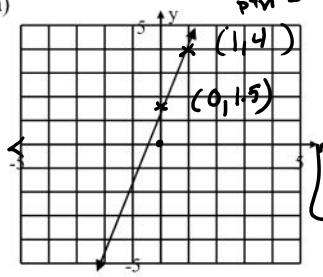
Lesson 3 – Graphing Linear Equations using Slope-Intercept Form
~~y=mx+b~~ Part 2

Example 1: $y = mx + b$

Determine the equation of each line given the graph.

a)



pt n^2

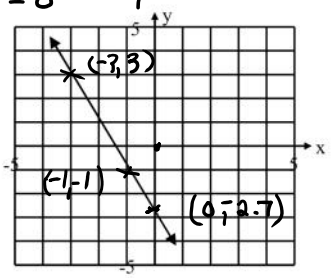
$m = \frac{\Delta y}{\Delta x} = \frac{4-1.5}{1-0} = \frac{2.5}{1}$

$m = 2\frac{1}{2} = \frac{5}{2}$

$b =$

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

b)



$y = -2x - 2.7$

$m = \frac{\Delta y}{\Delta x} = \frac{3+1}{-3+1} = \frac{4}{-2} = -2$

Example 2:

Consider the equation $y = 2x + b$. What is each value of b if a graph of the line passes through each point? Solve graphically and algebraically.

a) (1,7)

$7 = 2(1) + b$

$7 = 2 + b$

$-2 \quad -2$

$5 = b$

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

$b = 5$

b) (-3,-5)

x y

$y = 2x + b$

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

$b = 1$

$-5 = 2(-3) + b$

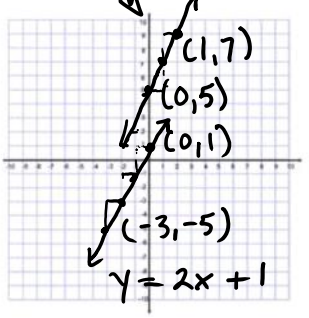
$-5 = -6 + b$

$+6 \quad +6$

$b = 1$

algebraically

$y = 2x + 5$



Example 3:

Consider the equation $y = mx - 3$. What is each value of m if a graph of the line passes through each point? Solve graphically and algebraically.

x, y

a) (1,7)

$7 = m(1) - 3$

$+3 \quad +3$

$10 = m$

b) (-3,-5)

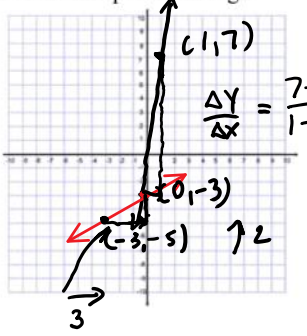
$y = mx - 3$ (0,-3)

$-5 = -3m - 3$

$+3$

$\frac{-2}{-3} = \frac{-3m}{-3}$

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



$\frac{\Delta y}{\Delta x} = \frac{7--3}{1-0} = \frac{10}{1} = 10$

$m = 10$

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

$= \frac{2}{3}$

Example 4:

Considering the following points, write the equation of a line, in slope-intercept form, that passes through both points.

a) (-2,5) (-5,-3)

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

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

$y = \frac{8}{3}x + b \quad (-2,5)$

$5 = \frac{8}{3}(-2) + b$

$5 = \frac{-16}{3} + b$

$16\frac{1}{3} + \frac{16}{3}$

$b = \frac{15}{3} + \frac{16}{3}$

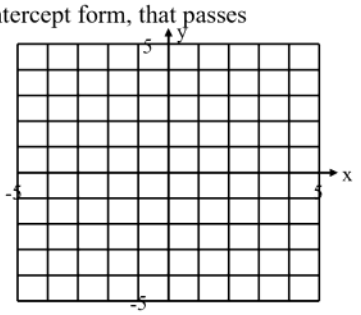
$b = \frac{31}{3}$ or $10\frac{1}{3}$

b) (-1,2) (5-4)

$m = \frac{2-(-4)}{-1-5}$

$m = \frac{2+4}{-6}$

$m = \frac{6}{-6} = -1$



$y = -1x + b \quad (-1,2)$

$2 = (-1)(-1) + b$

$2 = 1 + b$

$b = 1$

$y = -x + 1$

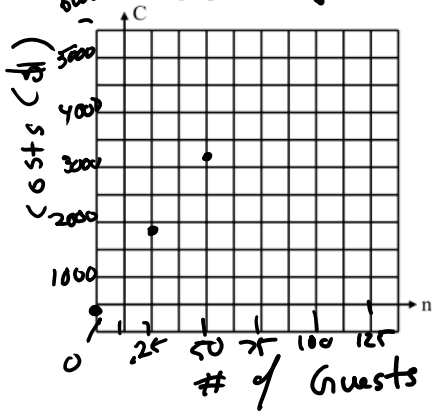
$y = mx + b$

Example 5:

Asha has selected a hotel for her wedding reception. The cost involves a fee for the deluxe ballroom and a buffet charge that depends on the number of guests. This is shown in the table.

Number of Guests	Cost ($)
0	425
25	1800
50	3175
100	5925

a) Sketch a graph of the data in the table.



a) What are the slope and y-intercept of the line? What does each **parameter** represent?

$m = \frac{1800-425}{25-0} = \frac{1375}{25} = 55$

$y = 55x + b$

55 cost/guest

$b = 425$ $ cost to rent the hall constant

b) Write an equation that describes the relationship between the cost and the number of guests. Express the equation in slope-intercept form.

$C = 55n + 425$

rate of change

c) What is the cost of 140 guests?

$n = 140$

$C = 55 \cdot 140 + 425$

$C = 7700 + 425$

$C = 8125$

The cost for 140 guests is $ 8125.00

d) Asha would like the total cost to be no more than $15 000. What is the maximum number of guests that can attend?

$C = 15000$

$15000 \geq 55n + 425$

$-425 \quad -425$

$\frac{14575}{55} \geq \frac{55n}{55}$

$265 \geq n$

TO cost no more than $15000 must have 265 or less guests.

Assignment: Equation of a Line Worksheet; Pg.
Quiz on The Equation of a Line on _____

7.1 Extra practice sheet