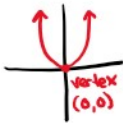
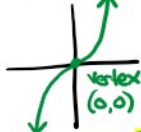


Quadratic Function
 $f(x) = x^2$



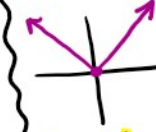
Cubic Function
 $f(x) = x^3$



Square Root Function
 $f(x) = \sqrt{x}$



Absolute Value Function
 $f(x) = |x|$



Reciprocal Function
 $f(x) = \frac{1}{x}$ ← cannot be zero

↑ cannot be zero



Horizontal Asymptote $y=0$ (x-axis)

Vertical Asymptote $x=0$ (y-axis)

- Asymptotes**
- ① The graph cannot cross an asymptote
 - ② Graphs get infinitely close to asymptotes
 - ③ Graphs do not "bounce off/away" from an asymptote

$f(x) = A(x+B)^2 + C$
vertex @ $(-B, C)$

$f(x) = A(x+B)^3 + C$
vertex @ $(-B, C)$

$f(x) = A\sqrt{x+B} + C$
vertex @ $(-B, C)$

$f(x) = A|x+B| + C$
vertex @ $(-B, C)$

$f(x) = A \cdot \frac{1}{x+B} + C$

$f(x) = \frac{A}{x+B} + C$

vertex @ $(-B, C)$

↑ point where asymptotes intersect

B-Values: move the graph LEFT / RIGHT

$f(x) = x^2$

$f(x) = (x-4)^2 + 0$
B = -4 (Right 4)



vertex @ $(-B, C)$
 $(4, 0)$

C-Values: move the graph UP / DOWN

$f(x) = \sqrt{x}$

$f(x) = \sqrt{x} + 2$
C = 2 (Up 2)



vertex @ $(-B, C)$
 $(0, 2)$

A-Values:

• IF $A < 0$ (negative), then graph is flipped up/down

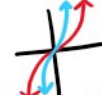
$f(x) = x^3$
 $f(x) = -x^3$
A = -1 (flip)



• IF $A > 1$ (big #), then the graph gets stretched



$f(x) = 4x^2$



$f(x) = 5x^3$



$f(x) = 2\sqrt{x}$



$f(x) = \frac{5}{2}|x|$

• IF $0 < A < 1$ (small fraction), then the graph gets squished



$f(x) = \frac{1}{2}x^2$



$f(x) = \frac{1}{4}x^3$



$f(x) = \frac{3}{5}\sqrt{x}$



$f(x) = \frac{3}{4}|x|$

ex $f(x) = -2|x-3| + 1$

A = -2 (Flip graph (negative) stretch (big #))
B = -3 (Right 3)
C = 1 (Up 1)

vertex @ $(-B, C)$
 $(3, 1)$

Flip graph (negative) stretch (big #)

Right 3

Up 1

① Plot vertex

② Draw graph shape, taking into account A-value adjustments

