<u>Learning Goals</u>

1. To understand how to calculate a slope, given two points.

2. To determine another point on a line, given the slope and a coordinate.

3. To understand what is meant by collinear.

4. To understand how to determine if 3 or more points are collinear.

<u>5.3 - Slope of a Line</u>

<u>Remember</u>:   m= $\dfrac{y_2 - y_1}{x_2 - x_1}$ or   m = $\dfrac{rise}{run}$

Example One

Calculate the slope of the line passing through A(5, 3) and B(7, -4).
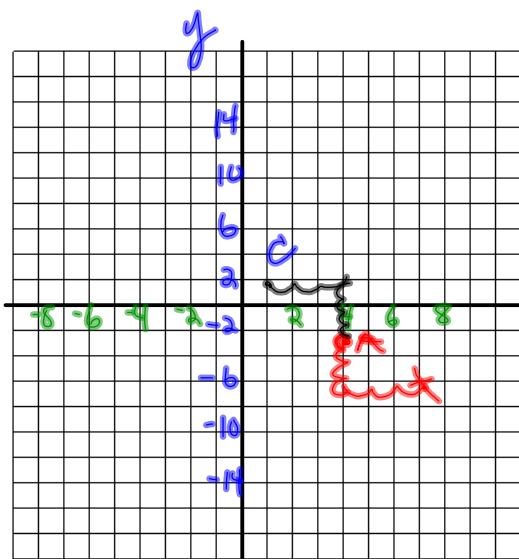
$$m = \frac{y^2 - y^1}{x^2 - x^1}$$

$$m = \frac{-4 - 3}{7 - 5}$$

$$m = \frac{-7}{2}$$

Example Two

Write the coordinates of one other point that would be on the line passing through A(4, -3) with a slope of $\frac{-4}{3}$.

Hint: Graph point A and then use the rise over run method to find another point.

Starting Pt:
(4, -3)

Slope: $\frac{-4 \text{ (down)}}{3 \text{ (right)}}$

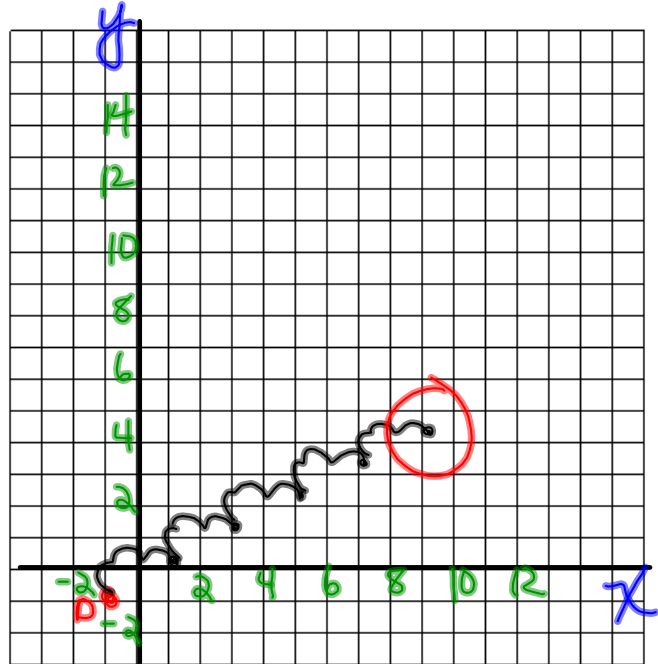∴ another pt would be: (7, -7)

or

C (1, 1)

Example Three

Using the graph, determine the value of "k" in point E(9, k) when m = $\frac{1}{2}$ and the line passes through D(-1, -1).

Starting Pt
(-1,-1)

Slope: $\frac{1}{2}$ (up)
(right)

∴ when x = 9,
y = 4 or k = 4.

Collinear - three or more points are collinear if they lie on the same line.

To determine if points are collinear:

1. Sketch graph of points.
2. Calculate the slope between points.
3. If all slopes are equal, then the points are collinear.

Example Four

Determine if the points A(-6, 12), B(3, 6) and C(12, 0) are collinear.
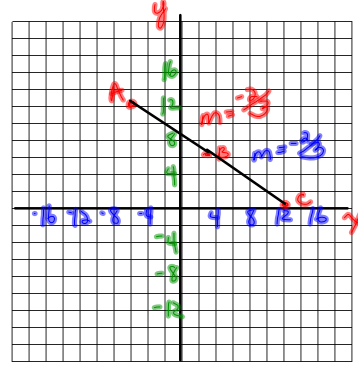
Slope of AB

$A(-6, 12)$ $B(3, 6)$
   x_1 y_1 x_2 y_2

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$= \dfrac{6 - 12}{3 - (-6)}$

$= \dfrac{-6 \div 3}{9 \div 3}$

$= -\dfrac{2}{3}$

Slope of BC

$B(3, 6)$ $C(12, 0)$
   x_1 y_1 x_2 y_2

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$= \dfrac{0 - 6}{12 - 3}$

$= \dfrac{-6 \div 3}{9 \div 3}$

$= -\dfrac{2}{3}$

∴ pt A, B & C are collinear b/c the slope between pts is equal.

Complete: p. 278 - 279 #1, 3ace, 4, 6ac, 7, 8, 12.