7.2 Absolute Value Functions

Example 1

Graph an Absolute Value Function of the Form $y = |ax + b|$

Consider the absolute value function $y = |2x - 3|$. → graph $Y = 2X - 3$

a) Determine the *y*-intercept and the *x*-intercept.

b) Sketch the graph.

c) State the domain and range. Domain $X \in R$

Range $Y \in R \mid Y \geq 0$

d) Express as a piecewise function.

$Y = |2X - 3|$

Xint $0 = 2X - 3$

$3 = 2X$

$1.5 = X$ $(1.5, 0)$

Yint $|2(0) - 3|$

$|-3|$

3 $(0, 3)$

Piecewise

$$Y = \begin{cases} 2X - 3 & \text{for } X \geq 1.5 \\ -(2X - 3) & \text{for } X < 1.5 \end{cases}$$

$ax - b$

$b - ax$

Example 2

Graph an Absolute Value Function of the Form $f(x) = |ax^2 + bx + c|$

Consider the absolute value function $f(x) = |-x^2 + 2x + 8|$.

a) Determine the y-intercept and the x-intercepts.

b) Sketch the graph.

c) State the domain and range.

d) Express as a piecewise function.

$Y = -x^2 + 2x + 8$

a) Y int $(0, 8)$

X int $0 = -x^2 + 2x + 8$

$0 = x^2 - 2x - 8$

$0 = (x-4)(x+2)$

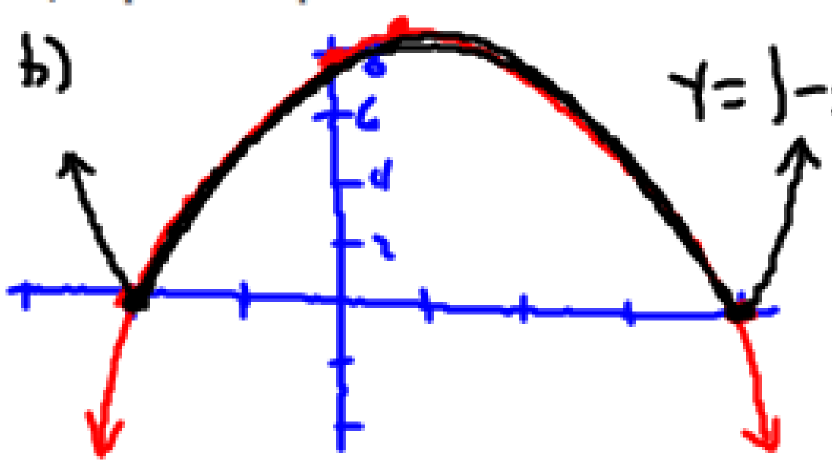
$(4, 0)$ $(-2, 0)$

vertex $x = \frac{-b}{2a}$ $\frac{-2}{-2}$

$x = 1$

$(1, 9)$

b)



$Y = |-x^2 + 2x + 8|$

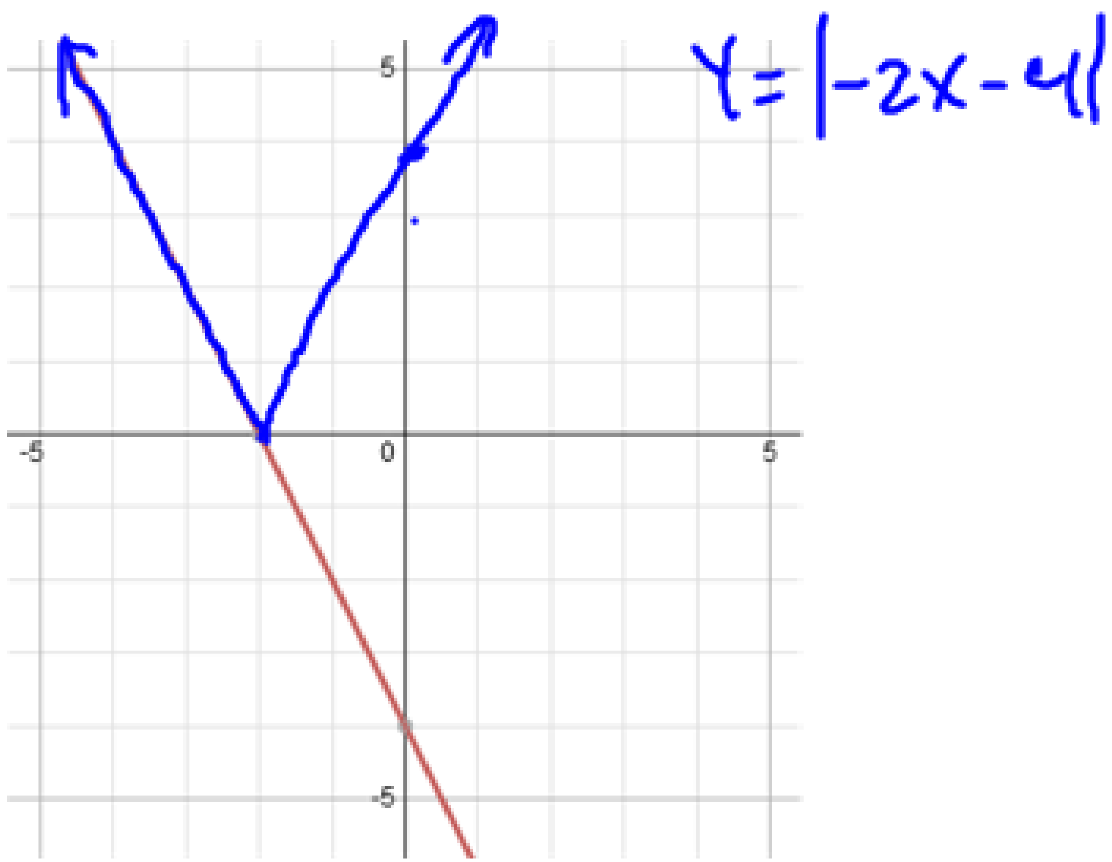
$Y = -x^2 + 2x + 8$

c) $X \in R$

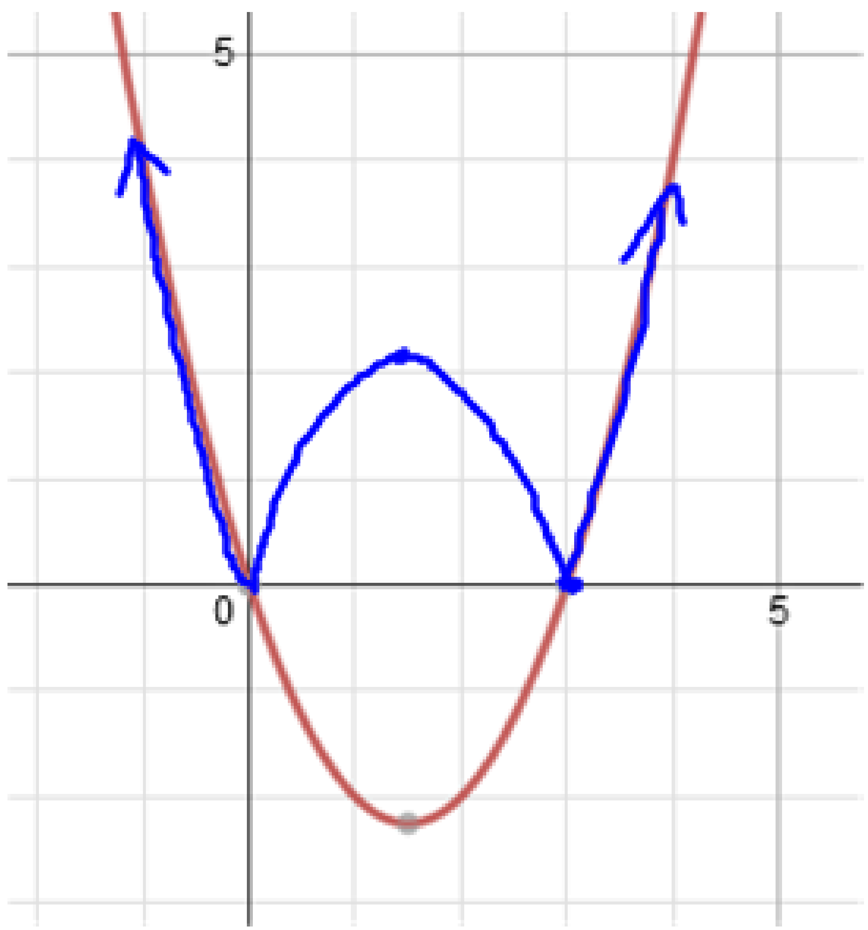
$Y \in R \mid Y \geq 0$

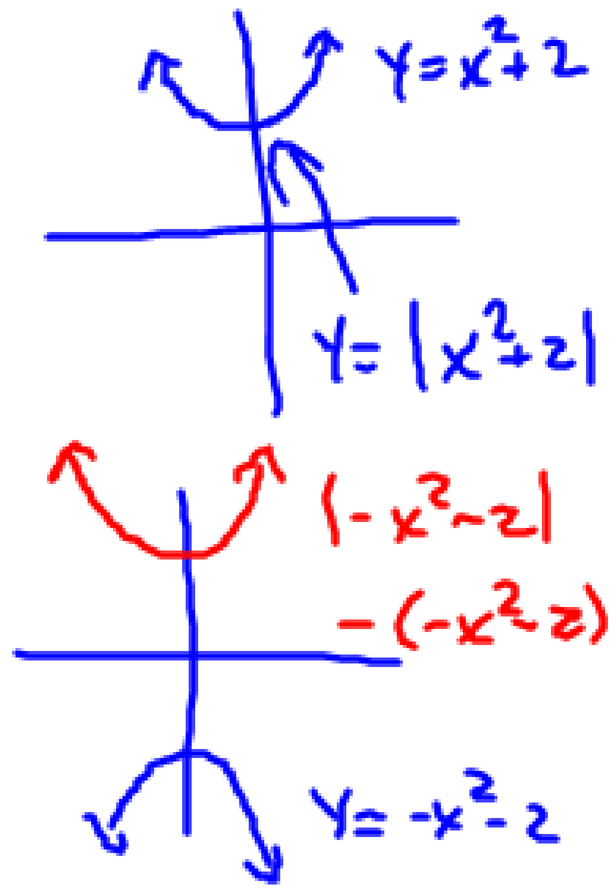
$$Y = \begin{cases} -x^2 + 2x + 8 & \text{for } -2 \leq x \leq 4 \\ -(-x^2 + 2x + 8) & \text{for } x < -2 \text{ or } x > 4 \end{cases}$$

$y = -2x - 4$

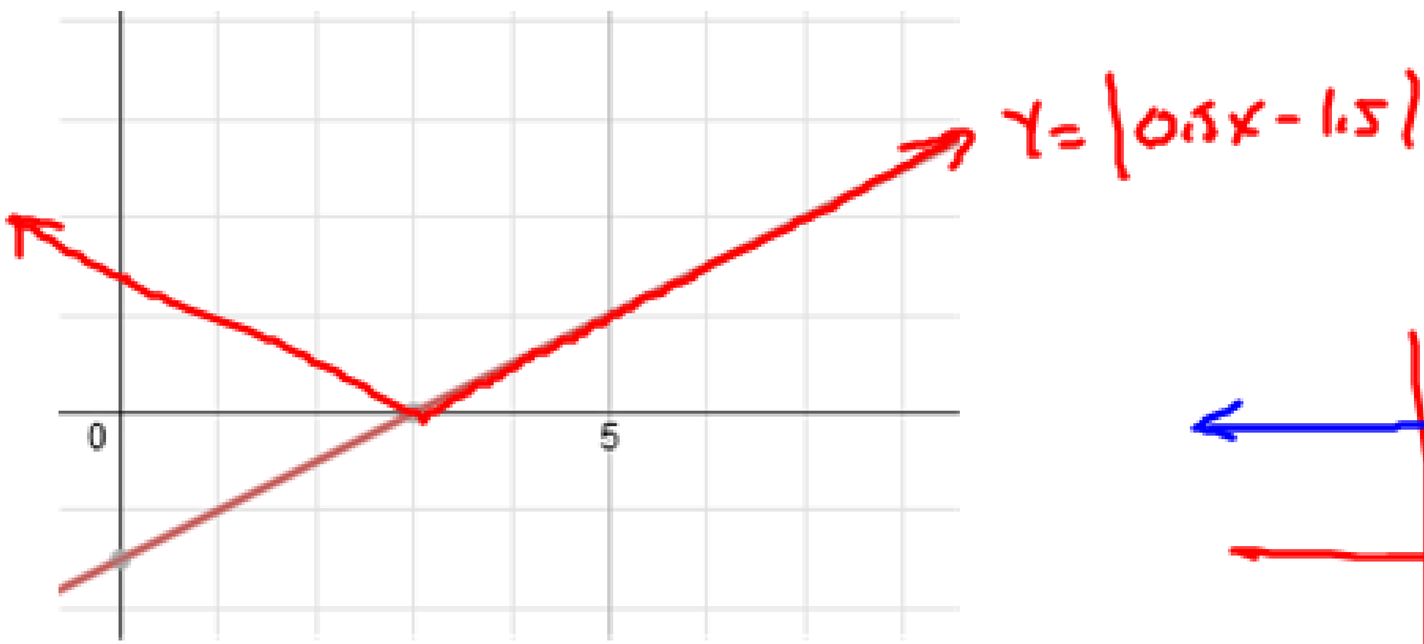


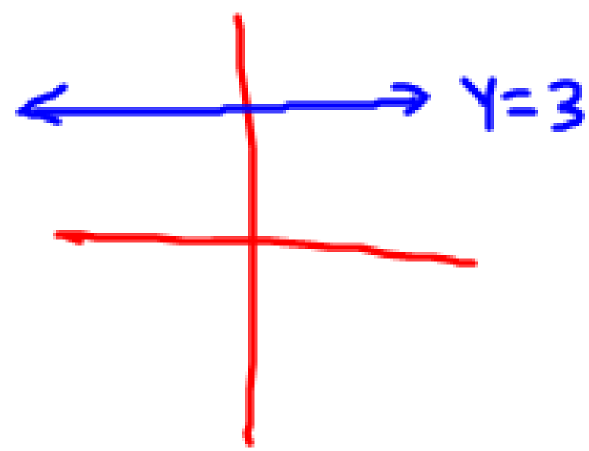
$y = x^2 - 3x$



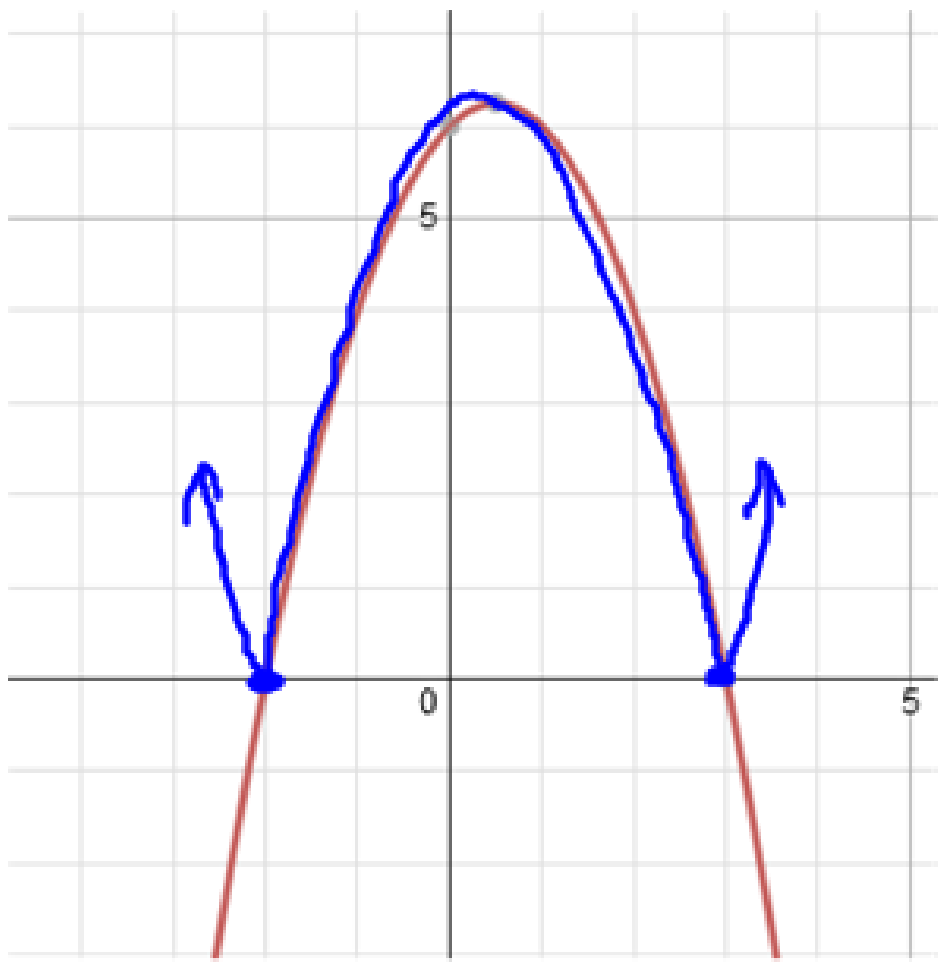


$y = 0.5x - 1.5$

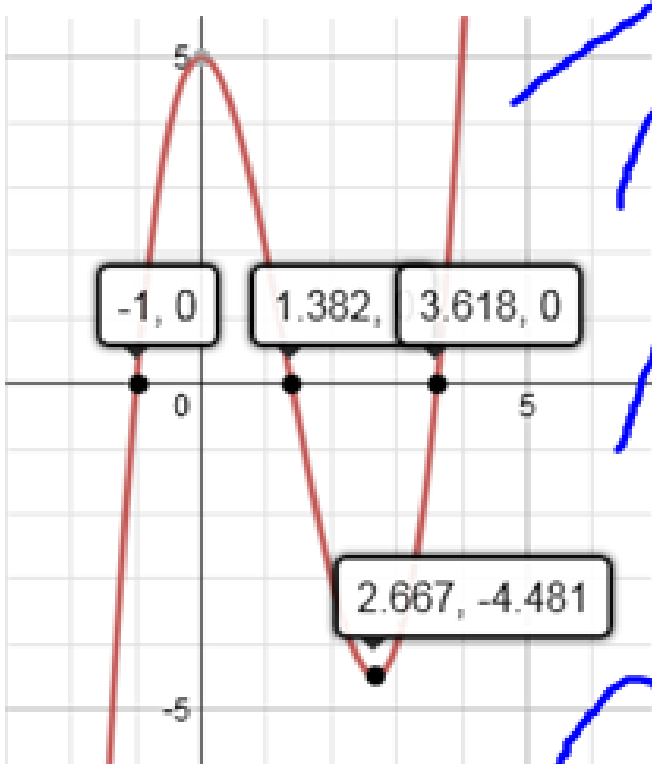


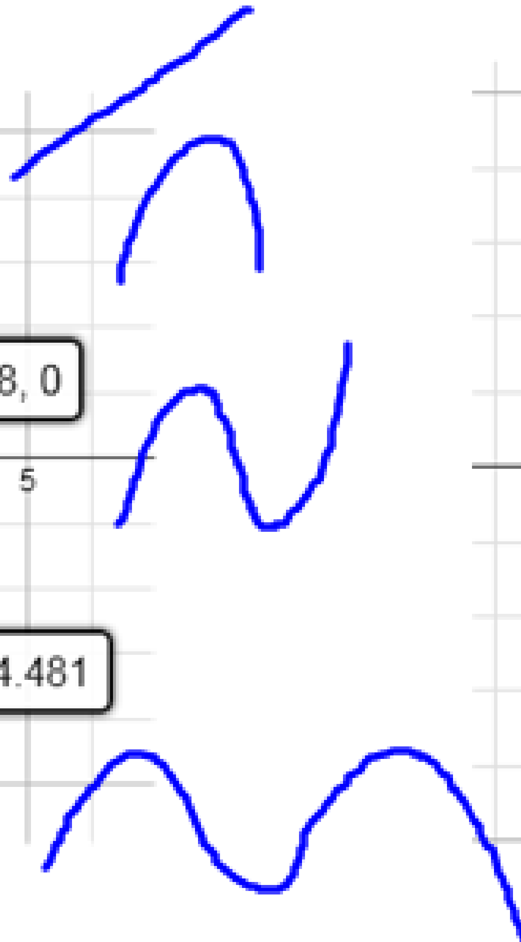


$$y = -(x+2)(x-3)$$



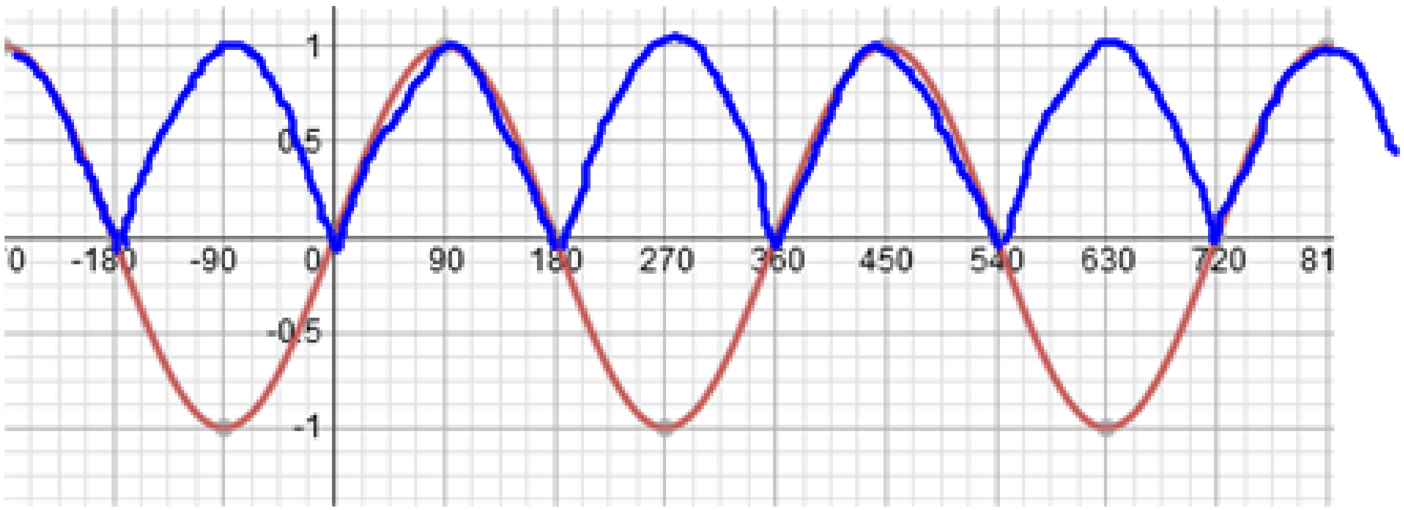
$y = x^3 - 4x^2 + 5$





$$y = \sin x$$

Y=|sinx|



<u>Absolute Value Graphs</u>:
graph the "regular" function carefully, then "flip" the negative parts

7.2 pgs.375-377 1-10 (for #6 and #8 just do a, c, e parts)

Monday: 7.2 #11-22 pgs.377-378