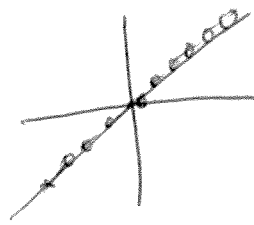


Parent
 $y = x$

EQ



Graph

x	y
1	1
2	2
2	3

Data

$$y = 3x$$



Stretch

$$\frac{y}{3} = x$$

stretches
along y-axis

$$y = \frac{x}{2} \leftarrow \text{stretch along x-axis}$$

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

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

More stretch in y-dir

$$\frac{y}{\frac{1}{2}} = \frac{x}{\frac{2}{3}} \text{ more in } x$$

Move Left or Right

Line

$$y = x$$

~~$y = x$~~

$$y = (x - 2)$$

Right by 2

+2

$$(y + 2) = x$$



down by 2

$$(y - 7) = (x + 3)$$

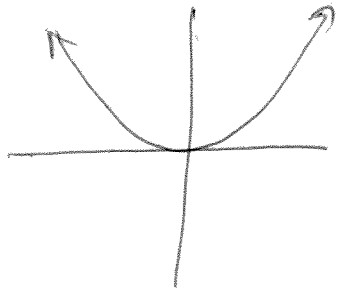
up 7 Left by 3

$$y - 7 = x + 3$$

$$y = x + 10$$

Parent

$$y = x^2$$



$$\underline{\underline{y}} = \frac{x^2}{2} \rightarrow y = \frac{3}{2}x^2$$

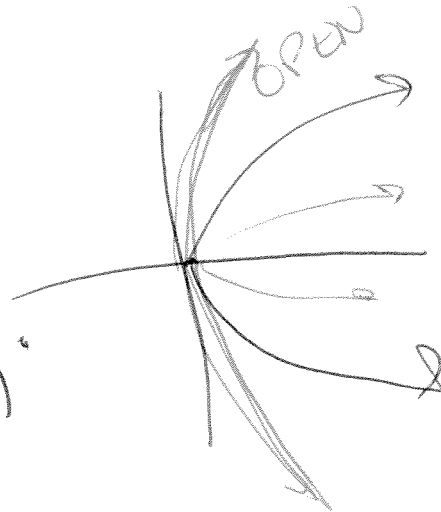
③ stretch toward "y"

$$x = y^2$$

NOT A FUNCTION

$$\frac{x}{4} = \underline{\underline{y^2}}$$

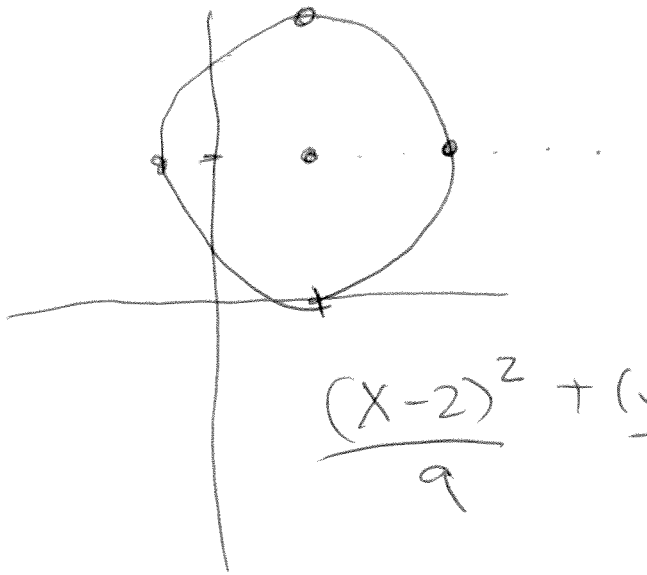
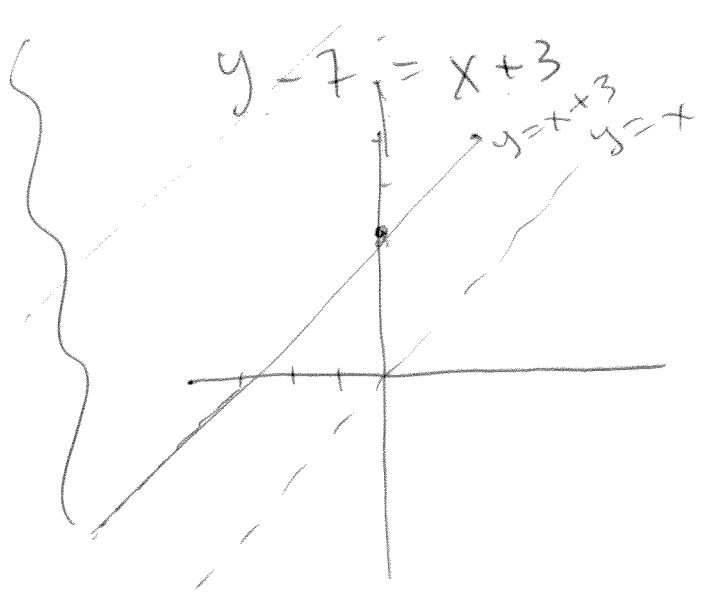
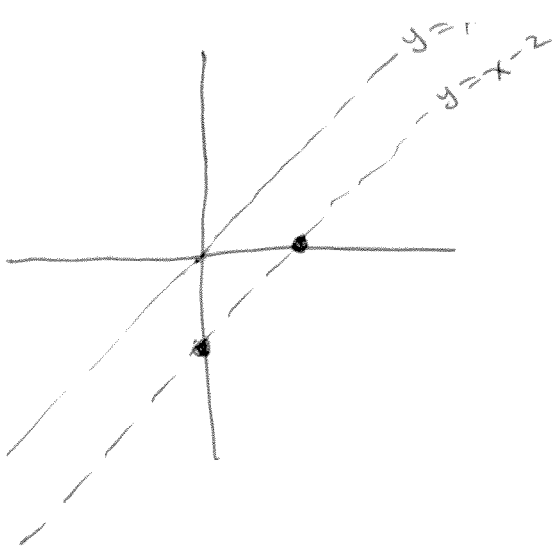
stretch in "y"



x	y
4	2
4	-2
0	0

$$y = \pm\sqrt{x}$$

$$y = \pm\sqrt{\frac{9}{4}x}$$



EQUATION OF CIRCLE

STANDARD FORM

$$\frac{(X-2)^2}{9} + \frac{(y-3)^2}{9} = 1$$

$$\frac{(X+1)^2}{4} + \frac{(y-2)^2}{4} = 1$$

Center: $(-1, 2)$

Left by 1

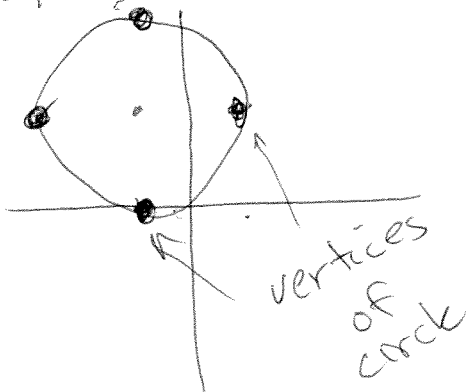
UP by 2

Stretch by $2 = \sqrt{4}$

In X

in Y

Circle of radius 2



$(-1, 0)$ makes equation TRUE

$$0 + \frac{4}{4} = 1$$

$$\frac{2^2}{4} + 0 = 1$$

X	Y
-1	0
1	2

$$(y-3) = (x-2)^2 \rightarrow y = (x-2)^2 + 3$$

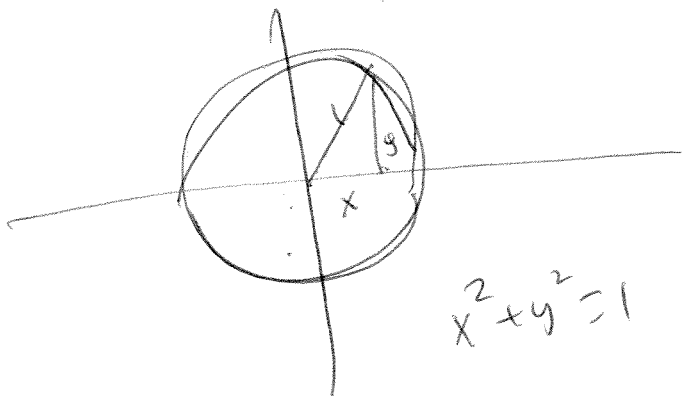
$$y = x^2$$

$$\frac{(y-3)}{7} = \frac{(x-2)^2}{5} \rightarrow y = \frac{7}{5}(x-2)^2 + 3$$

Circle $x^2 + y^2 = 1$

$$y^2 = 1 - x^2$$

$$y = \pm \sqrt{1 - x^2}$$



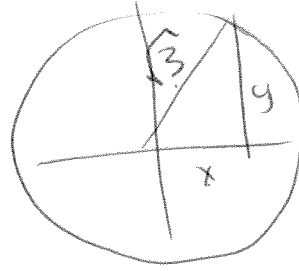
x	y
1	0
0	1
$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$

$$x^2 + y^2 = 3$$

~~Ex~~

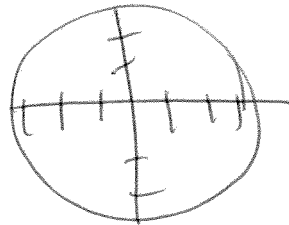
$$x^2 + y^2 = 1$$

Stretches by $\sqrt{3}$ in x
& y



~~Ex~~

$$\frac{x^2}{9} + \frac{y^2}{9} = 1$$



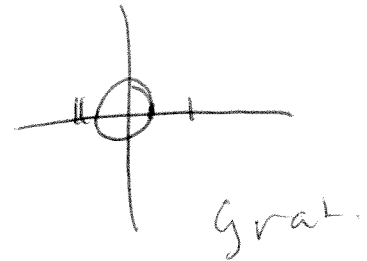
~~Ex~~

Form

$$\frac{x^2}{\frac{1}{4}} + \frac{y^2}{\frac{1}{4}} = 1$$

$$4x^2 + 4y^2 = 1$$

$$x^2 + y^2 = \frac{1}{4}$$



Ex

$$\frac{(x-2)^2}{9} + \frac{(y-3)^2}{9} = 1$$

Rest by 2
up by 3
Radius of $\frac{3}{2}$

Circle in standard Form

$$\frac{(x-h)^2}{r^2} + \frac{(y-k)^2}{r^2} = 1$$

Center (h, k)
Radius r .

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

General Form

$$Ax^2 + Ay^2 + Bx + Cy + D = 0$$

This is a circle

Ex $x^2 + y^2 + 2x - 4y - 7 = 0$

$$x^2 + 2x + \textcircled{1} + y^2 - 4y + \boxed{4} = 7 + \textcircled{1} + \boxed{4}$$

$$(x+1)^2 + (y-2)^2 = 12$$

Center $(-1, 2)$ Radius $\sqrt{12}$

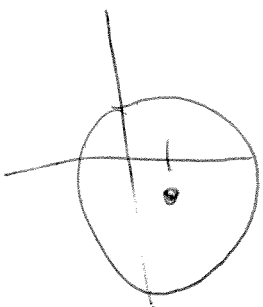
Ex $3x^2 + 3y^2 - 9x + 3y - 8 = 0$

$$3x^2 - 9x + 3\textcircled{0} + 3y^2 + 3y + 3\boxed{} = 8 + 3\textcircled{0} + 3\boxed{}$$

$$3(x^2 - 3x + \textcircled{9/4}) + 3(y^2 + y + \boxed{1/4}) = 8 + 3\textcircled{9/4} + 3\boxed{1/4}$$

$$3(x - 3/2)^2 + 3(y + 1/2)^2 = 8 + \frac{27}{4} + \frac{3}{4}$$

$$(x - 3/2)^2 + (y + 1/2)^2 = \frac{51/2}{3} = 5/6$$

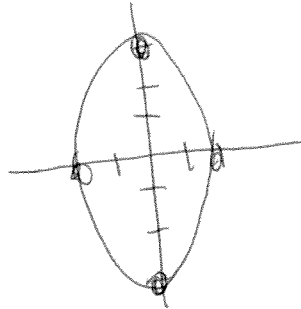


Ellipse

$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

\swarrow \swarrow
 2^2 3^2

x	y
2	0
-2	0
0	3
0	-3



Ex

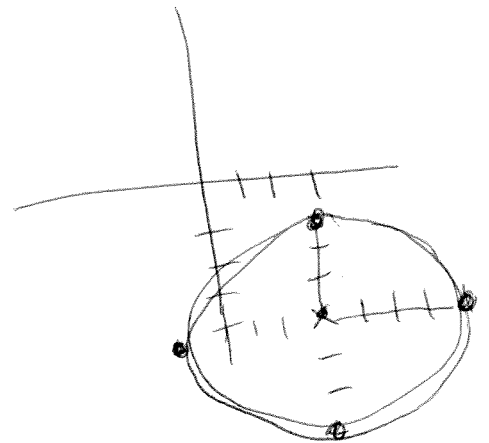
$$\frac{(x-3)^2}{16} + \frac{(y+4)^2}{9} = 1$$

Center (3, -4)

Standard Form

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

\swarrow \swarrow
 stretch x stretch y



General Form

$$Ax^2 + By^2 + Cx + Dy + E = 0 \text{ stretch } 5 \text{ in } y$$

A & B same sign

$$\frac{y^2}{25} + \frac{x^2}{16} = 1$$

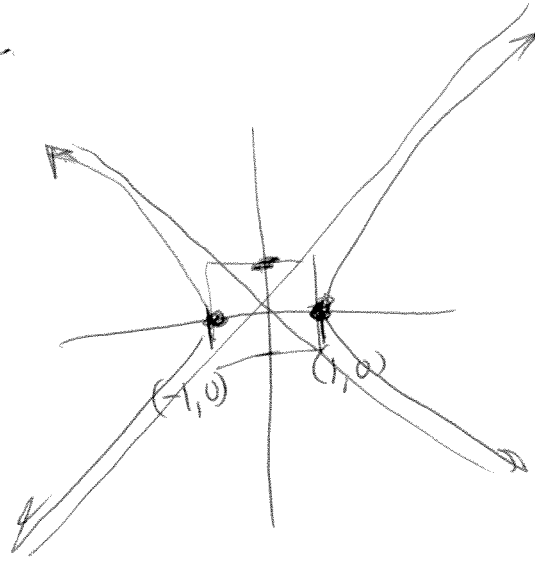
\downarrow \uparrow
 5 in y 4 in x

Hyperbola

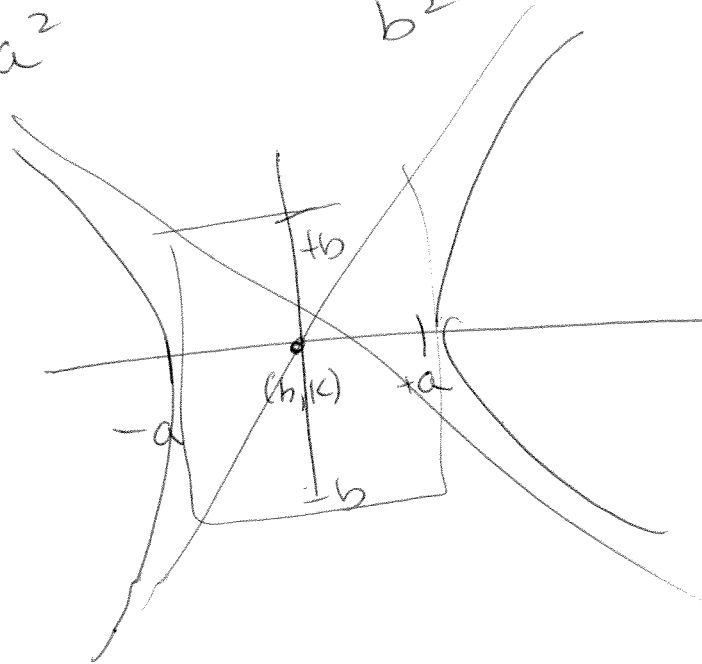
$$x^2 - y^2 = 1$$

$$y^2 = x^2 - 1$$

$$y = \pm \sqrt{x^2 - 1}$$



$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$



General Form

$$Ax^2 - By^2 + Cx + Dy + E = 0$$

$$-3x^2 + 4y^2 - 8 = 0$$

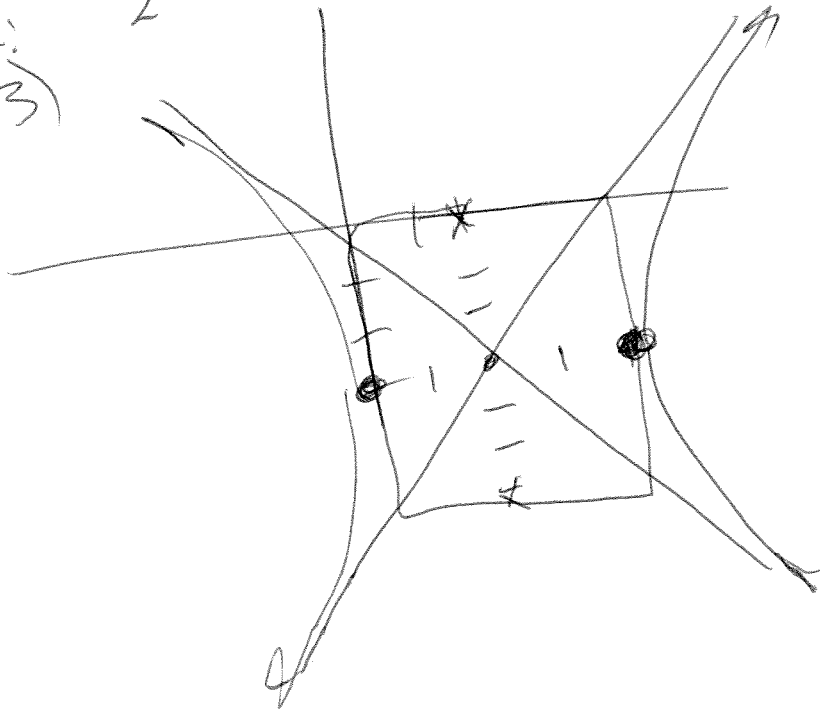
$$3x^2 - 4y^2 + 8 = 0$$



Ex $\frac{(x-2)^2}{4} - \frac{(y+3)^2}{9} = 1$

$2^2 = 4$

Center: $(2, -3)$



OR

EX $\frac{(y+2)^2}{1} - \frac{(x+3)^2}{9} = 1$

Center $(-3, -2)$

