# QUADRATICS FUNCTIONS

$y = ax^2 + bx + c$ ← standard form

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

## Vertex Form

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

Vertex $(h, K)$

Width $|a| = 1$ normal

$|a| > 1$ narrow (vertical stretch)

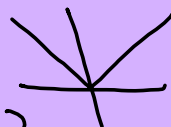$0 < |a| < 1$ wide (vertical shrink)

Direction: $+a$ UP

$-a$ down

Line of
Symmetry: $x = h$

$y = |x|$

$y = |x| + 2$

Left 5

$y = |x+5|$

$y = x^2$

| X | y |
|---|---|
| 0 | 0 |
| −1 | 1 |
| −2 | 4 |
| −3 | 9 |

Line of Symmetry
$x = 0$
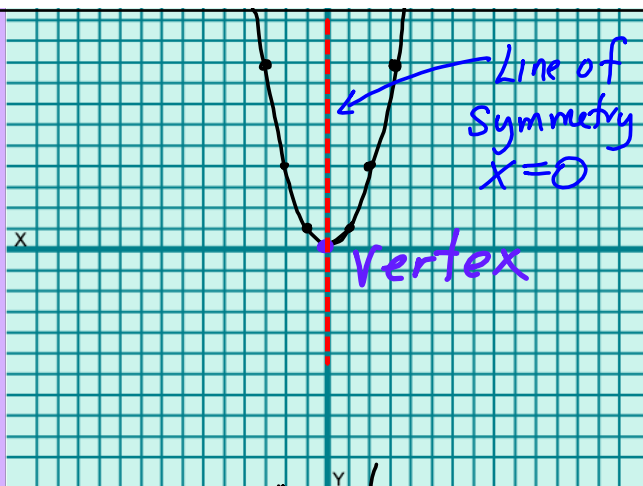
Vertex

$y = 3x^2$

narrow
(vertical Stretch)

| | |
|---|---|
| 0 | 0 |
| 1 | 3 |
| 2 | 12 |
| 3 | 27 |
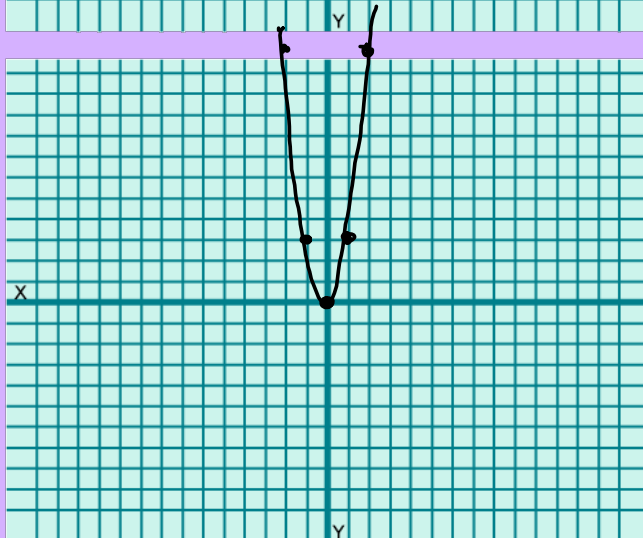
$$y = -2(x-4)^2 + 7$$

Vertex: $(4, 7)$

Line of Symm: $x = 4$

Direction: Down

Width: Narrow

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

$$= \frac{2}{3}(x-0)^2 - 5$$

Vertex: $(0, -5)$
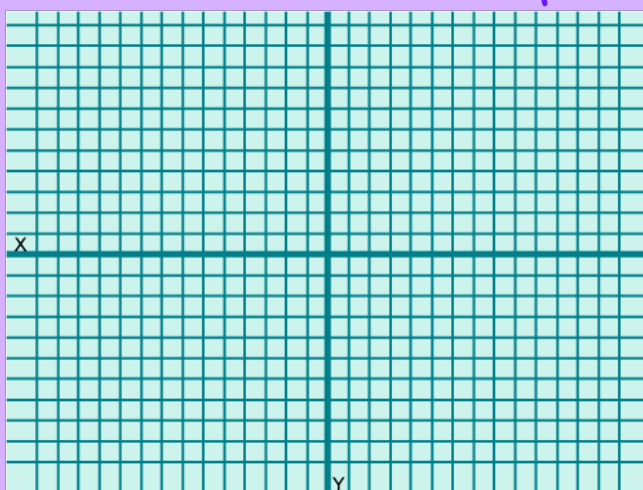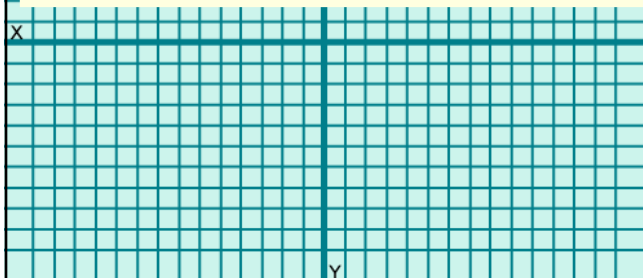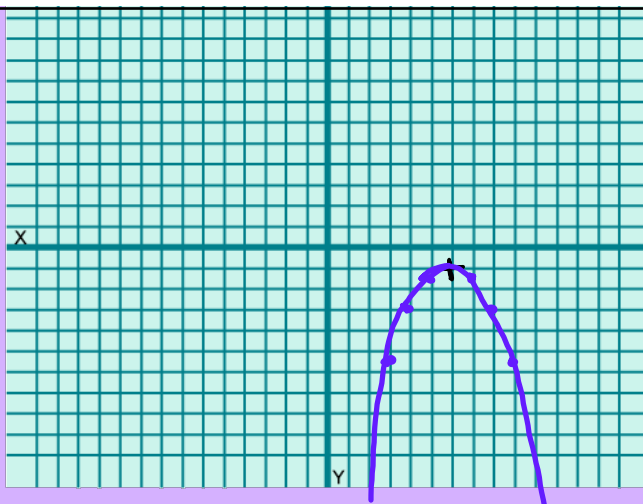
Line of Symm: $x = 0$

Direction: Up

Width: Wide

$$y = \left(-\frac{1}{2}\right)(x - 6)^2 - 1$$

vertex: $(6, -1)$

| | |
|---|---|
| 0 | 0 |
| 1 | -0.5 |
| 2 | -2 |
| 3 | -4.5 |

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

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

Left    UP
6      3

Vertex: $(-6, 3)$

| 0 | 0 |
|---|---|
| 1 | $x$ $-\frac{1}{2}$ |
| 2 | $x$ $-2$ |
| 3 | $x$ $-4.5$ |

Direction: down

Line of symm: $X = -6$

Width: Wide

$2(x-0)^2$

$y < 2x^2 - 9$

Over    Down
0      9
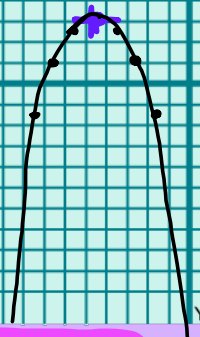
| 0 | 0 |
|---|---|
| 1 | $x$ $2$ |
| 2 | $x$ $8$ |
| 3 | $x$ $18$ |

Vertex: $(0, -9)$

Direction: UP

Line of Symm: $X = 0$

Width: Narrow