Graphing Parabolas with a > 1

Graph the following parabolas, remember to find:

y-intercept
x-intercepts
L.O.S.
Vertex
4 additional points

$2x^2 - 8$

$6x^2 - 4x$

$-3x^2 - 4x + 7$

$4x^2 + 4x + 1$

$-4x^2 - 8x - 3$

$4x^2 + 4x - 15$

$2x^2 - 8$

$2(x^2-4)$
$2(x-2)(x+2)$

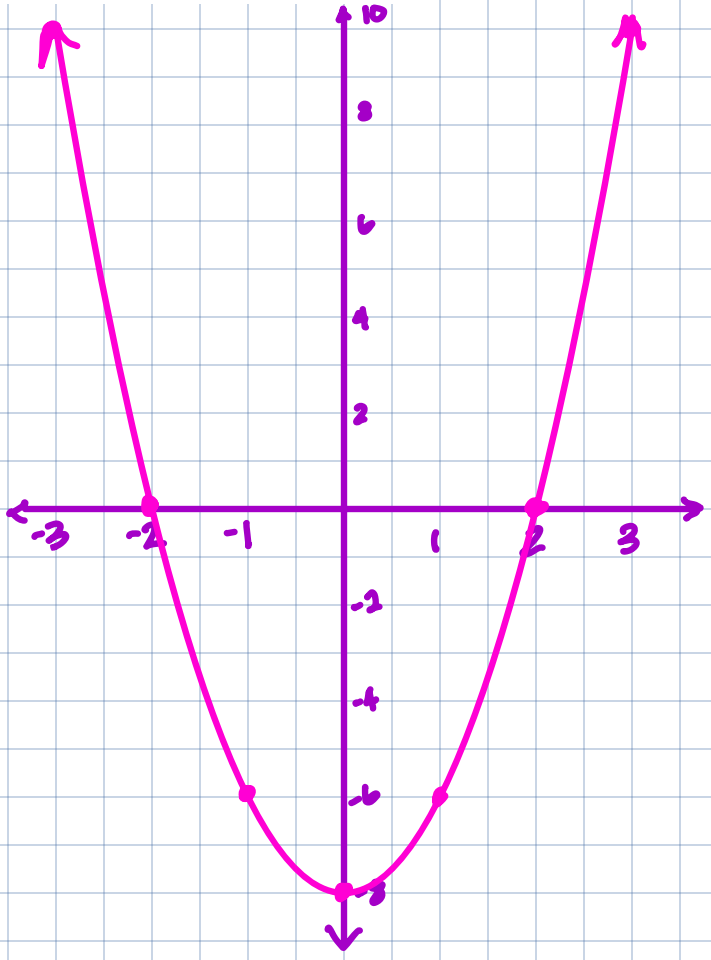
x-ints: $x-2=0$ $+2\ +2$ $x=2$ $(2,0)$; $x+2=0$ $-2\ -2$ $x=-2$ $(-2,0)$

y-int: $(0,-8)$

LOS: $\frac{2+-2}{2}=0$ $x=0$

vertex: $y=2(0)^2-8$ $y=-8$ $(0,-8)$

Add'l Pants: $(1,-6)$ $(3,10)$



$6x^2 - 4x$

$2x(3x-2)$

x-ints: $2x(3x-2)$

$2x=0$ → $x=0$ → $(0,0)$

$3x-2=0$ → $+2\ +2$ → $\frac{3x}{3}=\frac{2}{3}$ → $x=\frac{2}{3}$ → $(\frac{2}{3},0)$

y-int: $(0,0)$

LOS: $\frac{1}{2}(0+\frac{2}{3})=\frac{2}{6}=\frac{1}{3}$

$x=\frac{1}{3}$

Vertex: $2(\frac{1}{3})(3(\frac{1}{3})-2)$

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

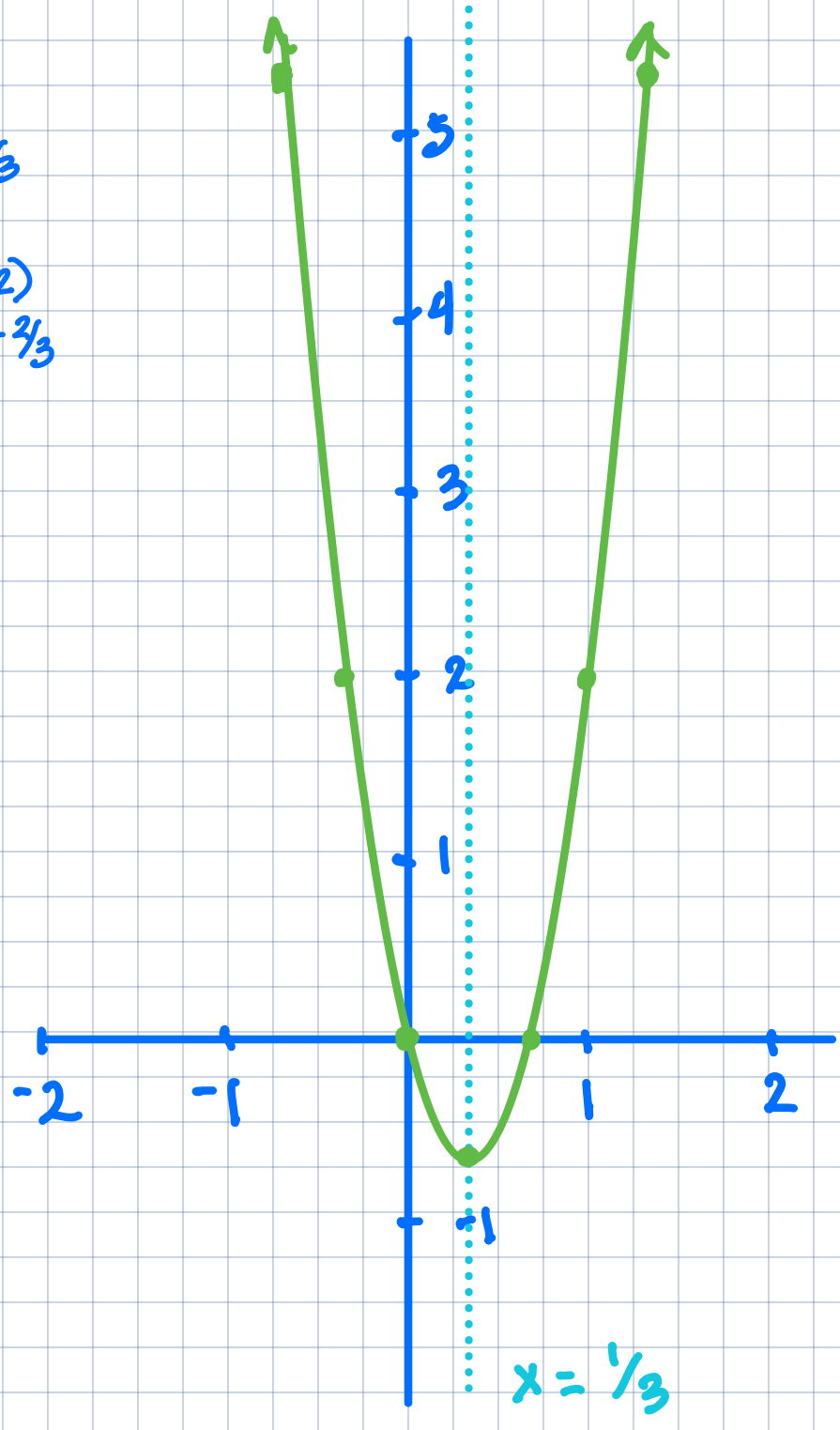
$(\frac{1}{3},-\frac{2}{3})$

Add'l Pts: $(1,2)$

$(-\frac{1}{3},2)$

$(\frac{4}{3},\frac{16}{3})$

Opens: UP



$-3x^2 - 4x + 7$

(-1,8) (-1/3, 8)

$-3x^2 - 7x + 3x + 7$ (+2, -3)

$-x(3x+7) + 1(3x+7)$

$(3x+7)(-x+1)$

$3x+7=0$ | $-x+1=0$

$-7 \quad -7$ | $+x \quad +x$

$3x = -7$ | $1 = x$

$x = -7/3$

x-ints: $(-7/3, 0)$ $(1, 0)$

y-int: $(0, 7)$

LOS: $x = \frac{1}{2}(-7/3 + 1) = \frac{1}{2}(-4/3)$

$x = -2/3$

Vertex: $(3(-2/3)+7)(2/3+1)$

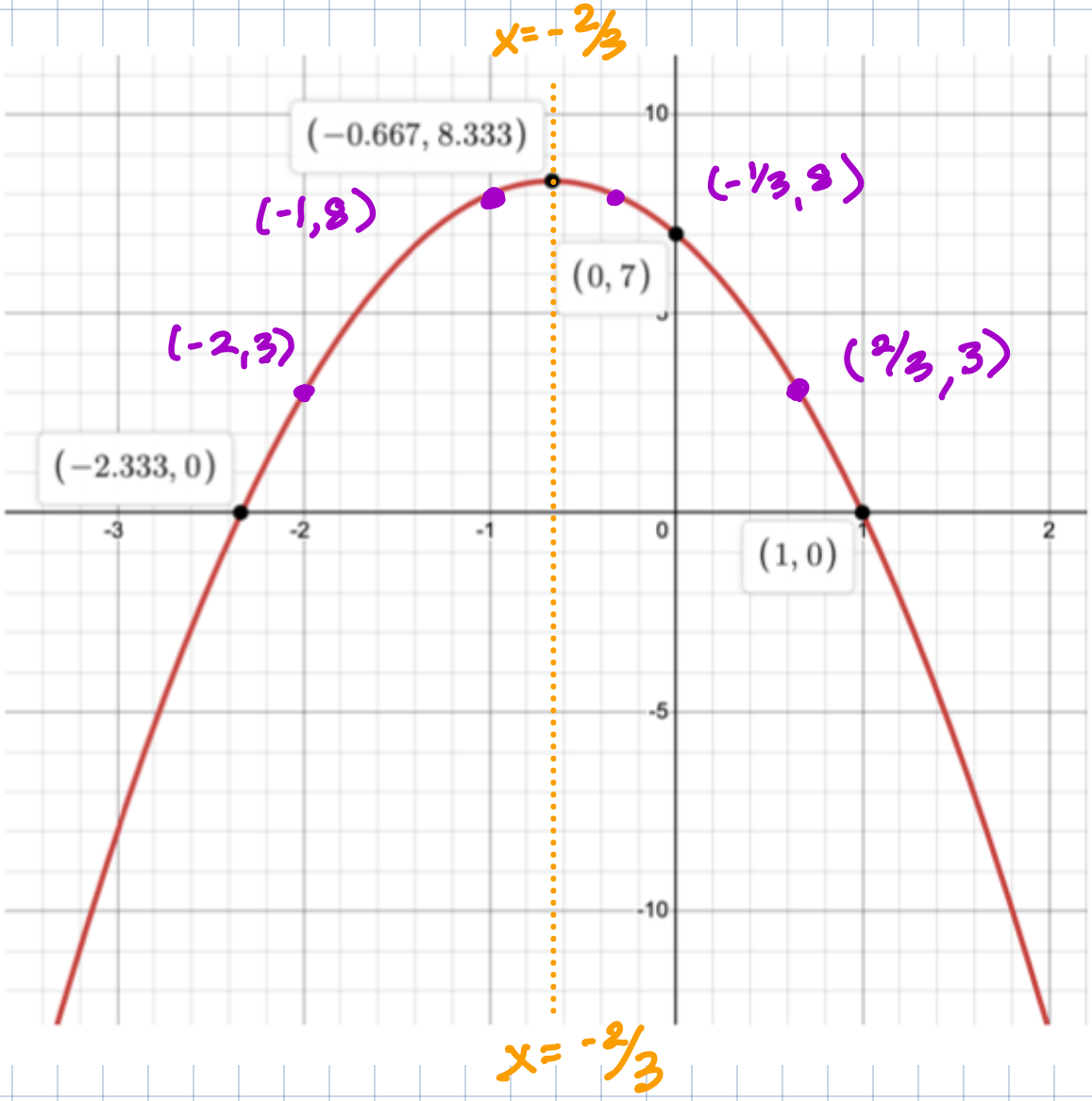
$(5)(5/3) = 25/3$

$(-2/3, 25/3)$

Opens: Up

Add'l Points: $(2, -13)$

$(-1, 8)$



$4x^2 + 4x + 1$

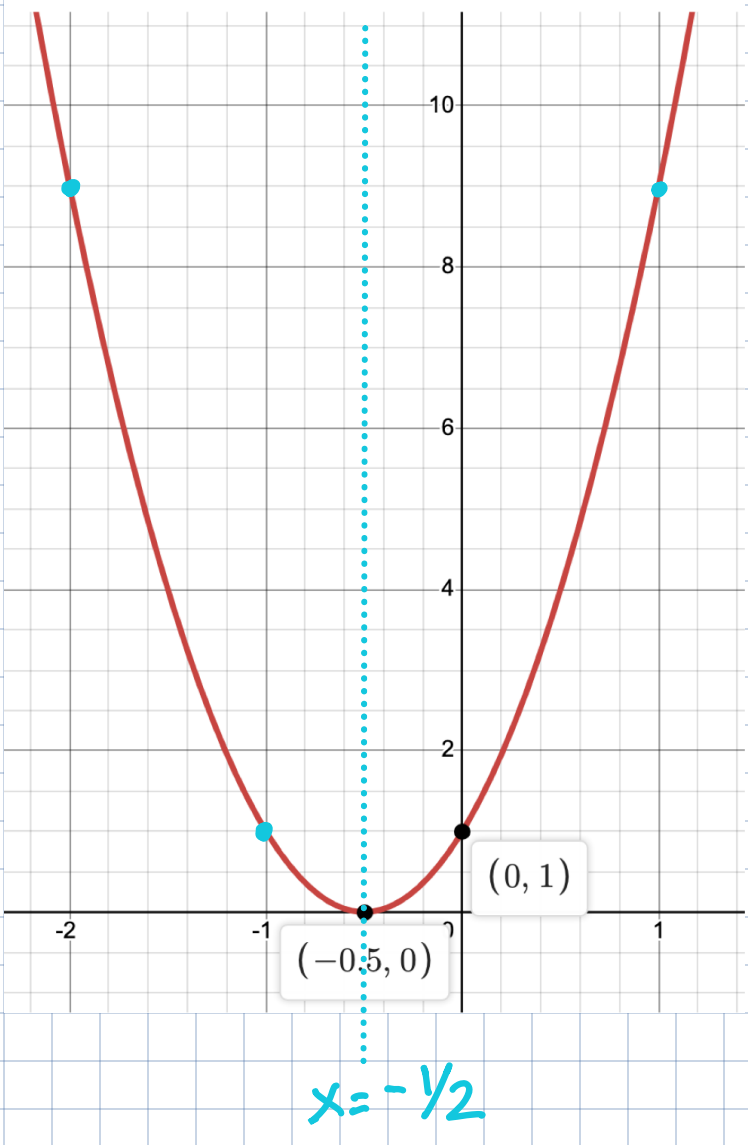
$= (2x+1)^2$

$2x+1 = 0$

$-1 \quad -1$

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

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



x-int: $(-\frac{1}{2}, 0)$

y-int: $(0, 1)$

LOS: $x = -\frac{1}{2}$

Vertex:

$(2(-\frac{1}{2})+1)^2 = 0$

$(-\frac{1}{2}, 0)$

Opens: UP

Add'l Points: $(-1, 1)$

$(1, 9)$ $(-2, 9)$

$(2, 25)$ $(-3, 25)$

$-4x^2 - 8x - 3$

$-4x^2 - 6x - 2x - 3$

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

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

$-2x - 1 = 0$

$+1 \quad +1$

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

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

$2x + 3 = 0$

$-3 \quad -3$

$\frac{2x}{2} = \frac{-3}{2}$

$x = -\frac{3}{2}$

x-ints: $(-\frac{1}{2}, 0)$ $(-\frac{3}{2}, 0)$

y-int: $(0, -3)$

LOS: $\frac{1}{2}(-\frac{1}{2} + -\frac{3}{2}) = -1$

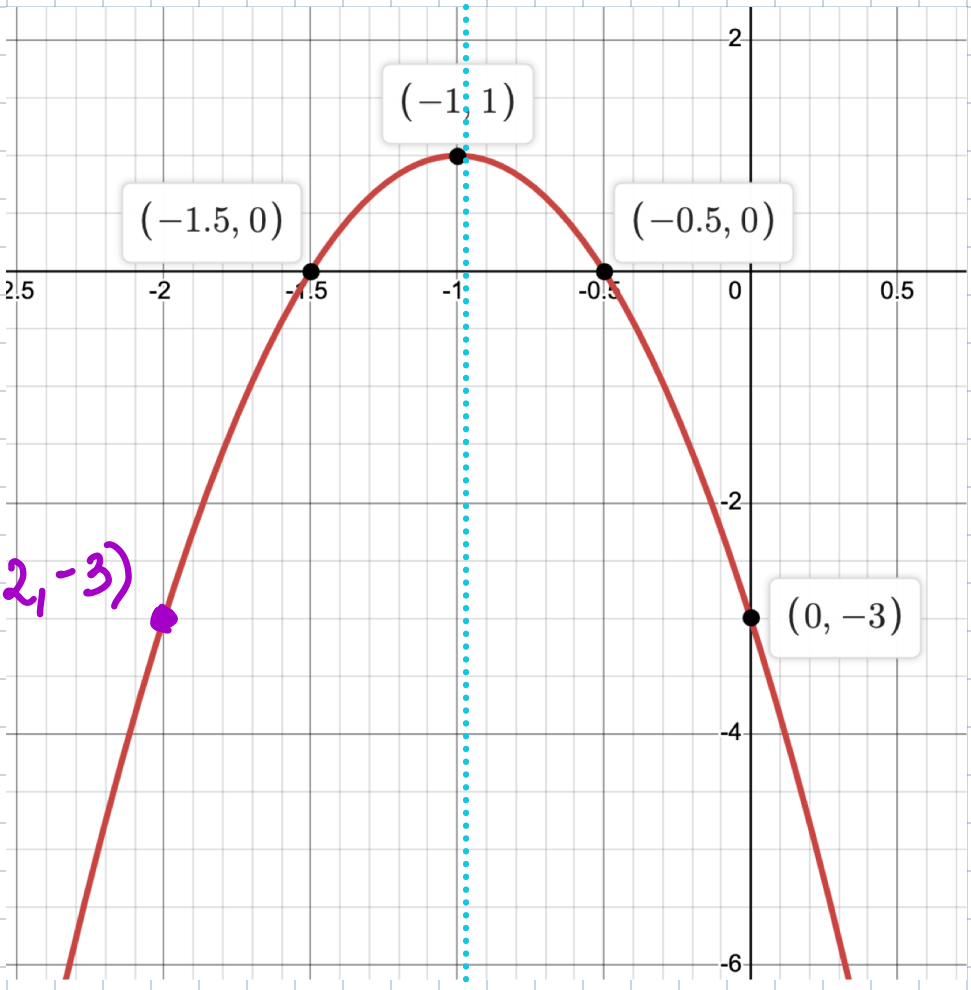
$x = -1$

Opens: Down

Add'l Points: $(-2, -3)$

$(0.5, -8)$

$(-2.5, -8)$



(-2, -3)

$x = -1$

$4x^2+4x-15$

$4x^2+10x-6x-15$

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

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

y-int: $(0,-15)$

x-ints: $(1.5,0)$ $(-2.5,0)$

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

$2x-3=0$ $\quad$ $2x+5=0$

$+3\ +3$ $\quad$ $-5\ -5$

$\frac{2x}{2}=\frac{3}{2}$ $\quad$ $\frac{2x}{2}=\frac{-5}{2}$

$x=1.5$ $\quad$ $x=-2.5$

LOS: $\frac{1.5+-2.5}{2}=-0.5$

Vertex: $(2x-3)(2x+5)$

$(2(-0.5)-3)(2(-0.5)+5)$

$=(1-3)(-1+5)$

$=(-4)(4)$

$=16$

$(-0.5,16)$

Add'l Points:

$x=0.5$ $\quad (2(0.5)-3)(2(0.5)+5)$

$=(1-3)(1+5)$

$=-12$ $\quad (0.5,-12)$

$x=1$ $\quad (2(1)-3)(2(1)+5)$

$(-1)(7)$

$=-7$ $\quad (1,-7)$