Math10FPC

Chapter 7:

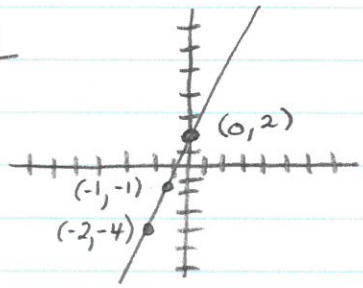
Slope Intercept form:

$y = mx + b$

$\text{slope} = \frac{\text{rise}}{\text{run}}$ or $\frac{y_2 - y_1}{x_2 - x_1}$

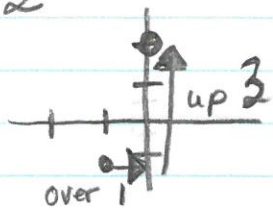
→ m = slope
→ b = y intercept

ex



y intercept = (0,2)
so $b = 2$

Slope is $\frac{\text{rise}}{\text{run}}$



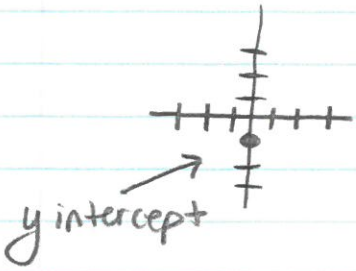
$= \frac{3}{1}$ or 3.

so equation of this line is
$y = 3x + 2$

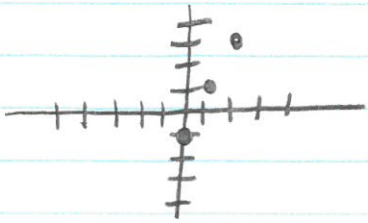
To use slope intercept for to draw a graph

ex $y = 2x - 1$

① put a dot on y intercept
② put slope into a fraction ⇒ $y = \frac{2}{1}x - 1$



③ Use slope to find next point

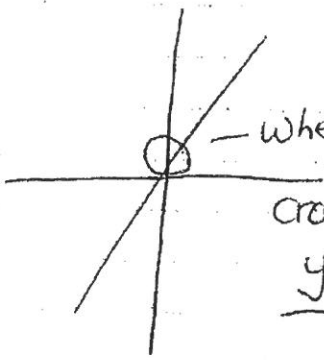


$m = \frac{2}{1}$ ↑ up → over

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

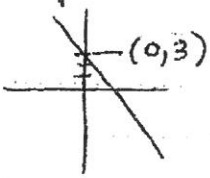
* Slope $= \dfrac{y_2 - y_1}{x_2 - x_1}$

* y intercept $\longrightarrow$



where the line crosses the y axis

the y intercept on the graph below



is at 3 or more acturately written (0,3)

In the y intercept form $y=mx+b$

slope $= m$

y intercept is b.

Ex The slope of the line is -2
the y intercept is 12

So the equation of the line is:

$$y = \underbrace{\boxed{-2}}_{\text{slope}}\,x \underbrace{\boxed{+12}}_{\text{y intercept}}$$

* you now can use this equation to find other values on the line.

Find the equation

using a table of values:

x	y
0	1
1	3
2	5

← * remember that this is the y intercept ⇒ when x = 0

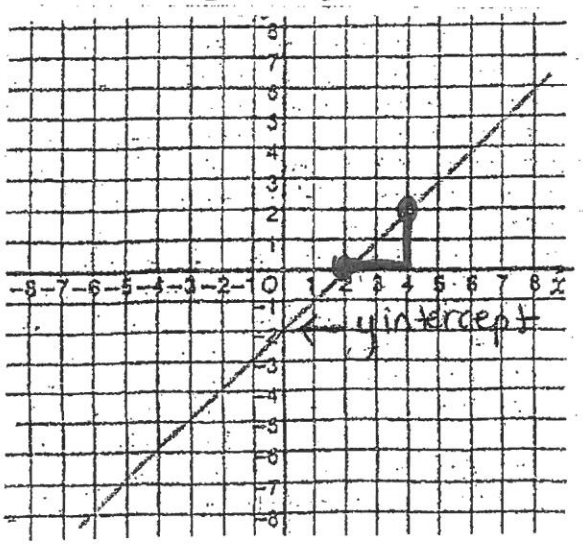
① find the slope $\frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{3-1}{1-0} = \frac{2}{1} = 2$

② put into the formula.

$y = 2x + 1$

Using a graph:



y intercept = (0, −2)

* pick 2 points to find slope (4, 2); (2, 0)

$\frac{0-2}{2-4} = \frac{-2}{-2} = 1$

So equation ⇒

$y = 1x - 2$

or $y = x - 2$

7.2 - General Form

$Ax + By + C = 0$

* A, B & C have to be whole numbers (no fractions allowed)
* A has to be positive.

To rewrite an equation in general form use your mad algebra skills.

ex $y = 2x + 3 \Rightarrow -2x + y = +3 \Rightarrow \boxed{-2x + y - 3 = 0}$

$-2x \quad -2x \qquad -3 \quad -3$

$-1(-2x + y - 3) = 0$

* * * remember the number infront of x has to be positive so multiply the whole equation by -1.

$\boxed{2x - y + 3 = 0}$

General Form - used to find x & y intercepts

$3x - 4y + 12 = 0$

$\boxed{x = 0 \text{ (y intercept)}}$

$3(0) - 4y + 12 = 0$

$-4y + 12 = 0$

$\therefore y = 3$

$\boxed{y = 0 \text{ (x intercept)}}$

$3x - 4(0) + 12 = 0$

$3x + 12 = 0$

$\therefore x = -4$

ex 2

$$y = \cancel{\frac{2}{3}x} - \frac{5}{4} \Rightarrow -\frac{2}{3}x + y = \cancel{-\frac{5}{4}}$$

$$-\frac{2}{3}x \qquad \cancel{-\frac{2}{3}x} \qquad +\frac{5}{4} \qquad \cancel{+\frac{5}{4}}$$

$$\Rightarrow -\frac{2}{3}x + y + \frac{5}{4} = 0$$

*** A, B, C can't be fractions & A has to be positive.

So → find a common denominator & multiply the equation by it

$$\left(-\frac{2}{3}x + y + \frac{5}{4} = 0\right)^{\times 12} \Rightarrow -8x + 12y + 15 = 0$$

* multiply by -1 to make Ax +

$$= \boxed{8x - 12y - 15 = 0}$$

Use General Form to graph

* using algebra

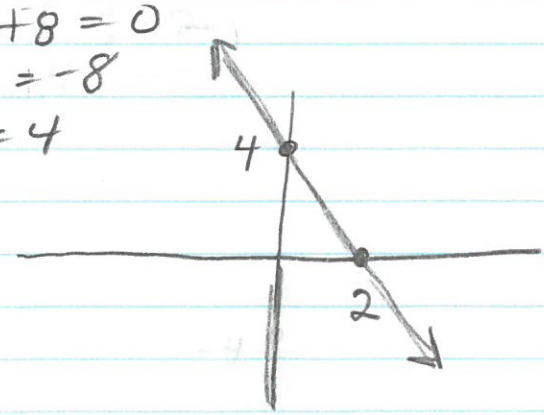
$$4x - 2y + 8 = 0$$

$x = 0$ (y intercept)

$$4(0) - 2y + 8 = 0$$
$$-2y + 8 = 0$$
$$-2y = -8$$
$$y = 4$$

$y = 0$ (x intercept)

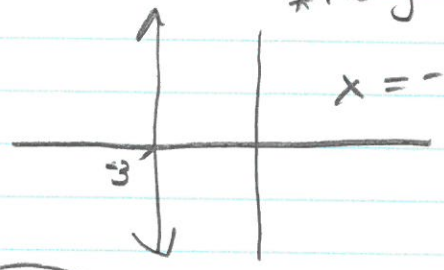
$$4x - 2(0) + 8 = 0$$
$$4x - 8 = 0$$
$$4x = 8$$
$$x = 2$$



Types of lines

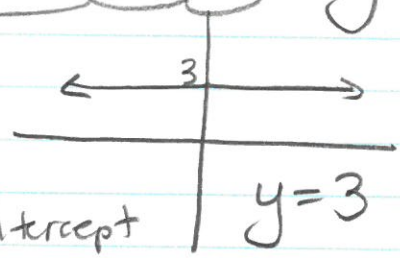
vertical ⇒ x = lines

horizontal ⇒ y = lines



*no y intercept

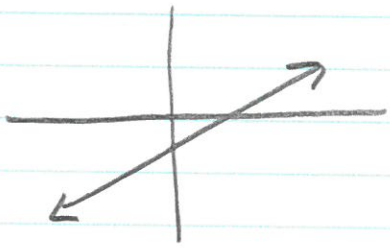
x = -3



*no x intercept

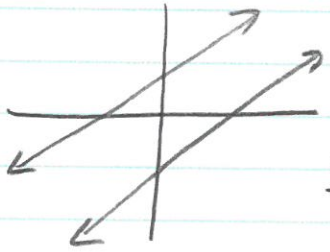
y = 3

oblique lines (have x & y)



*both x & y intercepts

Parallel lines:



have the same slope

ex $y = 2x + 3$ has a parallel line which goes through $(5, 0)$ (x, y)

① same slope ∴ $y = \underline{\underline{2}}x + b$ ② now sub in given x & y points

$0 = 2(5) + b$

$0 = 10 + b$

$-10 \quad -10$

$b = -10$

∴ equation = $y = 2x - 10$

Perpendicular Lines

↳ slope is the negative reciprocal

ex if slope of one equation is 5

then → $\frac{5}{1}$ ↻ $\times -1$ ⇒ perpendicular slope is $-\frac{1}{5}$