Vertex (h,k) form of a Quadratic

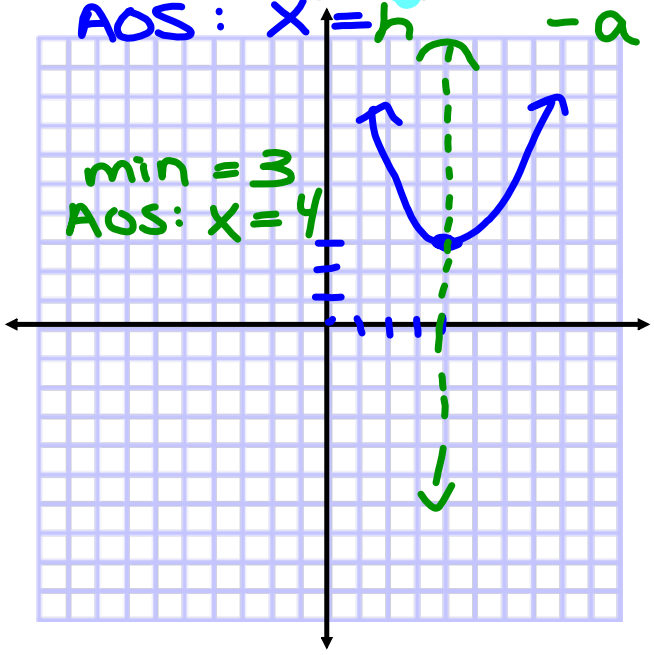
- Standard Form:

$y = ax^2 + bx + c$ $x = \frac{-b}{2a}$ AOS

$vertex\ form: y = \pm a(x-h)^2 + k$

$vertex: (h,k)$ $+a$ = min at k

AOS: $x = h$ $-a$ = max at k



$y = (x-4)^2 + 3$

R+4 up 3

vertex

(4,3)

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

$(x-(-3))^2 + 5$

$(x+3)^2 + 5$

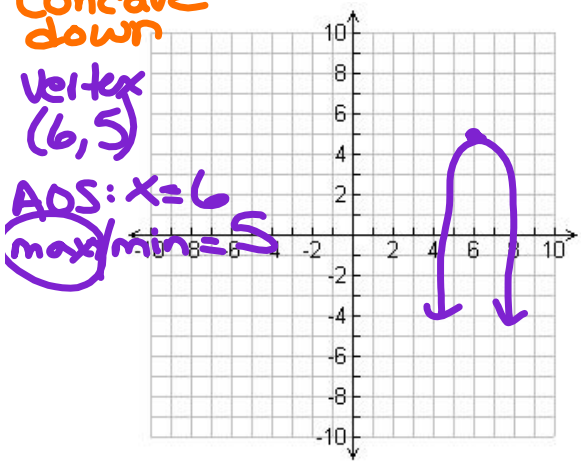
V: (-3,5)

Sketch the graph

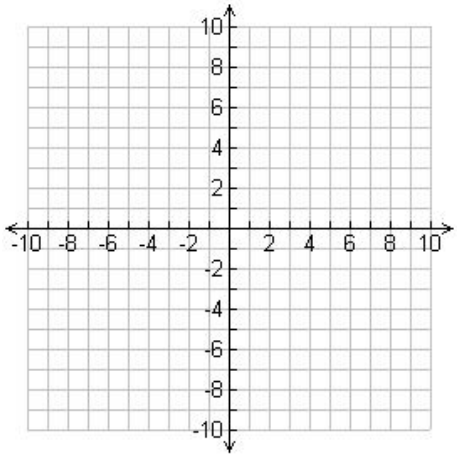
Identify all important parts.

1. $y = -3(x-6)^2 + 5$

Concave down
Vertex (6, 5)
AOS: $x = 6$
max/min = 5



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



Another

$$y = 3x^2 - x - 2$$

V: (0.17, -2.08)

min = -2.08

AOS: x=0.17

Zeros: -0.67, 1

D $(-\infty, \infty)$

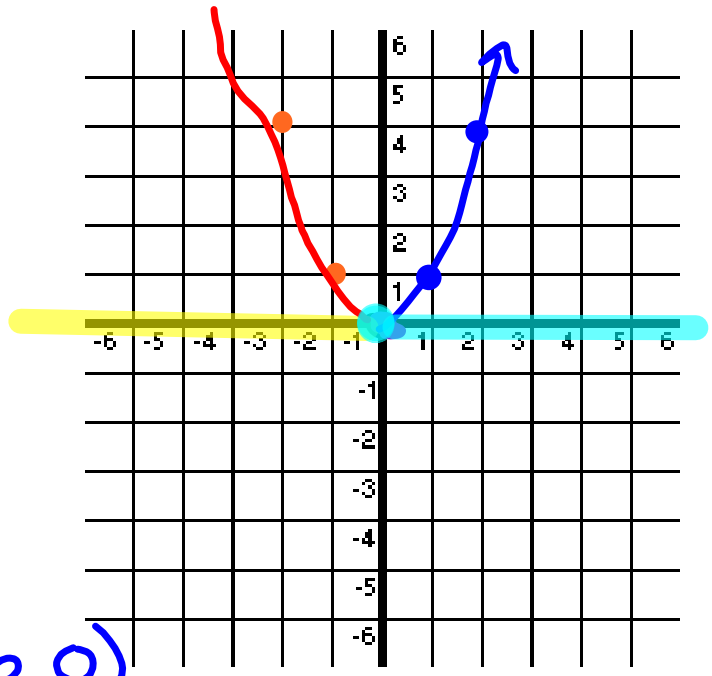
R $[-2.08, \infty)$

Intervals of Increasing and Decreasing

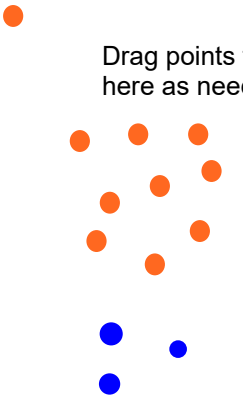
The Quadratic Parent Graph

$y = x^2$

x	y
-2	4
-1	1
0	0
1	1
2	4

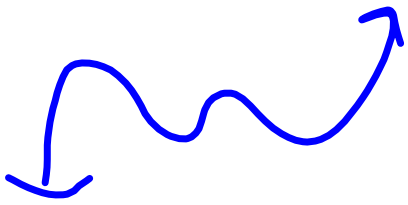


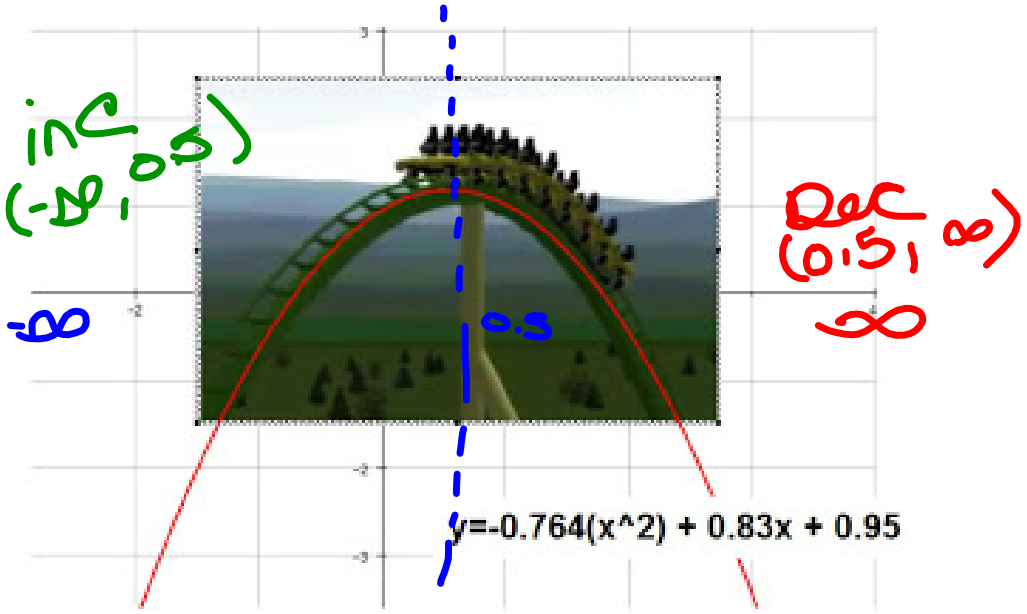
Drag points from here as needed



Dec $(-\infty, 0)$

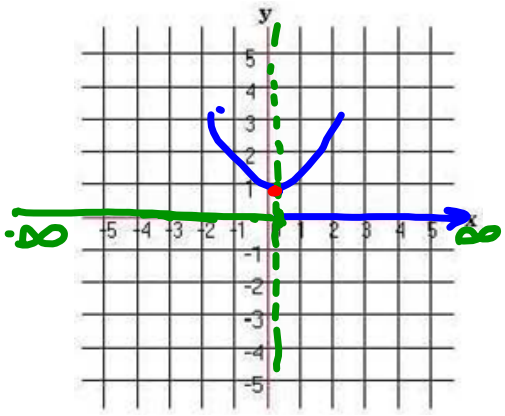
Inc $(0, \infty)$




inc
(-∞, 0.5)
-∞
0.5
dec
(0.5, ∞)
∞
y=-0.764(x^2) + 0.83x + 0.95

Find the following:

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



Vertex: (0.25, 0.75)

AOS: x = 0.25

Max/Min: 0.75

Inc: (0.25, ∞)

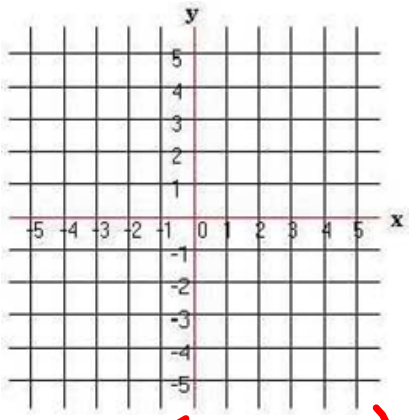
Dec: (-∞, 0.25)

Zeros: No real zeros

Domain: (-∞, ∞) Range: [0.75, ∞)

Find the following:

$$y = -3x^2 - 5x - 7$$



Vertex: (-0.83, -4.92) ordered pair

AOS: x = -0.83 x-value x=

Max/Min: -4.92 y-value

Inc: (-∞, -0.83)

Dec: (-0.83, ∞)

Zeros: No real Zeros

Domain: (-∞, ∞)

Range: (-∞, -4.92]