2.1/2.2 Graphing 2 variable Equations and Inequalities

Slope - Intercept Form
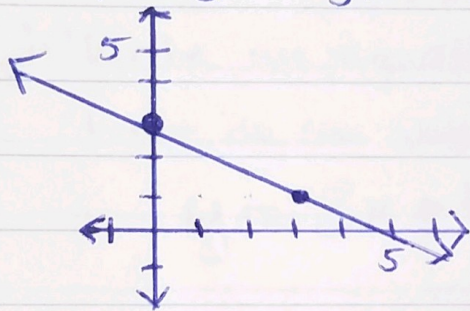
$$y = mx + b$$

$m = $ slope $ = $ rate of change
$m = $ rise/run
$b = y$-intercept

① Plot the y-intercept.
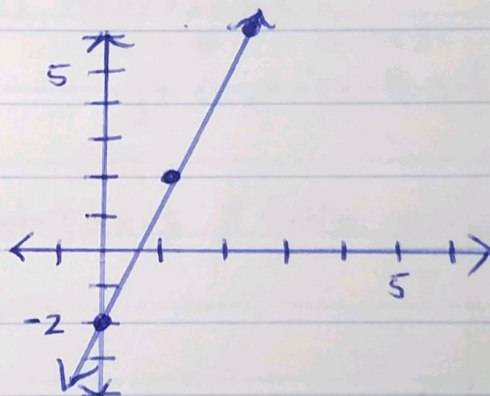
② Plot the next point(s) using slope.

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

Ex #2 $4x - y = 2$
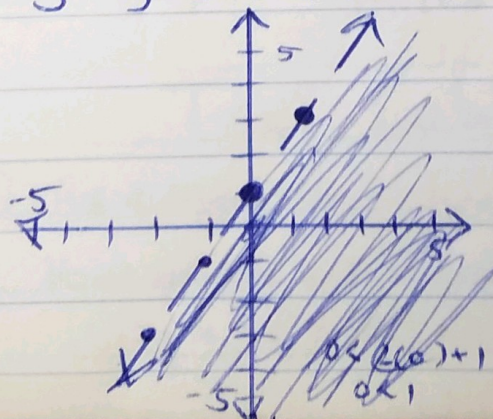$-y = -4x + 2$
$y = ④x - 2$

Graphing Linear Inequalities

① Graph the boundary with a solid or dashed line.

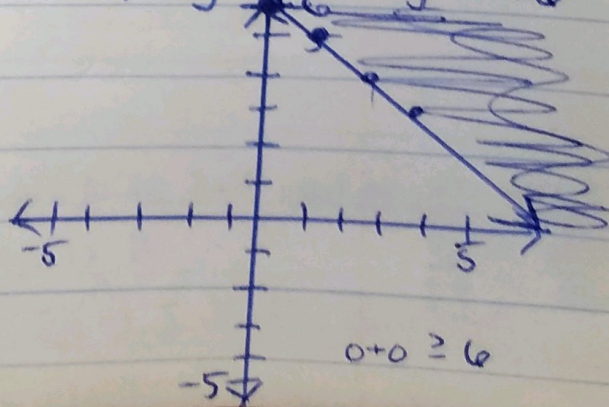② Test a point, $(0,0)$ is good, to determine shading.

→ If $(0,0)$ works, shade that side.

→ If $(0,0)$ doesn't work, shade the other side.

Ex #3 $y < 2x + 1$

$0 < 2(0) + 1$
$0 < 1$

EX #4 $x + y \geq 6 \Rightarrow y \geq -x + 6$

$0 + 0 \geq 6$

Word Problem

Ex #5 A taxi company charges an initial fee of $4.50 plus $3.00 per mile.

a) make a table that shows what it would cost to take a taxi for tips 1, 2, 3, 4, & 5 miles.

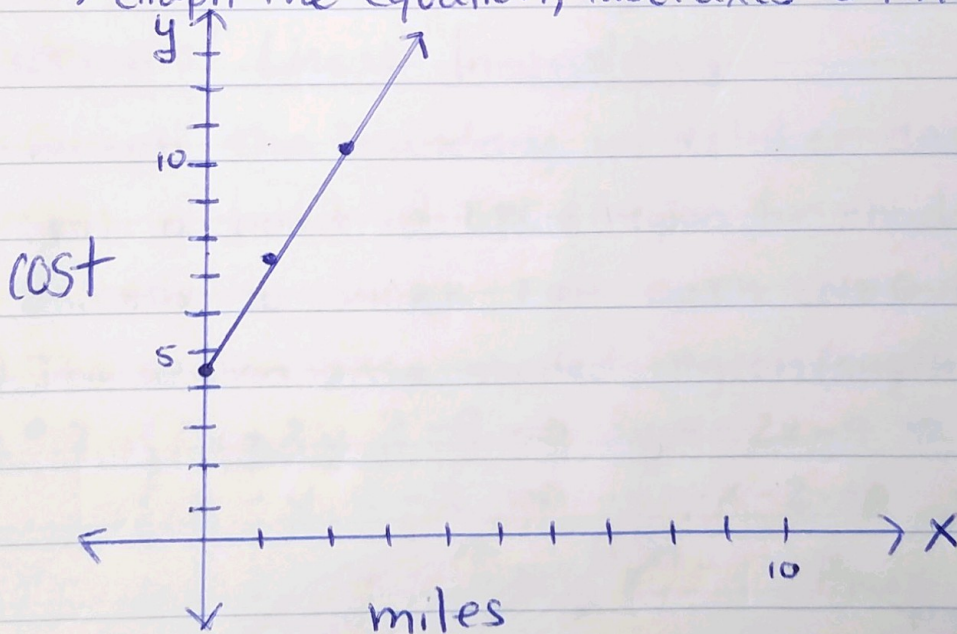| miles	1	2	3	4	5
cost ($)	7.50	10.50	13.50	16.50	19.50

b) Write an equation that models the situation. What do the variables represent?

$$y = 3x + 4.5$$

$x = $ # of miles
$y = $ cost in $ of total trip

c) Graph the equation, label axes & title graph.

cost

miles

Taxi Cab Cost

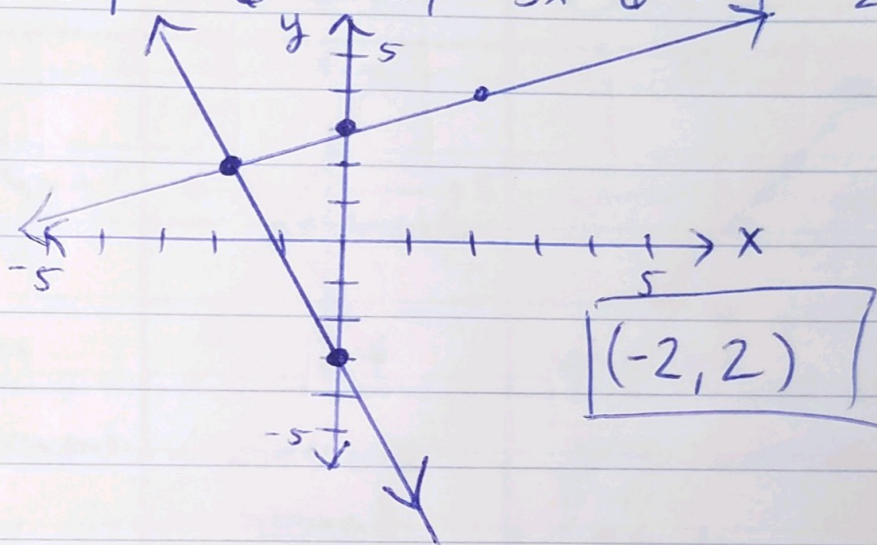d) The distance from here to the park is 2.4 miles. How much will it cost to get there?

$$y = 3(2.4) + 4.5 = 7.2 + 4.5 = 11.7$$

it will cost
$11.70

Systems of Linear Equations

① Sketch both lines on one graph.

② The solution is the intersection point.

Ex #6 $\begin{cases} x - 2y = -6 \Rightarrow -2y = -x - 6 \Rightarrow y = \frac{1}{2}x + 3 \\ 5x + 2y = -6 \Rightarrow 2y = -5x - 6 \Rightarrow y = -\frac{5}{2}x - 3 \end{cases}$

$$\boxed{(-2, 2)}$$

Systems of Linear Inequalities

① Graph the boundary w/ solid or dashed lines.

② Test a point in EACH region for shading

 (NEEDS TO WORK FOR BOTH INEQUALITIES!)

③ The solution is the shaded region (anything inside it).

Ex #7 $\begin{cases} 2x + 3y \geq -9 \Rightarrow 3y = -2x - 9 \Rightarrow y = -\frac{2}{3}x - 3 \\ x - y < -2 \Rightarrow -y = -x - 2 \Rightarrow y = x + 2 \end{cases}$

$(0,0)$
$2(0) + 3(0) \geq -9$
$0 \geq -9$ ☺
$0 - 0 < -2$
$0 < -2$ ☹

$(-3, 3)$

$2(-3) + 3(3) \geq -9$
$-6 + 9 \geq -9$
$3 \geq -9$ ☺
$-3 - 3 < -2$
$-6 < -2$ ☺