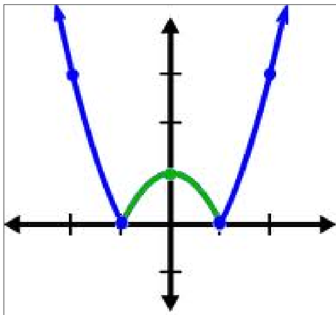
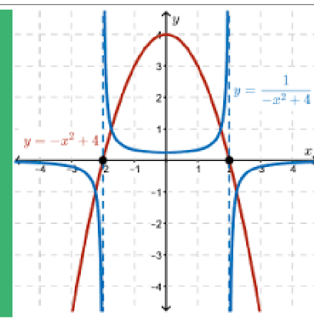


Unit 5: Absolute Values, Reciprocals, Inequalities

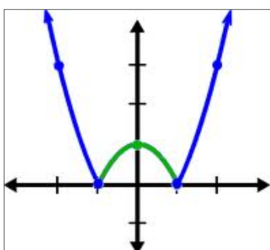


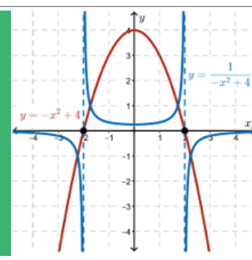
5.2 Solving Absolute Value Equations

Absolute value equations are equations with a variable in the absolute value bars.

Ex.) $|x| = 9$

When solving absolute value equations, we have to consider two cases; the positive case and the negative case.





Ex.) Solve, both algebraically and graphically:

$|6 - x| = 2$

Graphically

$Y_1 = |6 - x|$

$Y_2 = 2$

$\boxed{x = 4, 8}$

Algebraically

Case 1

$6 - \cancel{x} = 2$

$+x \quad +x$

$6 = 2 + x$

$-2 \quad -2$

$\boxed{4 = x}$

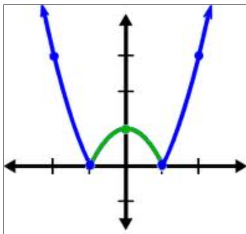
Case 2

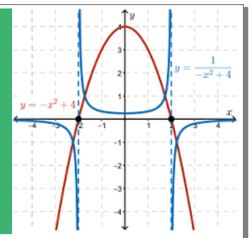
$-(6 - x) = 2$

$-\cancel{6} + x = 2$

$+\cancel{6} \quad +6$

$\boxed{x = 8}$





Ex.) | x + 5 | = 4x - 1

Graphically

$y_1 = |x+5|$

$y_2 = 4x-1$

$\boxed{x=2}$

Algebraically

Case 1

$x+5 = 4x-1$

$-4x \quad -4x$

$-3x+5=-1$

$-3x=-6$

$\boxed{x=2}$

Case 2

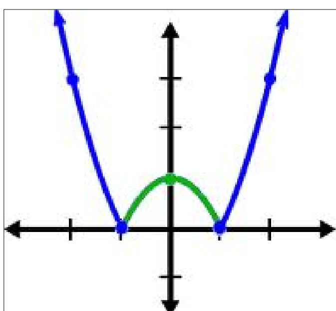
$-(x+5) = 4x-1$

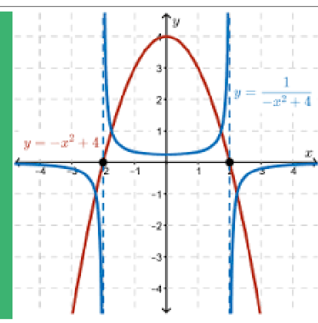
$-x-5 = 4x-1$

$\frac{-4}{5} = \frac{5x}{5}$

$\boxed{x = \cancel{-4/5}}$ extraneous

always verify w/ original equation

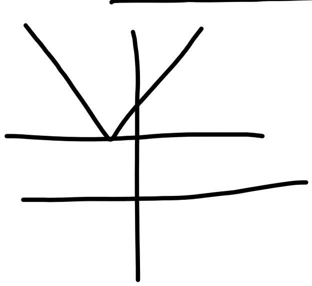




Ex.) $|3x - 4| + \cancel{12} = 9$

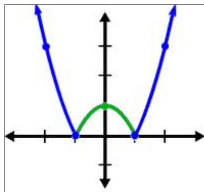
$\quad -\cancel{12} \quad -12$

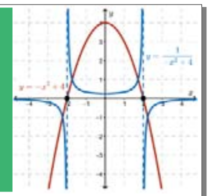
$|3x-4| = -3$



no solutions

because by the definition of abs. value $\neq -\#$





Ex.) $|x - 5| = x^2 - 8x + 15$

$3 \stackrel{?}{=} 3$

Case 1

$x - 5 = x^2 - 8x + 15$

$0 = x^2 - 9x + 20$

$0 = (x-4)(x-5)$

$x = \cancel{4}, \boxed{5}$

extraneous

Case 2

$-1(x-5) = x^2 - 8x + 15$

$-x + 5 = x^2 - 8x + 15$

$0 = x^2 - 7x + 10$

$0 = (x-5)(x-2)$

$\boxed{x = 5, 2}$

* make sure abs. value bars are isolated *

* set up 2 cases *

Pg. 389 #4-6.