Math 10C

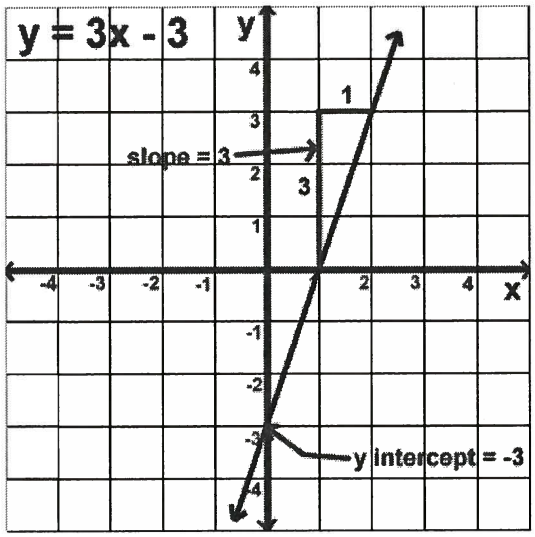
KEY

L34 – 7.1 Slope y-Intercept

In order to write an equation in slope y-intercept form, you need to find two things:

1. ***Slope*** → "m"
   → the steepness
   → $m = \frac{\text{rise}}{\text{run}}$ $\quad m = \frac{y_2 - y_1}{x_2 - x_1}$

2. ***y-Intercept*** → "b"
   → where it crosses the y-axis.
   → The point (0, b)



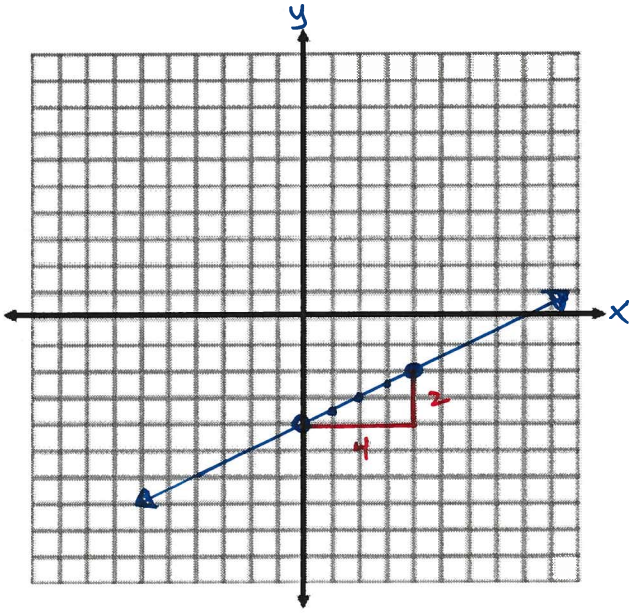
Part 1 – Understanding Slope y-Intercept Form

Use the following information to answer Q1-Q3:

$$y = \frac{1}{2}x - 4$$

Q1: Complete the table of values and graph the line.

x	y
0	-4
1	-3.5
2	-3
3	-2.5
4	-2



Q2: What is the slope of the line?

$m = \frac{\text{rise}}{\text{run}} = \frac{2}{4} = \frac{1}{2}$

$m = \frac{1}{2}$

Q3: What is the y-intercept of the line?

Crosses y-axis at -4

$y = mx + b$

$y = \frac{1}{2}x - 4$ Equation of line.

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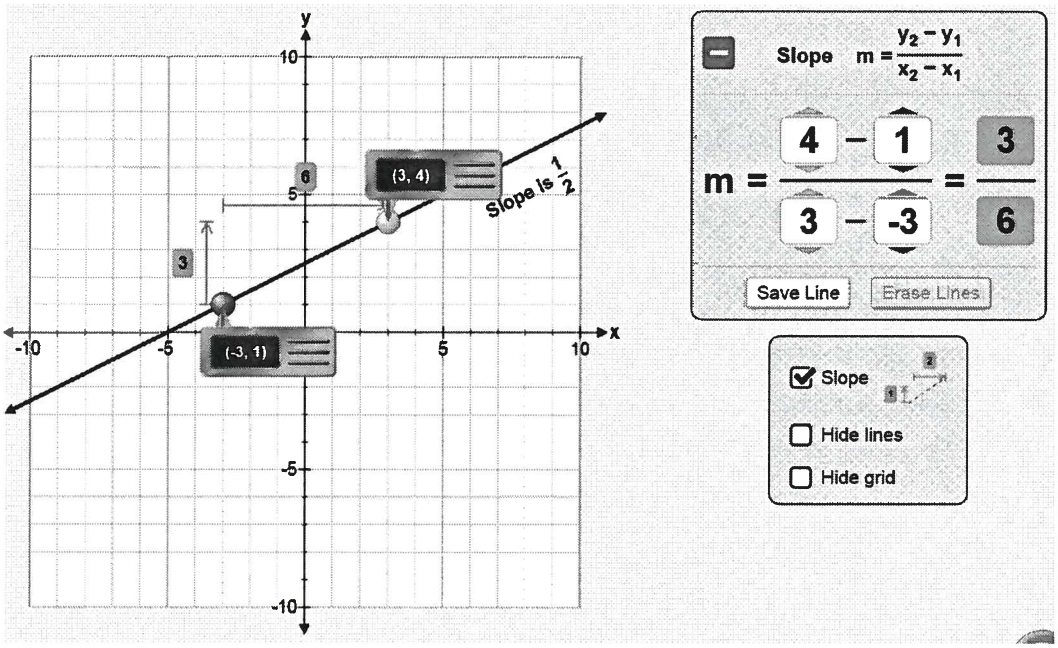
Part 2 – Slope y-Intercept Form in Colorado PhET Simulation

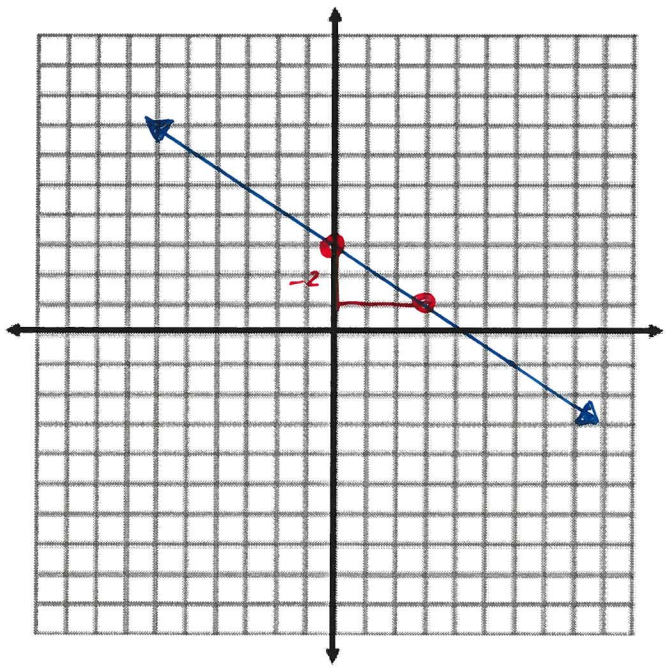
Colorado PhET – "Graphing Lines"
https://phet.colorado.edu/sims/html/graphing-lines/latest/graphing-lines_en.html



Note that we will be spending an entire day using this simulation in ***Lesson 40****.*

Part 3 – Graphing a Line using Slope-Point Form

Q4: Given the equation $f(x) = -\frac{2}{3}x + 3$, graph the relationship.



$y = mx + b$

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

Slope is $-\frac{2}{3}$ y-intercept is 3.

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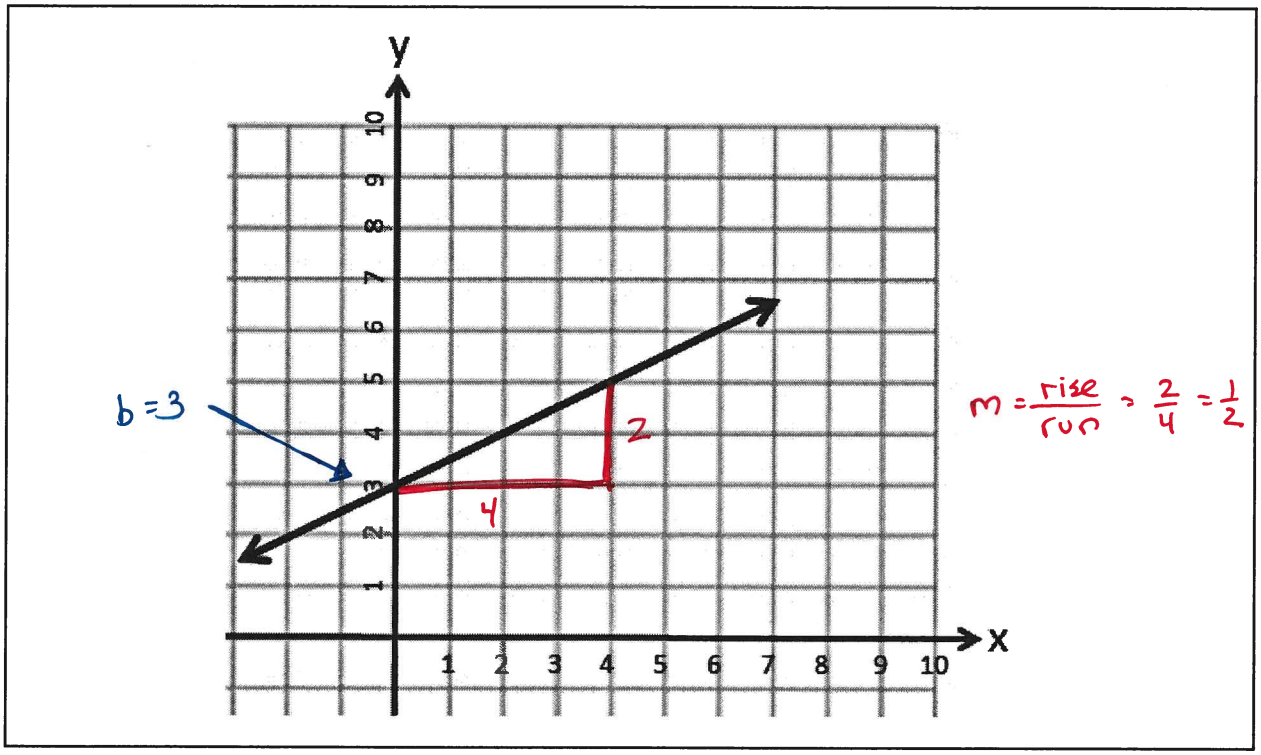
Part 4 – Determining the Equation from a Graph

Use the following information to answer Q5-Q6:



Q5: Determine the equation of the line in *Slope y-Intercept* form.

$y = mx + b$ $\quad m = \frac{1}{2}$ $\quad b = 3$

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

Q6: What is *f(200)* = ?

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

$f(200) = \frac{1}{2}(200) + 3$

$= 100 + 3$

$= 103$

when $x = 200$, $y = 103$

or the point $(200, 103)$ exists on the line.

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Part 5 – Determining the Equation from Two Coordinates

Q7: Write the equation of a line in *Slope y-Intercept* form that passes through the points (6,1) and (9,-1).

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1-1}{9-6} = \frac{-2}{3} \Rightarrow y = -\frac{2}{3}x + b$ ($x_1\ y_1$ $x_2\ y_2$)

Use point (6,1) to find "b" (x y)

$1 = -\frac{2}{3}(6) + b \Leftarrow 1 = -4 + b$

$5 = b \Rightarrow \boxed{y = -\frac{2}{3}x + 5}$

Q8: Write the equation of a line in *Slope y-Intercept* form that passes through the points (4,6) and (7,-3).

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3-6}{7-4} = \frac{-9}{3} = -3 \Rightarrow y = -3x + b$ ($x_1\ y_1$ $x_2\ y_2$)

Use point (4,6) to find "b"

$6 = -3(4) + b \Leftarrow 6 = -12 + b$

$18 = b \Rightarrow \boxed{y = -3x + 18}$

Part 5 – Manipulating an Equation to Slope y-Intercept Form

Q9: What is the slope of the line $3x - 2y - 12 = 0$?

$3x - 2y - 12 = 0$

$-3x \quad -3x$

$-2y - 12 = -3x$

$+12 \quad +12$

$-2y = -3x + 12$

$\div(-2) \quad \div(-2) \quad \div(-2)$

$y = \frac{3}{2}x - 6$ → Slope is $3/2$

Q10: A line has the same slope as $5x + 6y = 8$ and has an x-intercept of -2. Find the equation of the line in *Slope y-Intercept* form.

$5x + 6y = 8$

$-5x \quad -5x$

$6y = -5x + 8$

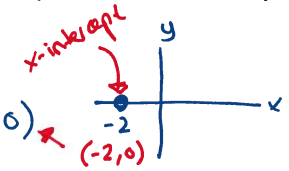
$\div 6 \quad \div 6 \quad \div 6$

$y = -\frac{5}{6}x + \frac{4}{3}$

Slope is $-5/6$

Line # 2

$m = -\frac{5}{6}$ and point (-2,0)



$y = mx + b$

$0 = -\frac{5}{6}(-2) + b$

$0 = \frac{5}{3} + b$

$-\frac{5}{3} = b \Rightarrow y = -\frac{5}{6}x - \frac{5}{3}$

Part 6 – Textbook Practice

Pg. 349 #1bdf, 3ace, 5 (pick 4), 9ac, 10ac, 14