and
the ___Vertical___ axis is called the *y*-axis.

The *x*-axis and *y*-axis meet at the ___Origin___. All points can be labeled with
___Co-ordinates___ and expressed as ordered pairs, (__X__, __y__).

The *xy*-plane is divided into ___four___ quadrants, called quadrants 1, 2, 3, and 4. (I,II,III,IV)
Always label the axes and mark the scale, as shown, on the *xy*-plane.

ACTIVITY:
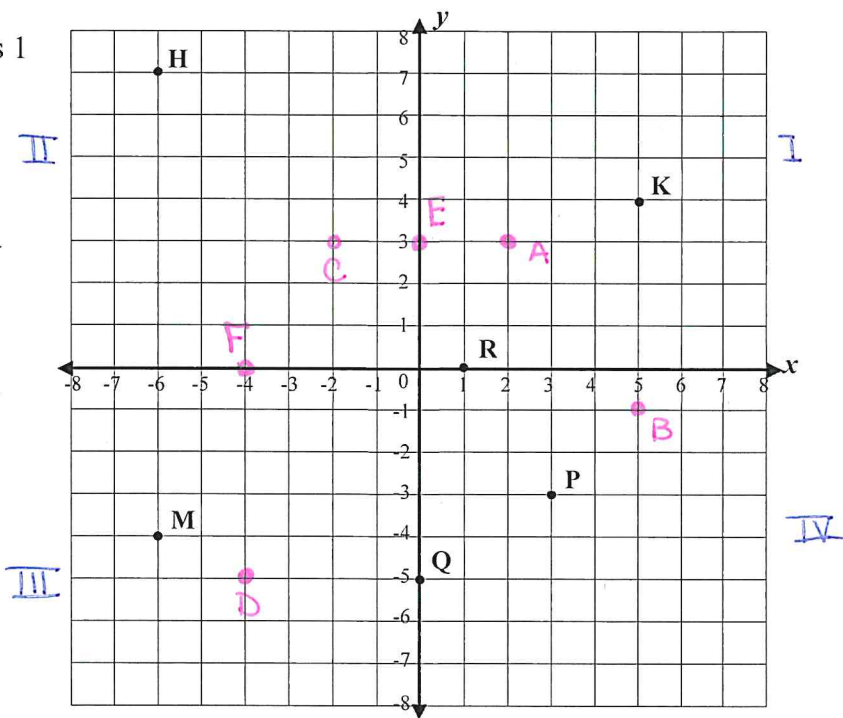
Use this *xy*-plane to complete questions 1 to 3.

1. State the coordinates of each point.

H: $(-6, 7)$ K: $(5, 4)$

M: $(-6, -4)$ P: $(3, -3)$

Q: $(0, -5)$ R: $(1, 0)$

2. Identify where each of the four quadrants are located.

3. Graph these points on the *xy*-plane above. Include the labels (the capital letter).
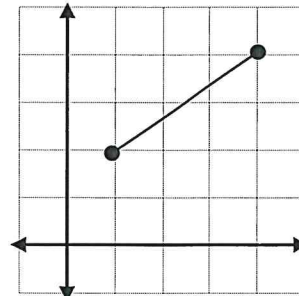
A(2, 3)   B(5, -1)   C(-2, 3)   D(-4, -5)   E(0, 3)   F(-4, 0)

SLOPE

Linear Relation: The _relationship_ between _two_ variables that appears as a _line_ on a _graph_

Slope: Measures the _steepness_ of a _line_.

- It measures the "_rate_ _of_ _change_" of one point with respect to another point.

- Ask: For every unit change in "_y_", how much does "_x_" change?

RISE: The _vertical_ distance between _two_ points on a _line_

RUN: The _horizontal_ distance between _two_ points on a _line_

CALCULATING SLOPE:
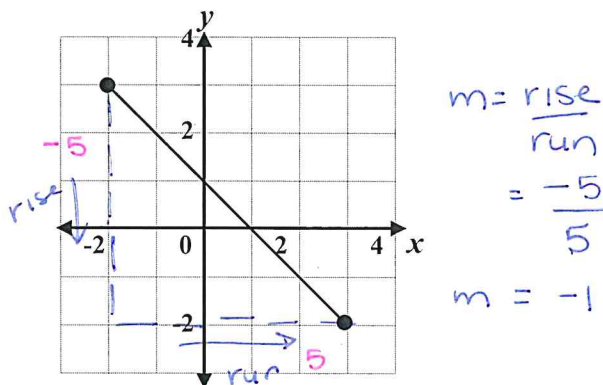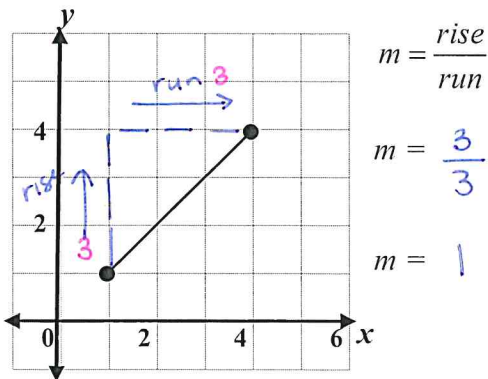
The variable used to represent slope is "_m_"

To calculate slope, use the equation:

$$\text{Slope }(m) = \frac{rise}{run}$$

← vertical distance

← horizontal distance

Examples:

$$m = \frac{rise}{run}$$

$$m = \frac{3}{3}$$

$$m = 1$$

$$m = \frac{rise}{run}$$

$$= \frac{-5}{5}$$

$$m = -1$$

POSITIVE vs. NEGATIVE SLOPE

Positive Slope: Follow the line from left to right: the _line_ goes _up_.

Negative Slope: Following the line from left to right: the _line_ goes _down_.