AGS 1 Name: _____ Period: _____ Date: _____

Unit 2.3 – Linear & Exponential Functions

Warmup – Find the slope between each set of points.

a) (–3, –2) and (–3, 6)

$\frac{6-(-2)}{-3-(-3)} = \frac{8}{0}$

Slope = undefined

b) (1, 3) and (3, -2)

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

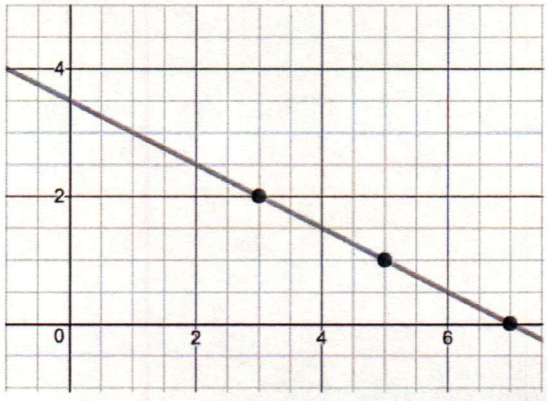
Slope = $-\frac{5}{2}$

c) Ms. Ped and Ms. Laurance both hired painters to paint rooms in their houses. The painters finished Ms. Ped's painting in 6 hours for $135, they finished Ms. Laurance's painting in 8 hours for $180. Find the rate of change for painting.

$\frac{\$}{\text{hrs}}$ $\frac{180-135}{8-6} = \frac{45}{2} = \$22.50/\text{hour}$

Lesson – Types of Linear Equations

Three students were given this graph on their homework and asked to write an equation that represented the line.



Allen got: $y = -\frac{1}{2}x + \frac{7}{2}$ correct

$0 = -\frac{1}{2}(7) + \frac{7}{2}$

$0 = -\frac{7}{2} + \frac{7}{2}$

$0 = 0$

Claudia got: $y = -\frac{1}{2}(x-3) + 2$ Correct

$0 = -\frac{1}{2}(7-3) + 2$

$0 = -\frac{1}{2}(4) + 2$

$0 = -2 + 2$

$0 = 0$

Karla got: $y = -\frac{1}{2}(x-7)$ correct

$0 = -\frac{1}{2}(7-7)$

$0 = -\frac{1}{2}(0)$ $0 = 0$

How can each of them prove to the others that their answer is correct? Determine whose equation is correct.

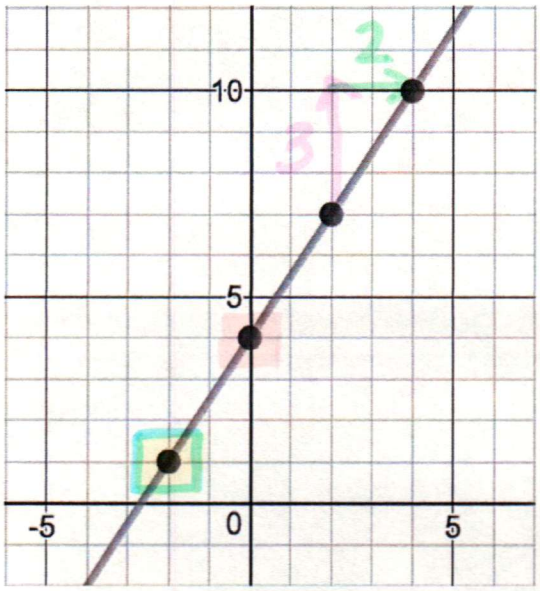
a) substitute a point

b) simplify the equation

All equations are correct. They are just in different forms

Type	General Form	Example
Slope – Intercept	$y = mx + b$ (m: slope / common difference; b: y-intercept)	$y = \frac{2}{3}x - 4$
Point – Slope	$y = m(x - x_1) + y_1$ (m: slope; x_1: x value; y_1: y value; (x_1, y_1))	$y = -2(x-5) + 3$ $(5, 3)$

Given the following graph, write equations in both forms.



Slope – Intercept Form

$m = \frac{3}{2}$ $b = 4$

$$y = \frac{3}{2}x + 4$$

Point – Slope Form

$m = \frac{3}{2}$, point: $(-2, 1)$

$y = \frac{3}{2}(x - (-2)) + 1$

$$y = \frac{3}{2}(x + 2) + 1$$

Test each equation with the point (12, 22) to see if your equations are correct.

Slope – Intercept

$y = \frac{3}{2}x + 4$

$22 = \frac{3}{2}(12) + 4$

$22 = 18 + 4$

$22 = 22$

Correct!

Point – Slope

$y = \frac{3}{2}(x - 4) + 10$

$22 = \frac{3}{2}(12 - 4) + 10$

$22 = \frac{3}{2}(8) + 10$

$22 = 12 + 10$

$22 = 22$

Correct!

For each set of points write a linear equation that models the graph they would create.

d) (3, 5) and (6, –1)

Slope: $\frac{-1-5}{6-3} = \frac{-6}{3} = -2$

Slope = -2

Point – Slope Form:

$y = -2(x-3)+5$

or

$y = -2(x-6)-1$

Slope – Intercept Form:

$y = -2x+12-1$

$y = -2x+11$

e) (–4, 2) and (2, 6)

Slope: $\frac{6-2}{2-(-4)} = \frac{4}{6} = \frac{2}{3}$

Slope = $\frac{2}{3}$

Point – Slope Form:

$y = \frac{2}{3}(x-(-4))+2$

$y = \frac{2}{3}(x+4)+2$

or

$y = \frac{2}{3}(x-2)+6$

Slope – Intercept Form:

$y = \frac{2}{3}x - \frac{4}{3} + 6$

$y = \frac{2}{3}x + \frac{14}{3}$

f) An app calculates the number of calories you burn while sleeping. Determine the equation that the app uses based on the given table.

Hours of Sleep	6.5	7	8.5	9
Calories Burned	390	420	510	540

Slope: $m = \frac{540-420}{9-7} = \frac{120}{2}$

Slope = 60

Point – Slope Form:

$y = 60(x-7)+420$

or

* $y = 60(x-9)+540$

Slope – Intercept Form:

* $y = 60x - 540 + 540$

$y = 60x$