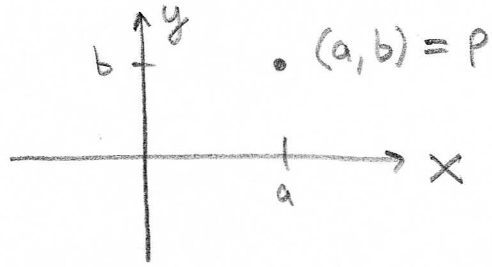
Graphing Equations (§1.1)



P has x-component a

P has y-component b

P is distance $\sqrt{a^2+b^2}$ from the origin (0,0).

Def^{n}/ The "graph" of an equation is the set of all points (x, y) that solve the equation. The x-intercept (s) is where $y=0$ on the graph. The y-intercept (s) is where $x=0$ on the graph.

$F(x, y) = 0$: Equation with (x,y) on graph)

$F(x,y) = 0$ and $y=0$: Conditions for x-intercepts

$F(x,y) = 0$ and $x=0$: Conditions for y-intercepts.

E52 Consider $y=\sqrt{x+4}$ is the point $(0, 2)$ on the graph? What about $(1, -2)$? Notice

$(0,2)$: $x=0$ \$ $y=2 \longrightarrow 2=\sqrt{0+4}=\sqrt{4}=2$ ✓

$(1,-2)$: $x=1$ \$ $y=-2 \longrightarrow -2=\sqrt{1+4}=\sqrt{5}\neq -2$ no. not on the graph.

E53 Find intercepts for $y=16-4x^2$.

x-intercepts) $y=0=16-4x^2 \Rightarrow 4x^2=16$

$\Rightarrow x^2=4$

$\Rightarrow \boxed{x=\pm 2}$

y-intercept) $y=16-4(0)^2$

$\Rightarrow \boxed{y=16}$

- See picture for §1.1 #9 it agrees with my algebra here.

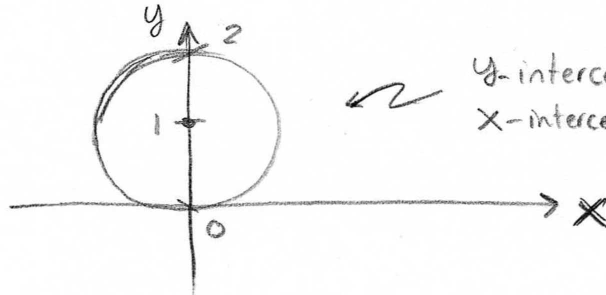
Def^n/ A circle of radius $R>0$ centered at (h,k) is the set of all points distance R from (h,k). It is the graph of the equation

$$(x-h)^2 + (y-k)^2 = R^2$$

E54 A circle at $(1,2)$ with radius 6 has the eq^n

$$(x-1)^2 + (y-2)^2 = 36.$$

E55 $x^2 + (y-1)^2 = 1$ is a circle with $R=1$ and $(h,k) = (0,1)$.



y-intercepts 0, 2.
x-intercept 0.

Linear Equations in One Variable (§1.2)

E56 Solve

$$x+8 = 2(x-2) - x$$
$$x+8 = 2x - 4 - x$$
$$x+8 = x-4$$
$$\Rightarrow 8 = -4$$

thus there are no sol^n's.

E57 Solve

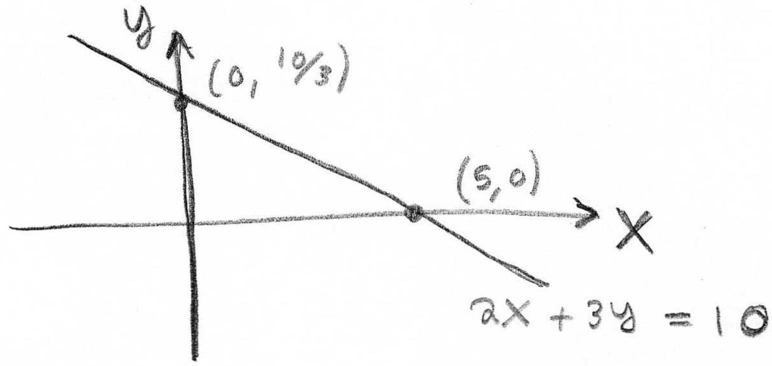
$$10 - \frac{13}{x} = 4 + \frac{5}{x}$$
$$\Rightarrow 6 = \frac{13}{x} + \frac{5}{x} = \frac{18}{x}$$
$$\Rightarrow 6x = 18$$
$$\Rightarrow x = 3.$$

$\boxed{E58}$ $2x + 3y = 10$ find intercepts, then graph. the equation.

$\underline{x=0|}$ $3y = 10 \rightarrow y = 10/3$ is y-intercept

$\underline{y=0|}$ $2x = 10 \rightarrow x = 10/2 = 5$ is x-intercept.

Thus, we have a <u>line</u> with points $(0, 10/3)$ and $(5, 0)$
So graphing this is as simple as connecting the dots,



Notice $2x + 3y = 10 \Rightarrow \underline{y = \frac{10}{3} - \frac{2}{3}x}$. Perhaps you recall negative-slopes look like the one graphed above.

$\boxed{E59}$ $6x + ax = 2x + 5$: solve for x.

$$4x + ax = 5$$

$$x(4+a) = 5$$

$$\boxed{x = \frac{5}{4+a}} \quad \text{provided } a \neq -4.$$

(If $a = -4$ then there are no sol^{n}'s)