

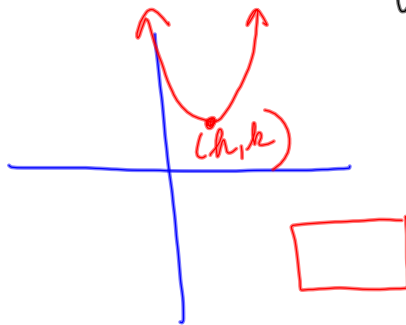
Sec. 1.2 Graph Quadratic Functions in Vertex or Intercept Form

Vertex form:

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

$+ \uparrow$ $|a| > 1$ v. stretch
 $- \downarrow$ $0 < |a| < 1$ v. compression

vertex: (h, k)



Graph

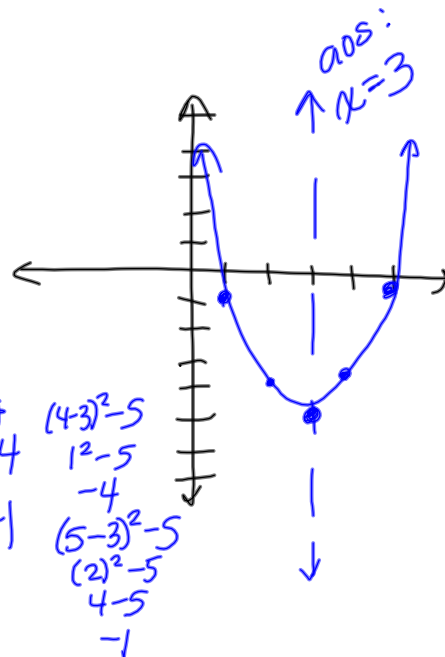
$$y = (x - 3)^2 - 5$$

vertex: $(3, -5)$

over	y-axis
1	1a
2	4a

x	y
4	-4
5	-1

$$\begin{aligned}
 (4-3)^2 - 5 &= 1^2 - 5 = 1 - 5 = -4 \\
 (5-3)^2 - 5 &= 2^2 - 5 = 4 - 5 = -1
 \end{aligned}$$



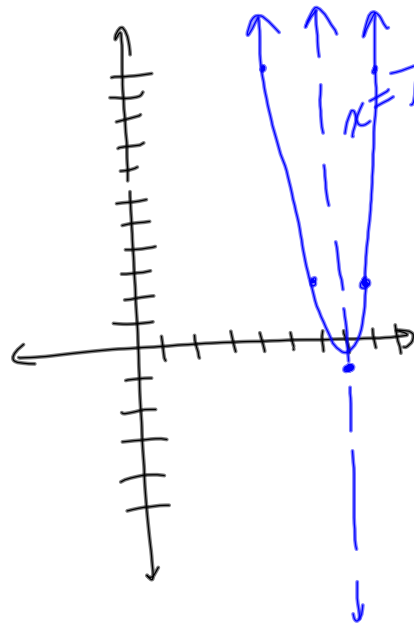
b. $y = 3(x - 7)^2 - 1$

vertex: $(7, -1)$

aos: $x = 7$

x	y
8	2
9	11

$$\begin{aligned}
 3(1)^2 - 1 &= 3 - 1 = 2 \\
 3(2)^2 - 1 &= 3 \cdot 4 - 1 = 12 - 1 = 11
 \end{aligned}$$



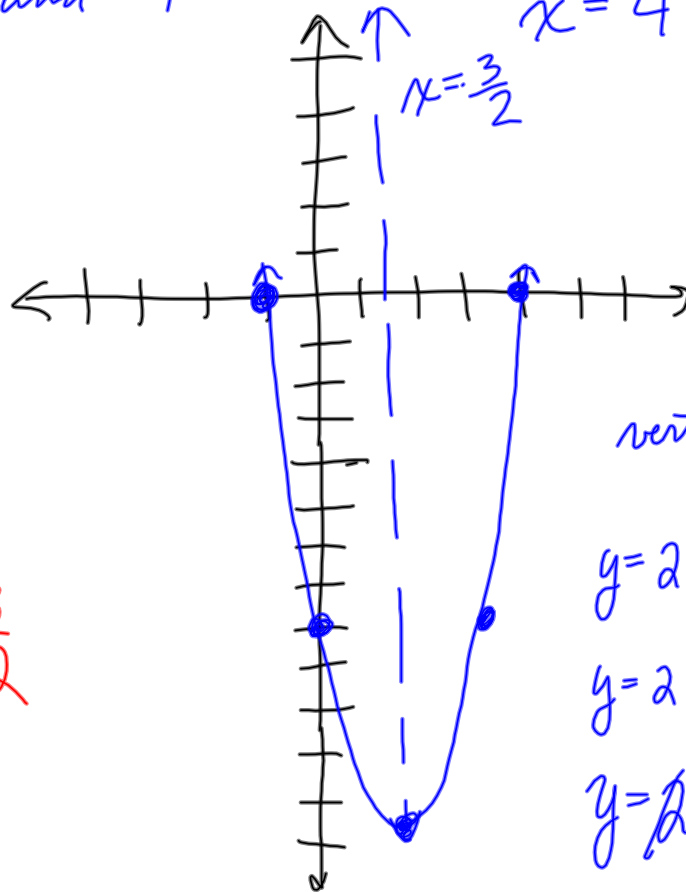
Intercept Form: $y = a(x-p)(x-q)$
 $x\text{-int} = p, q$

$$y = 2(x-4)(x+1) = 0 \quad \cancel{2=0}$$

x -intercepts
4 and -1

$$x-4=0 \quad x+1=0$$

$$x=4 \quad x=-1$$



axis of symmetry

$$x = \frac{4 + (-1)}{2} = \frac{3}{2}$$

$$x = \frac{p+q}{2}$$

x	y
0	-8

$$2(0-4)(0+1)$$

$$2(-4)(1)$$

$$-8$$

vertex: $(\frac{3}{2}, -\frac{25}{2})$

$$y = 2(\frac{3}{2}-4)(\frac{3}{2}+1)$$

$$y = 2(\frac{3}{2}-\frac{8}{2})(\frac{3}{2}+\frac{2}{2})$$

$$y = 2(-\frac{5}{2})(\frac{5}{2})$$

$$-\frac{25}{2} = -12\frac{1}{2}$$

2.8] Polynomial in intercept form.

$$f(x) = \overbrace{(x+1)(x+1)}^{\text{double root}} \underline{(x-1)} \underline{(x-3)}$$

x-int: -1, 1, 3

degree: 4

EB: ↑ ↑

x	y
0	3
2	-9

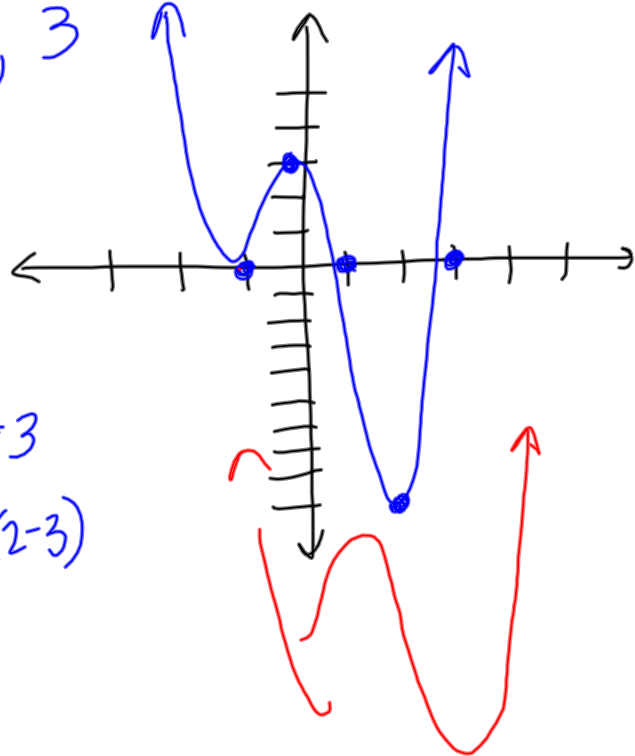
$$(1)^2(-1)(-3) = 3$$

$$(2+1)^2(2-1)(2-3)$$

$$(3)^2(1)(-1)$$

$$9(-1)$$

$$-9$$



1.9

$$y < -x^2 + 3x + 10 \quad \text{dashed}$$

SF

$$\frac{-b}{2a}$$

$$y\text{-int: } 10$$

Test (0,0)

$$0 < 10$$

$$-\frac{b}{2a} = \frac{-3}{2(-1)} = \frac{3}{2} \quad F$$

$$V: \left(\frac{3}{2}\right)$$

$$-\frac{9}{4} + \frac{9}{2} + 10$$

$$\frac{9}{4} + \frac{40}{4} = \frac{49}{4} \approx 12.25$$

