

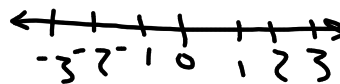
Unit 5: Absolute Values, Reciprocals,
Systems, Inequalities

5.1 Absolute Value Functions

Absolute Value - a number's distance from zero

Ex.) $|x| = x$


$|-3| = 3$



Ex.)

$$\begin{aligned} \text{a) } & |100 - 32| - 2|5 - 6| \\ & = |68| - 2|-1| \\ & = 68 - 2(1) \\ & = \boxed{66} \end{aligned}$$

$$\begin{aligned} \text{b) } & |5x^2 + 3x - 4| \text{ when } x = -3 \\ & = |5(-3)^2 + 3(-3) - 4| \\ & = |32| = \boxed{32} \end{aligned}$$



An absolute value function is a function that involves an absolute value of a variable.

Ex.) $f(x) = |3x + 1|$

- Create a table of values
- Graph the function
- Determine intercepts
- State domain and range

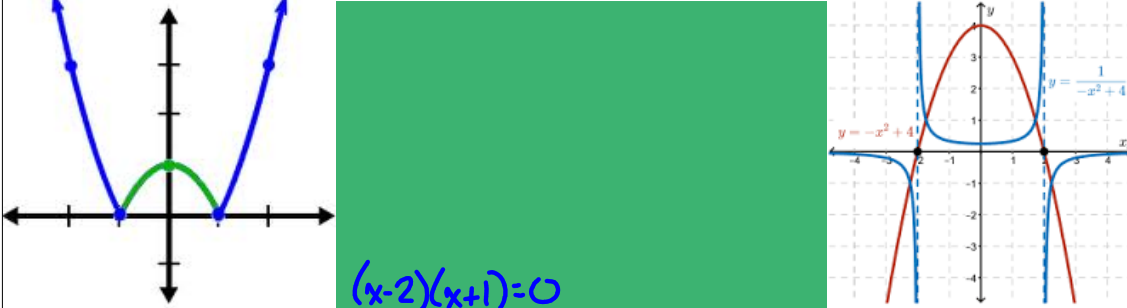
x	f(x)
-4	11
-3	8
-2	5
-1	2
0	1
1	4
2	7
3	10
4	13

Piecewise function

$$f(x) = \begin{cases} 3x+1 & \text{if } x \geq -1/3 \\ -(3x+1) & \text{if } x < -1/3 \end{cases}$$

$f(x) = |3x+1|$

X-int: $(-1/3, 0)$
 Y-int: $(0, 1)$
 Domain: $x \in \mathbb{R}$
 Range: $\{y | y \geq 0\}$



Ex.) For $g(x) = |x^2 - x - 2|$

- Sketch it
- Determine intercepts
- State domain and range

$$g(x) = \begin{cases} x^2 - x - 2 & \text{if } x < -1 \\ -(x^2 - x - 2) & -1 \leq x \leq 2 \\ x^2 - x - 2 & \text{if } x > 2 \end{cases}$$

$(x-2)(x+1) = 0$

$g(x)$

$x^2 - x - 2$

X-int: $(-1, 0), (2, 0)$
 Y-int: $(0, 2)$
 Domain: $x \in \mathbb{R}$
 Range: $y \geq 0$