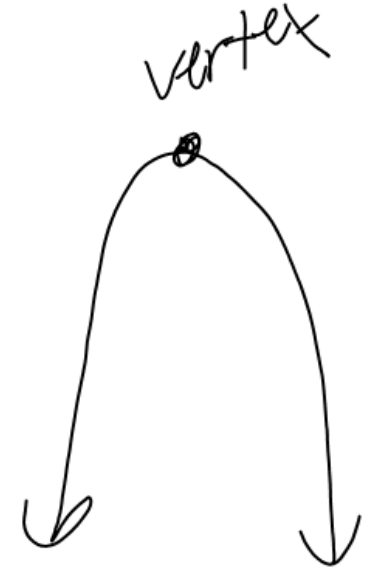
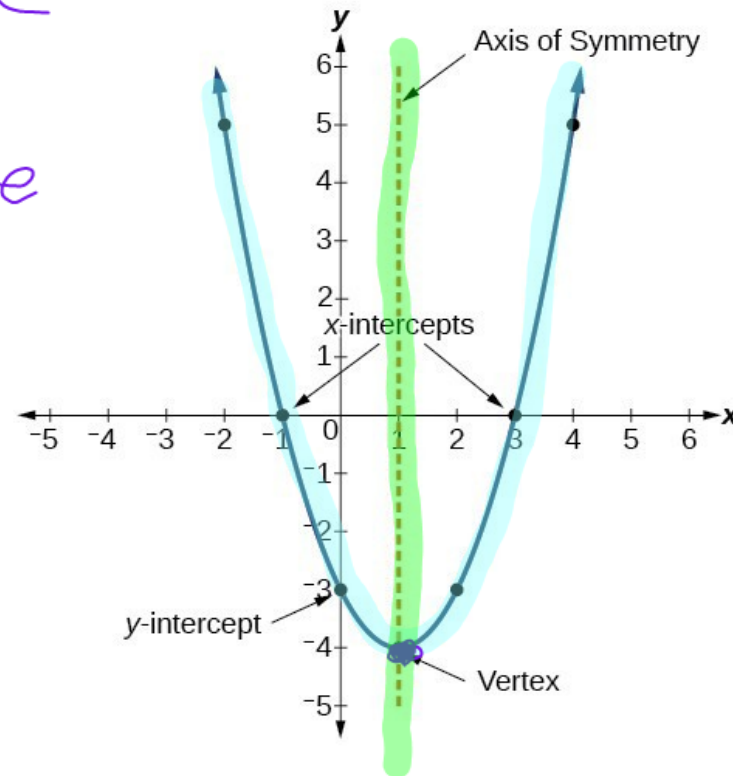


## 10.1 - Exploring Quadratic Graphs

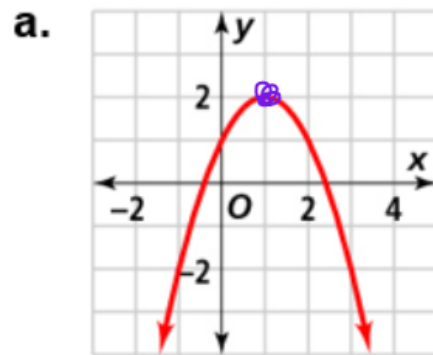
Vocabulary:  $y = ax^2 + bx + c$

- Quadratic Function
- Standard Form
- Parabola "U" shaped curve
- Vertex
- **Axis of Symmetry** "fold line"
- Minimum lowest point
- Maximum highest point

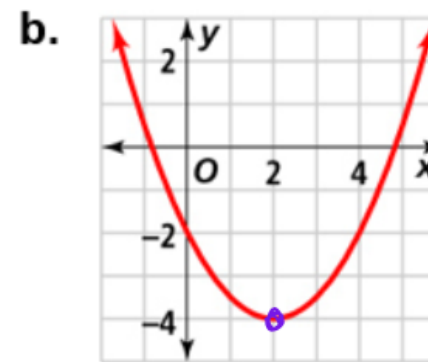
highest or lowest point



**1 EXAMPLE** Identify the vertex of each graph. Tell whether the vertex is a minimum or a maximum.



max.  $(1, 2)$

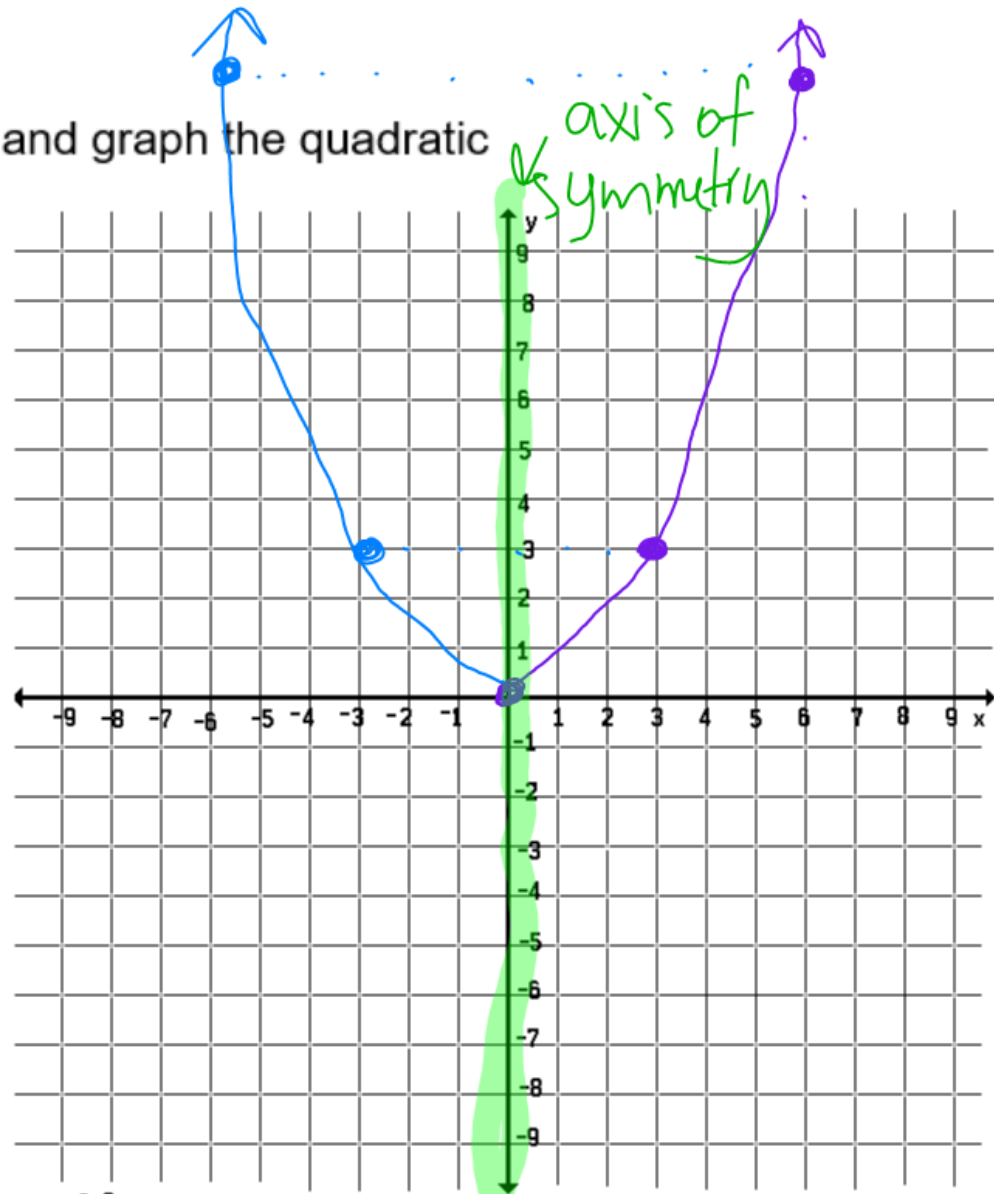


min.  $(2, -4)$

**2 EXAMPLE** Make a table of values and graph the quadratic

function  $y = \frac{1}{3}x^2$ .

0	$\frac{1}{3} \cdot 0^2$	0
3	$\frac{1}{3} \cdot 9 = 3$	3
6	$\frac{1}{3} \cdot 36 = 12$	12



A<sup>2</sup>

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Go to [desmos.com](https://www.desmos.com)

Graph the following equations:

Smallest #  $\rightarrow$  widest  
largest #  $\rightarrow$  narrowest

①  $x^2$  3<sup>rd</sup> w.

②  $\frac{1}{4}x^2$  widest

③  $\frac{1}{2}x^2$  2<sup>nd</sup> w.

④  $2x^2$  4<sup>th</sup> w.

⑤  $4x^2$  narrowest

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1  $y = x^2$

2  $y = 0.25x^2$

3  $y = 0.5x^2$

4  $y = 2x^2$

5  $y = 4x^2$

6

functions

7 8 9 ÷

4 5 6 ×

1 2 3 -

0 . = +

ABC ✓ π

**3 EXAMPLE** Use the graphs below. Order the quadratic functions

$f(x) = -x^2$ ,  $f(x) = -3x^2$ , and  $f(x) = \frac{1}{2}x^2$  from widest to narrowest graph.

$$f(x) = \frac{1}{2}x^2, \quad f(x) = -x^2, \quad f(x) = -3x^2$$


↑  
widest

↑  
narrowest


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Graph the following equations:

①  $x^2$

②  $x^2 + 2$  

up 2

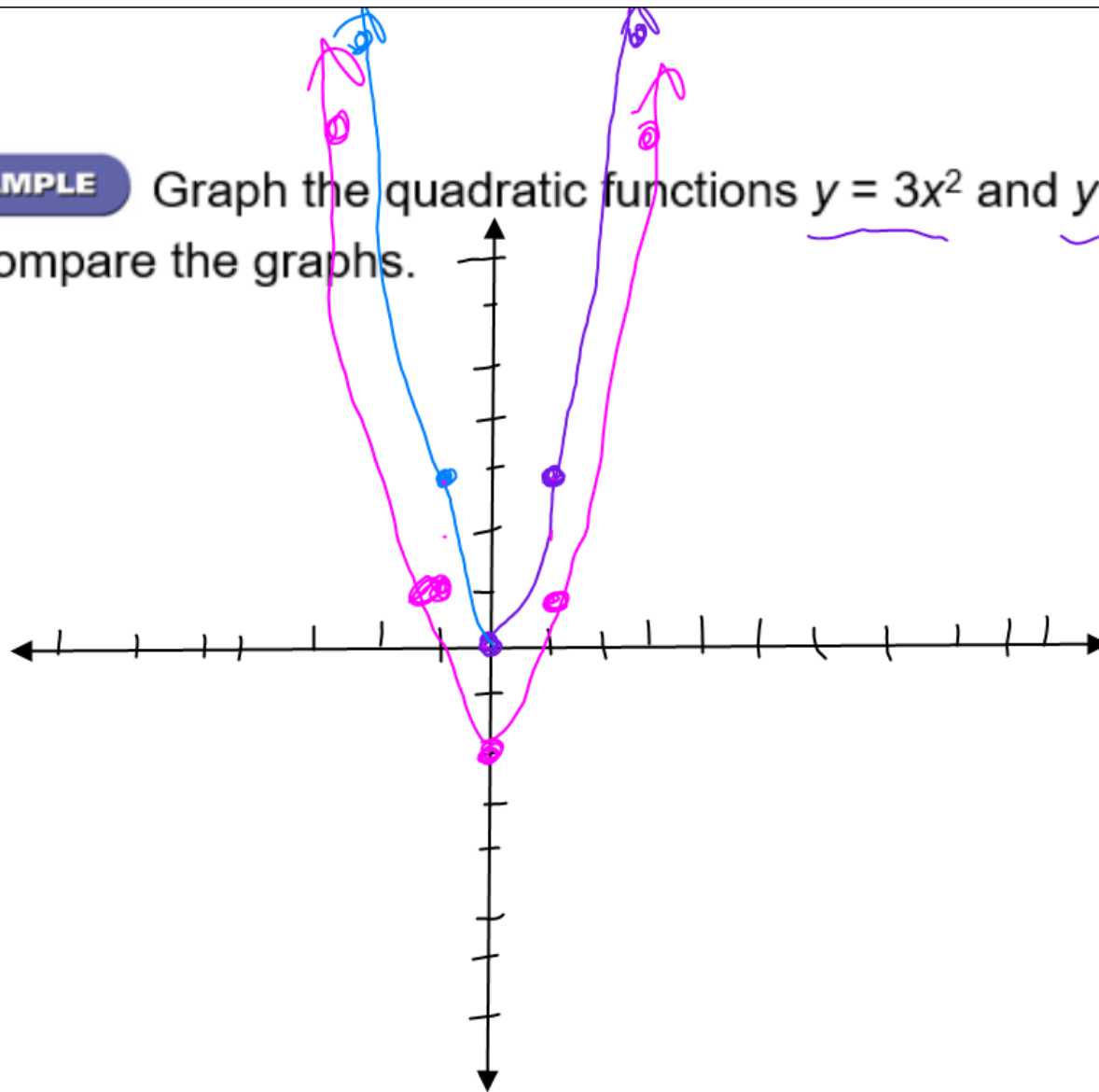
③  $x^2 - 2$  

down 2

**4 EXAMPLE**

Graph the quadratic functions  $y = 3x^2$  and  $y = 3x^2 - 2$ .

Compare the graphs.

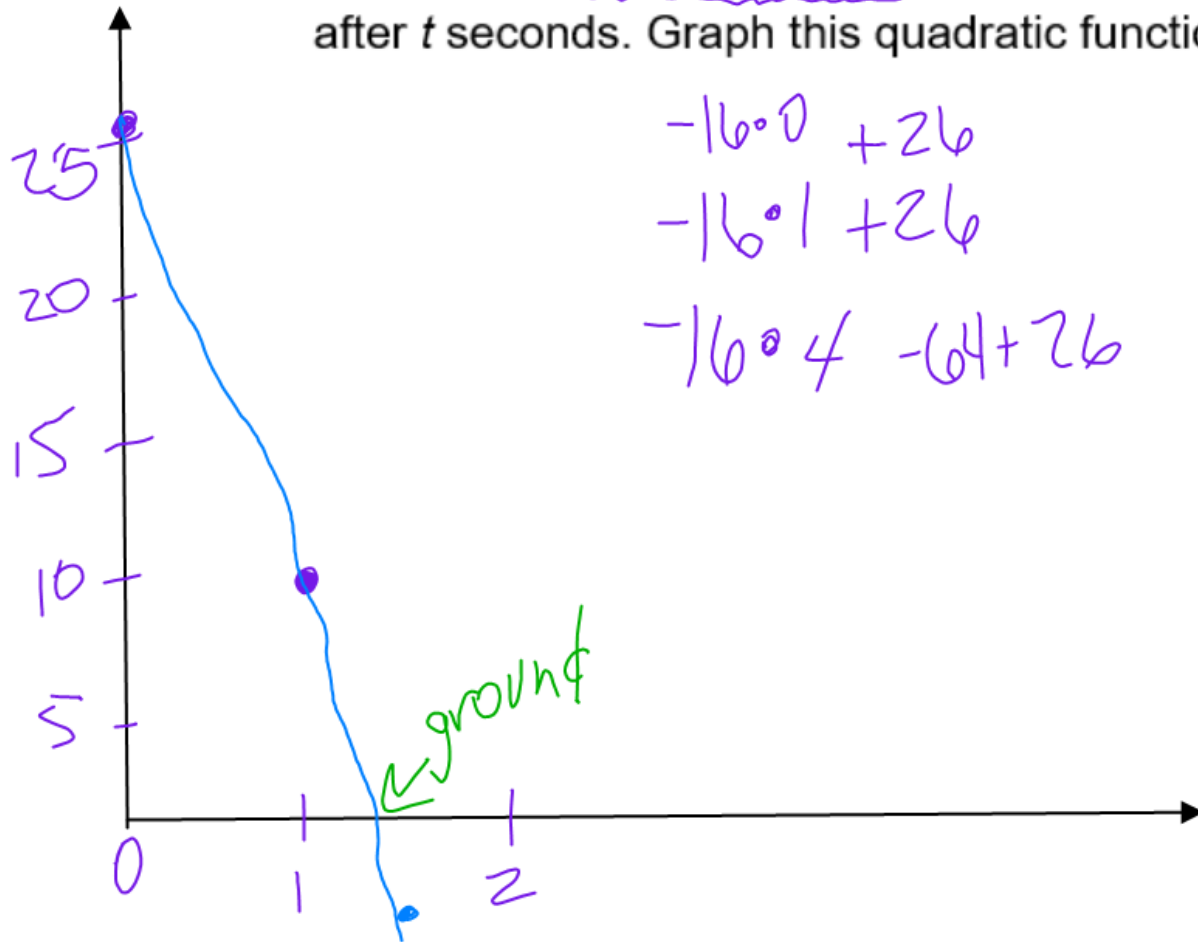


0	0
1	3
2	12

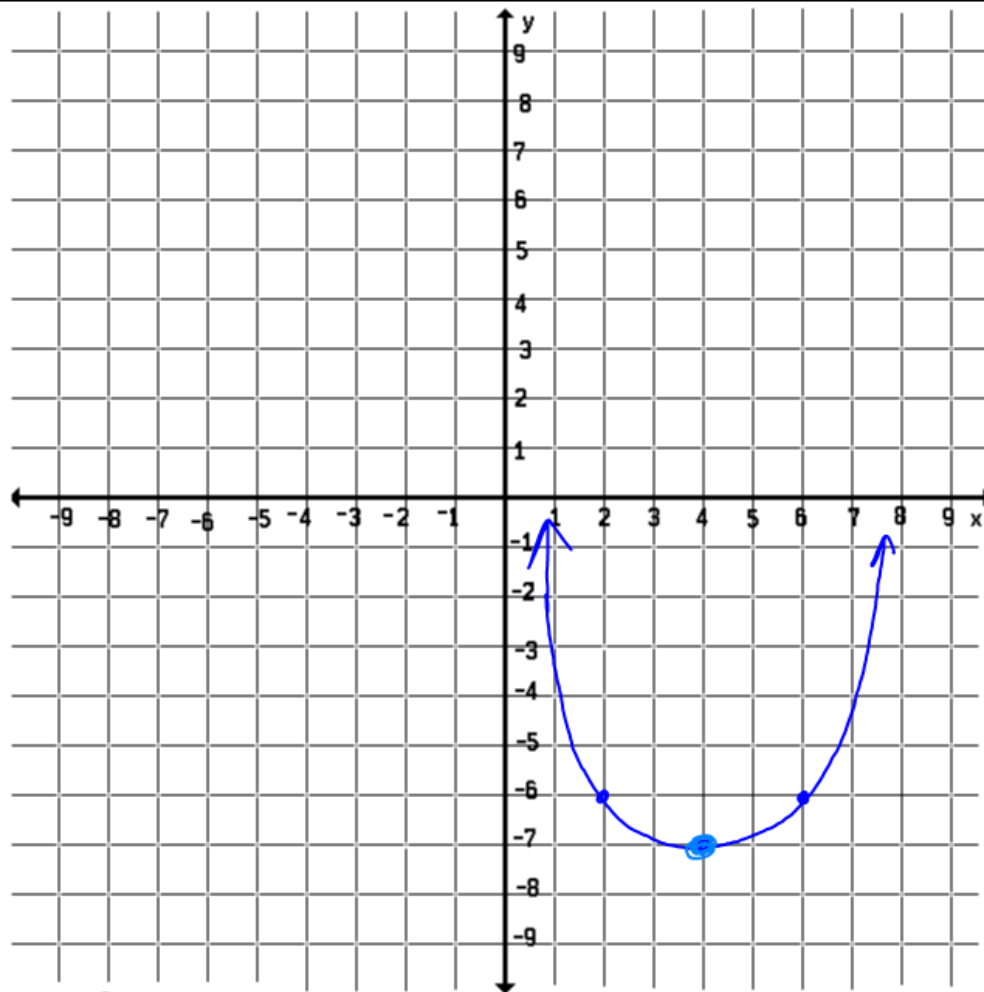


**5 EXAMPLE**

A monkey drops an orange from a branch 26 ft above the ground. The force of gravity causes the orange to fall toward Earth. The function  $h = -16t^2 + 26$  gives the height of the orange,  $h$ , in feet after  $t$  seconds. Graph this quadratic function.



$t$	$h$
0	26
1	10
1.5	-10
2	-38



Vertex:  $(4, -7)$

max / min

A<sup>2</sup>

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Graph the function by hand:

$$y = -\frac{1}{2}x^2$$

widest  $\longrightarrow$  narrowest  
 $-\frac{2}{3}x^2$        $-2x^2$        $4x^2$

$\overset{b}{-}2x^2$  ;  $\overset{b}{-}\frac{2}{3}x^2$  ;  $\overset{b}{4}x^2$

Graph :

$$x^2 - 3$$

Homework: pg. 553 #1, 4, ~~6~~, 10, 12, 18, ~~19~~, 20, 21-26 desmos tomorrow