Lesson Plan

Grade 9 Academic   **Lesson:** ___29___

Unit/Chapter: <u>Analytic Geometry</u>   **Topic: <u>Slope of a Line</u>**

▣ *homework check:* <u>**NPM 9**</u> **p. 263 # 1 – 3, p. 269 # 3, 5, 15**

▣ *note:* <u>**Slope of a Line**</u>

Using the slope of a line when graphing is a most helpful tool, however, slope can also be used to find if points lie on the same line. When points lie on the same line, they are collinear. It is also helpful to have a formula for finding slope without a given relationship, but rather with two points. For example, we know that $m = \dfrac{rise}{run}\ or\ \dfrac{\Delta y}{\Delta x}$, but we can also relate this to any two points $A(x_1, y_1)$ and $B(x_2, y_2)$ algebraically using $m = \dfrac{y_2 - y_1}{x_2 - x_1}$. If we are asked to determine whether points are collinear, we can find the slope between the pairs of points. If the slopes are equal, the points are collinear.

a) Determine if points $A(-3, -1)$, $B(1, 3)$, and $C(5, 7)$ are collinear.

Step 1: Find the value of the slope of AB.
$$(x_1, y_1) = A(-3, -1)$$
$$(x_2, y_2) = B(1, 3)$$
$$mAB = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{3 - (-1)}{1 - (-3)}$$
$$= \frac{4}{4}$$
$$= 1$$

Step 2: find the value of the slope of BC

$$(x_1, y_1) = B(1,3)$$

$$(x_2, y_2) = C(5,7)$$

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

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

$$= \frac{4}{4}$$

$$= 1$$

Step 3: State your conclusions.

Points A, B, and C are collinear because segments AB and BC have the same slope and share a common point B.

b) Given $mDE = \dfrac{-1}{5}$, and points $D(x,-2)$ and $E(-3,8)$, find the value of x.

Step 1: Set up and solve an equation using the slope formula and given points.

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

$$\frac{-1}{5} = \frac{8 - (-2)}{-3 - x}$$

$$\frac{-1}{5} = \frac{10}{-3 - x}$$

$$-1(-3 - x) = 5(10)$$

$$3 + x = 50$$

$$x = 47$$

Step 2: Make your conclusions.

Point D has coordinates $D(47,-2)$

⊞ *homework assignment:* <u>**NPM 9**</u> **p. 278 # 3, 6 - 8, 16, 18 - 20**