

5.1 Quadratic Functions

$$y = x^2$$

$$f(x) = ax^2 + bx + c$$

$$f(x) = x^2 + 5x + 6$$

Linear, line
 $y = x$

Constant
 $y = 2$ horizontal line

Absolute Value
 $y = |x|$
 V-shape

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

FOIL

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

$$f(x) = 2x^2 + 5x + 3$$

Quadratic

$$f(x) = x^2(x+4)$$

$$f(x) = x^3 + 4x^2$$

Cubic

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

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

$$f(x) = x^2 + 5$$

Quadratic

$$f(x) = ax^2 + bx + c$$

$$f(x) = x^2 + 0x + 5$$

$$f(x) = 0x^2 + 4x + 3$$

$$f(x) = 4x + 3$$

Linear

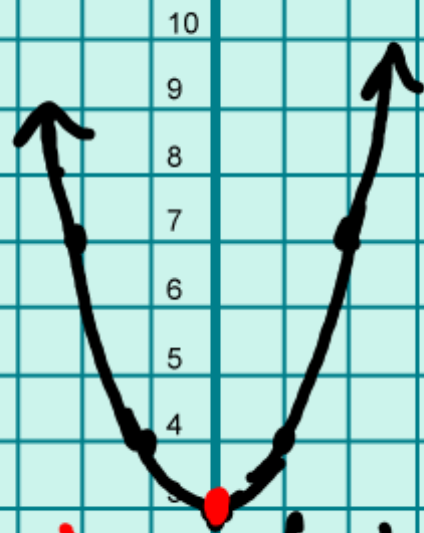
Graph

Parabola

U-Shape

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

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



$(0, 3)$

Vertex

Opens Upward

X

-14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13 14

-1

-2

-3

-4

-5

-6

-7

-8

-9

-10

Minimum

$$f(x) = ax^2 + bx + c$$

$$a > 0$$

Y

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

$$y = x^2 + 3$$

$$x = y^2 + 3$$

Opens Downward

X

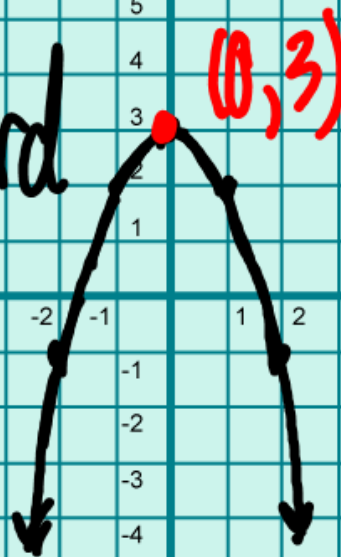
Maximum

$$f(x) = ax^2 + bx + c$$

$$a < 0$$

neg

Y

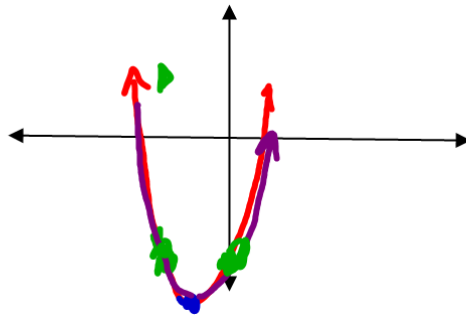


$$f(x) = x^2 + x - 12$$

Minimum Opens upward

2nd Calc Trace

3 Minimum



$$(-5, -12.25)$$

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

$$f(x) = -x^2 + 5x + b$$

Opens ~~Downward~~

Maximum Vertex