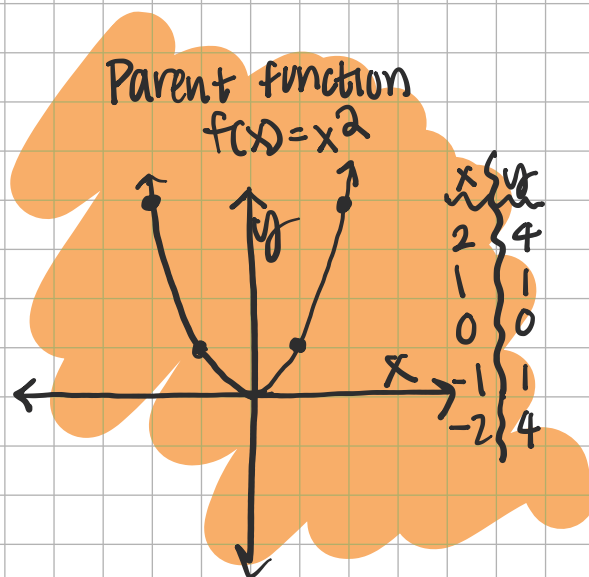
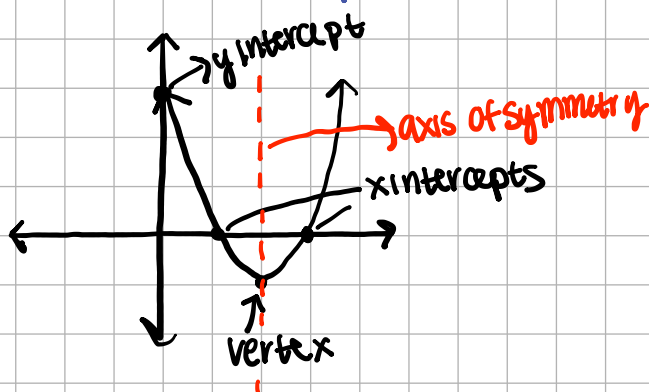


Quadratic Functions

a Quadratic function is represented by a polynomial equation of degree 2

Ex) $y = 3x^2$ $y = 5(x+1)^2$ $f(x) = -x^2 - 3$

The graph of quadratic is a parabola



3 forms of Quadratic Functions

1) Transformation form (aka vertex form)

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

2) Standard form

$$y = ax^2 + bx + c$$

3) Intercept form (aka factored form)

$$y = a(x-p)(x-q)$$

Transformation

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

Vertex
(h, k)

a = when a has a negative sign next to it ($-a$), the graph is

when a is positive, the graph is

h = $-h$ is a shift to the right
 $+h$ is a shift to the left

k = $+k$ is a shift up
 $-k$ is a shift down

What happens when a gets small or large?

$1 < a$ (ex 2, 3, 4, $\frac{9}{4}$) vertical stretch or horizontal shrink

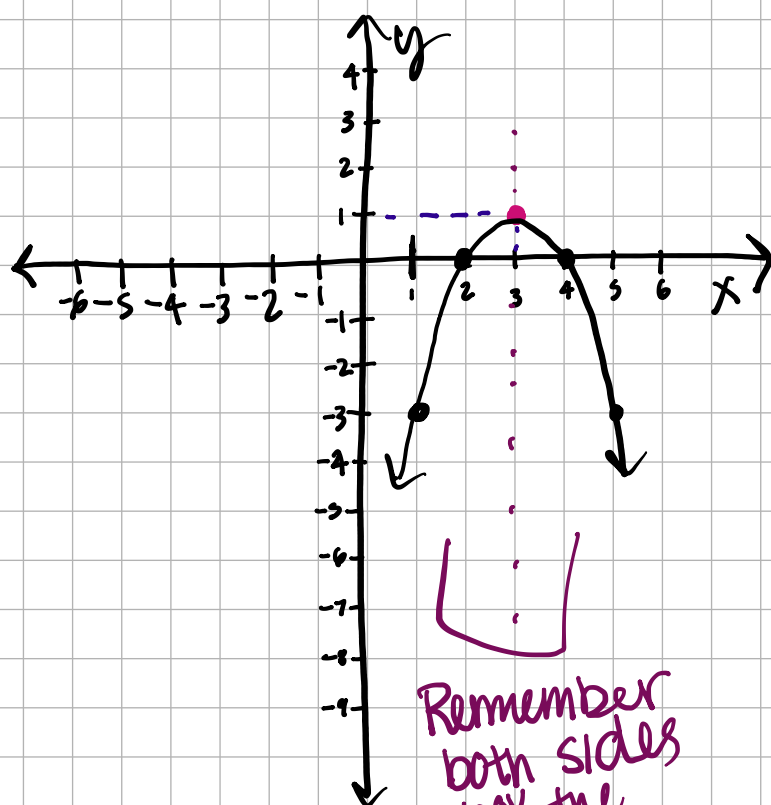
$0 < a < 1$ (ex $\frac{3}{7}$, $\frac{1}{2}$, $\frac{2}{5}$) vertical shrink horizontal stretch

Graph a Quadratic!

$$f(x) = -(x-3)^2 + 1$$

vertex
(h,k)
(3,1)

Reflection across
x axis (so the graph
looks like ↴)



The horizontal
shift right 3
and vertical
shift up 1

Plug points!

x	f(x)
2	0
3	1
4	0

Standard form

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

$$\begin{aligned} & -(x-3)(x-3) + 1 \\ & -(x^2 - 3x - 3x + 9) + 1 \\ & -(x^2 - 6x + 9) + 1 \\ & -x^2 + 6x - 9 + 1 \end{aligned}$$

$$y = -x^2 + 6x - 8$$

Factored form

$$y = -x^2 + 6x - 8$$

$$-(x^2 - 6x + 8)$$

$$y = -(x-4)(x-2)$$