

SECTION 1.4 – EQUATIONS OF LINES AND MODELING

Here are a few more examples covering equations of lines.

Ex. 1: Write the equation of the line with $m = -2$, passing through $(-3, 4)$.

a) In point-slope.

$$y - y_1 = m(x - x_1)$$

$$y - 4 = -2(x + 3)$$

$$\text{or } y - 4 = -2x - 6$$

b) In slope intercept form.

Take point-slope form and rearrange terms.

$$y - 4 = -2x - 6$$

$$y = -2x - 2$$

$$\text{or } f(x) = -2x - 2$$

Ex. 2: Find the linear function f such that $f(1) = 2$ and $f(-1) = -3$.

Synthesis:

- List ordered pairs
- Find slope
- Apply point/slope formula
- Put into $f(x) = mx + b$ form.

start with pt form

$$f(1) = 2 \Rightarrow (1, 2)$$

$$f(-1) = -3 \Rightarrow (-1, -3)$$

change

$$m = \frac{\Delta y}{\Delta x} = \frac{2 + 3}{1 + 1} = \frac{5}{2}$$

$$y - y_1 = m(x - x_1)$$

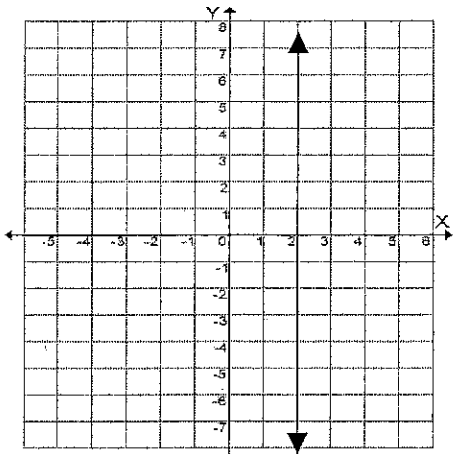
$$y - 2 = \frac{5}{2}(x - 1)$$

$$y = \frac{5}{2}x - \frac{5}{2} + \frac{4}{2}$$

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

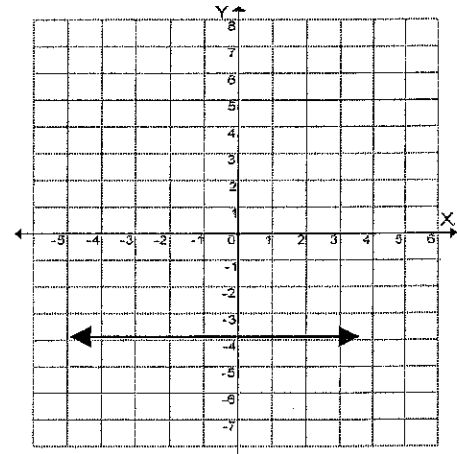
$$y\text{-int: } -\frac{1}{2}$$

Ex. 3: Label the coordinates of any two points on each line. Use your points to find the slope and the equation for each.



Slope: undefined $\Rightarrow x_2 - x_1 = 0$

Equation: $x = 2$



Slope: $m = 0 \Rightarrow y_2 - y_1 = 0$

Equation: $y = -4$

Ex. 4: One way to estimate the ideal minimum weight of a woman in pounds is to multiply her height in inches by 4 and subtract 130. Let W = ideal minimum weight and h = height.

a) Express W as a linear function of h .

$$\text{Weight} = 4 \times \text{height} - 130$$

$$W = 4h - 130$$

or $W(h) = 4h - 130$

c) What is the slope of the line in part a)?

$$m = 4$$

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$$4h - 130 = 5$$

$$4h = 135$$

$$h = 33\frac{3}{4}$$

b) Find $W(62)$. Include units.

$$\begin{aligned} W(62) &= 4(62) - 130 \\ &= 248 - 130 \\ &= 118 \end{aligned}$$

d) Graph the function. Label the axes.

