GRAPHING AND WRITING LINEAR EQUATION

I. Write a linear equation from the given two points
Exercise 1

Point (-2, -4) & Point (2,-2)

Step 1 Find the slope

$$\text{Slope, } m = \frac{\text{rise}}{\text{run}} = \frac{y2 - y1}{x2 - x1}$$

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

Step 2 Substitute one of the points and slope into the $y = mx + b$

$$m = \frac{1}{2} \quad \text{Point } (2,-2)$$

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

$$-2 = 1 + b$$

$$b = -3$$

$$\boxed{y = \frac{1}{2}x - 3}$$

II. Write a linear equation from the graph
Exercise 2

Step 1 Find the points

The Points are (0, -2) & (3,2)

Step 2 Find the slope

$$\text{Slope, } m = \frac{y2 - y1}{x2 - x1}$$

$$= \frac{2 - (-2)}{2 - (0)} = \frac{2 + 4}{2} = \frac{6}{2} = 3$$

Step 3 Substitute one of the points and slope into the $y = mx + b$

$$m = 3 \quad \text{Point } (3,2)$$

$$2 = 3(3) + b$$

$$2 = 9 + b$$

$$b = -7$$

$$\boxed{y = 3x - 7}$$

III. Write a Equation from Description
Exercise 3

The rent charged for space in an office building is a relationship related to the size of the space rented.

Monthly Rates:

600 square feet for $750

900 square feet for $1150

Step 1 Identify ordered pairs from the problem

The Points are (50, 50 and (70, 15)

Step 2 Find the slope

$$\text{Slope, } m = \frac{y2 - y1}{x2 - x1}$$

$$= \frac{15 - 50}{70 - 50} = \frac{-35}{20} = \frac{-7}{4}$$

Step 3 Substitute one of the points and slope into the $y = mx + b$

$$m = \frac{-7}{4} \quad \text{Point } (50,50)$$

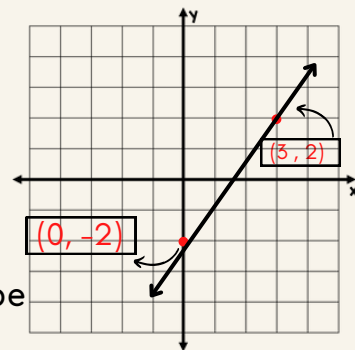$$50 = \frac{-7}{4}(50) + b \qquad 50 = 87.5 + b$$

$$b = -37.5$$

$$\boxed{y = \frac{-7}{2}x - 37.5}$$

IV. Write a equation from the given two points by using Point - slope form.
Exercise 4

Point (-7, 4) & Point (1,-3)

Step 1 Find the slope

$$\text{Slope, } m = \frac{y2 - y1}{x2 - x1}$$

$$= \frac{-3 - 4}{1 - (-7)} = \frac{-7}{1 + 7} = \frac{-7}{8}$$

Step 2 Choose one of the known points and label it

Let me take $(-7, 4)$

$$x1, y1$$

Step 3 Plug the slope m, $x1$, and $y1$ in to the Point-Slope Form

$$y - y1 = m(x - x1)$$

$$y - 4 = \frac{-7}{8}x - (-7)$$

$$y = \frac{-7}{8}x + 7 + 4$$

$$\boxed{y = \frac{-7}{8}x + 11}$$