October 19, 2023

Quadratic Functions

$y = ax^2 + bx + c$ – must have x^2 as highest power term.

$x^2 - 2x - 14$

$y = x^2$

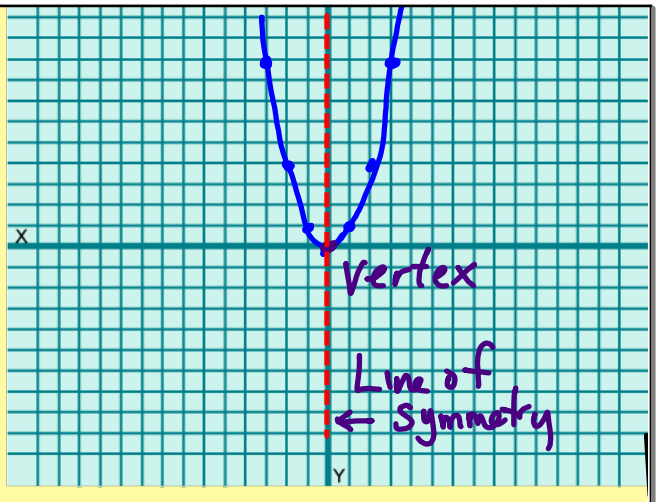
$y = 2x^2$

x	y
0	0
1	2
2	8
3	18

parabola

line of symmetry: $x = 0$

$x =$ x-coord of Vertex

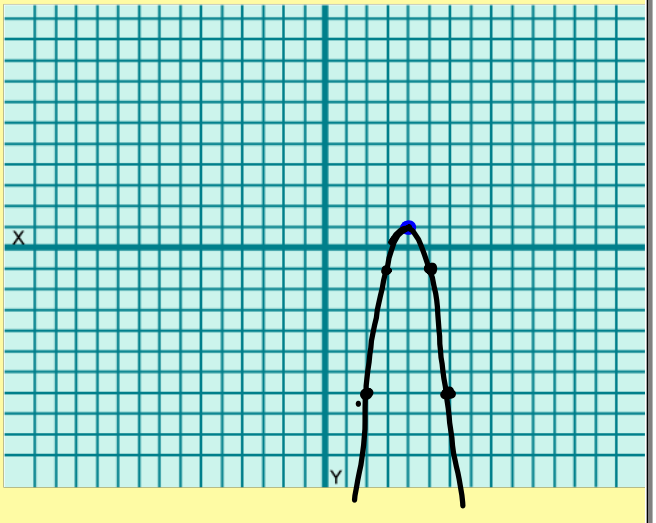


$y = -2(x-4)^2 + 1$

Right 4 ↑ up 1

Vertex: (4, 1)

x	y
0	0
1	-2
2	-8
3	-18



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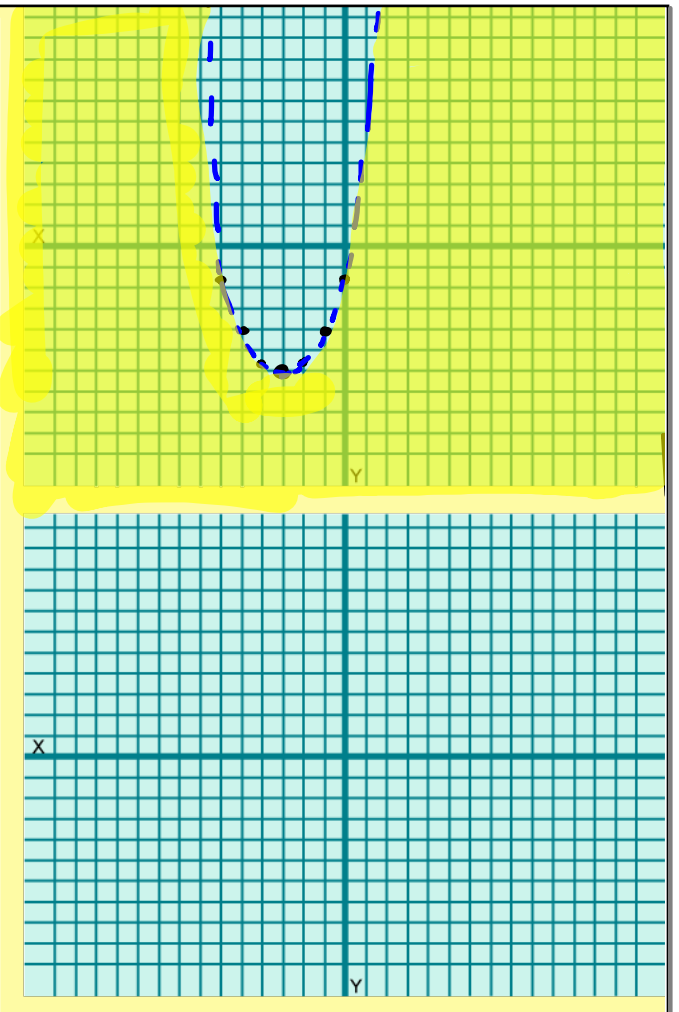
$y < \frac{1}{2}(x+3)^2 - 6$

left 3 ↑ down 6

Vertex: $(-3, -6)$

0	0
1	1 ½
2	4 2
3	9 4.5



$y = -5(x-4)^2 + 7$

Book - Describe all transformations

Up 7

Right 4

Reflect over x-axis

Narrow (vertical stretch)

$y = \frac{2}{3}x^2 - 5$ (Down 5)

Vertex: $(0, -5)$

Line of symmetry: $x = 0$

Direction: up

Width: wide

Vertex Form

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

Vertex: (h, k)

Line of symm: $x = h$

Direction: $+a$ up, $-a$ down

Width:

$|a| = 1$ normal

$|a| > 1$ narrow

$0 < |a| < 1$ wide

$y = (x+81)^2$ (left 81, up 3)

Vertex: $(-81, 0)$

Line of symm: $x = -81$

Direction: upward

Width: normal