

Honors Algebra 2
Ch 4 Review #2

Name: Kay

Solve the following equations and system of equations algebraically.

$$\begin{aligned} \text{Ex 1)} \quad & 2|2x-6|+4=8 \\ & -4 -4 \\ & \hline 2|2x-6| = 4 \\ & \quad 2 \\ & |2x-6| = 2 \end{aligned}$$

$$\begin{aligned} 2x-6 &= 2 \quad \text{OR} \quad 2x-6 = -2 \\ 2x &= 8 \quad \quad \quad 2x = 4 \end{aligned}$$

$$\boxed{x=4 \quad \text{OR} \quad x=2}$$

$$\begin{aligned} \text{Ex 3)} \quad & 3(x-4)^2+6=33 \\ & -6 -6 \\ & \hline 3(x-4)^2 = 27 \\ & \quad 3 \quad 3 \\ & \sqrt{(x-4)^2} = \sqrt{9} \\ & |x-4| = 3 \end{aligned}$$

$$\begin{aligned} x-4 &= 3 \quad \text{OR} \quad x-4 = -3 \\ +4 +4 & \quad \quad \quad +4 +4 \\ \hline x &= 7 \quad \text{OR} \quad x = 1 \end{aligned}$$

$$\begin{aligned} \text{5)} \quad & (\sqrt{x+2})^2 = (2x+1)^2 \\ & \frac{x+2}{-x-2} = \frac{4x^2+4x+1}{-x-2} \\ & 0 = 4x^2 + 3x - 1 \\ & 0 = (4x-1)(x+1) \\ & \boxed{x = \frac{1}{4}} \quad \boxed{x \neq -1 \quad (\text{EXTRANEous})} \end{aligned}$$

$$\begin{aligned} \text{Ex 2)} \quad & -3\sqrt{2x-1}+4=10 \\ & -4 -4 \\ & \hline -3\sqrt{2x-1} = 6 \\ & \quad -3 \quad -3 \\ & \sqrt{2x-1} = -2 \end{aligned}$$

NO SOLUTIONS

$$\begin{aligned} \text{Ex 4)} \quad & y = -2(x-2)^2 + 35 \\ & y = -2x + 15 \end{aligned}$$

$$\begin{aligned} -2(x-2)^2 + 35 &= -2x + 15 \\ -2(x^2 - 4x + 4) + 35 &= -2x + 15 \\ -2x^2 + 8x - 8 + 35 &= -2x + 15 \\ -2x^2 + 8x + 27 &= -2x + 15 \\ +2x^2 - 8x - 27 & \quad \quad \quad -8x - 27 + 2x^2 \end{aligned}$$

$$\begin{aligned} 0 &= 2x^2 - 10x - 12 \\ 0 &= 2(x^2 - 5x - 6) \\ 0 &= 2(x-6)(x+1) \\ & \quad \quad \quad \boxed{x=6 \quad x=-1} \\ y &= 2x+4 \\ 2x+4 &= (x+1)^2 + 3 \\ 2x+4 &= x^2 + 2x + 1 + 3 \\ 2x+4 &= x^2 + 2x + 4 \\ -2x - 4 & \quad \quad \quad -2x - 4 \\ 0 &= x^2 \\ 0 &= x \\ & \quad \quad \quad \boxed{(0,4)} \end{aligned}$$

$$\begin{aligned} y &= -2(6) + 15 \\ y &= 3 \\ y &= -2(-1) + 15 \\ y &= 17 \end{aligned}$$

Solve the following inequalities algebraically and represent the solution on a number line and as an algebraic statement.

$$\begin{aligned} \text{7)} \quad & 2x^2 + 5x - 10 \geq x^2 + 4x - 4 \\ & -x^2 - 4x + 4 - x^2 - 4x + 4 \\ & \hline x^2 + x - 6 \geq 0 \end{aligned}$$

$$(x+3)(x-2) \geq 0$$

Boundary Points:

$$x = -3 \quad x = 2$$

$$\text{8)} \quad -3 < 2 - \frac{x}{3} \leq -1$$

$$\begin{aligned} ^3(-3) < (2 - \frac{x}{3})^3 \quad \text{AND} \quad ^3(2 - \frac{x}{3}) \leq (-1)^3 \\ -9 < 6 - x & \quad \quad \quad 6 - x \leq -1 \\ -15 < -x & \quad \quad \quad -x \leq -9 \\ 15 > x & \quad \quad \quad x \geq 9 \end{aligned}$$

AND



$$\boxed{x \leq -3 \quad \text{OR} \quad x \geq 2}$$



Boundary Points

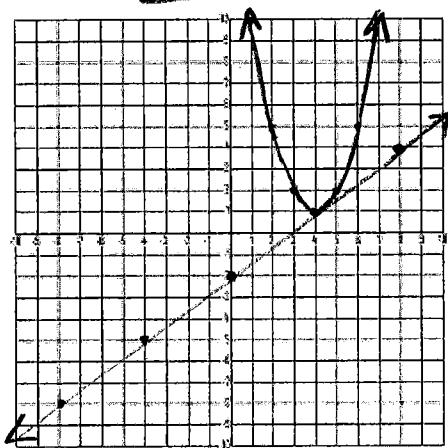
$$x = 9 \quad x = 15$$

$$\boxed{9 \leq x < 15}$$

Solve the equations/inequalities by graphing.

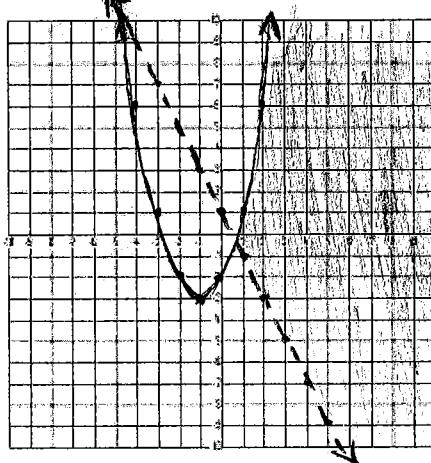
9) $(x - 4)^2 + 1 = \frac{3}{4}x - 2$

$$\boxed{x=4}$$



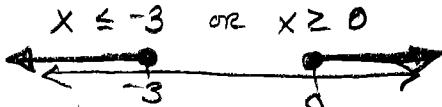
$\boxed{(0)} \quad Y \leq (x+1)^2 - 3$

$Y > -2x + 1$



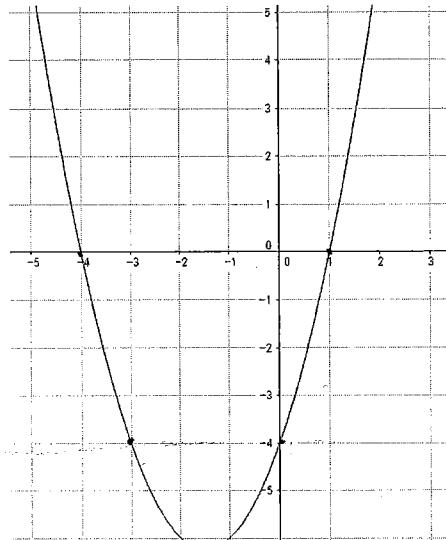
11) Use the graph at right to answer the following.

- a. For what values of x is $f(x) \geq -4$? Show your solution algebraically and on a number line.



- b. For what values of x is $f(x) = 0$? Show your solution algebraically.

$x = -4 \text{ or } x = 1$



12) Perform the operations for the following rational expressions. Be sure to simplify your answers as much as possible.

a. $\frac{2x}{5x-5} + \frac{4x+3}{(x-1)(x+2)}$

$$\frac{(x+2)}{(x+2)} \cdot \frac{2x}{5(x-1)} + \frac{4x+3}{(x-1)(x+2)} \cdot \frac{5}{5} = \frac{(x+1)}{(x+4)} \cdot \frac{3x+1}{(x-4)(x+4)} - \frac{3x+5}{(x+4)(x+4)} \cdot \frac{(x-4)}{(x-4)}$$

$$\frac{2x(x+2)}{5(x+2)(x-1)} + \frac{5(4x+3)}{5(x-1)(x+2)}$$

$$\frac{2x^2+4x+20x+15}{5(x+2)(x-1)}$$

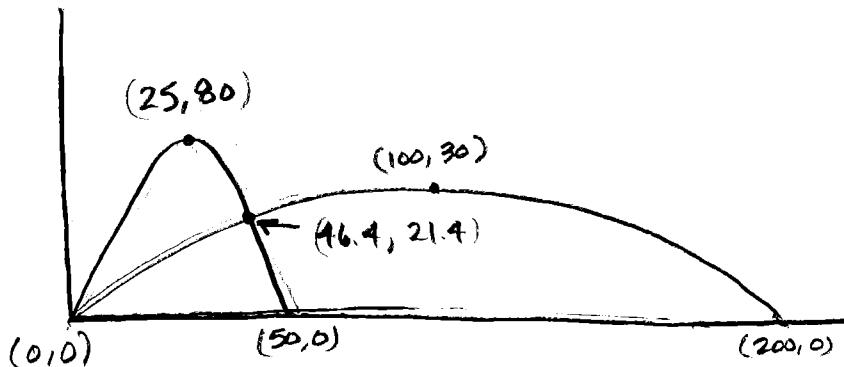
b. $\frac{3x+1}{x^2-16} - \frac{3x+5}{x^2+8x+16}$

$$\frac{3x^2+13x+4}{(x-4)(x+4)} - \frac{3x^2-7x-20}{(x-4)(x+4)} = \frac{(3x^2+13x+4) - (3x^2-7x-20)}{(x-4)(x+4)^2}$$

$$\frac{20x+24}{(x-4)(x+4)^2}$$

$$\boxed{\frac{2x^2+24x+15}{5(x+2)(x-1)}}$$

13) On Christmas Eve, Santa began his trip around the world and stopped at each house. When he left from the Smith's house in Bismarck, North Dakota Santa ascended 30 ft up and 200ft horizontally to get to the next chimney. At the same time, The Smith's children were trying to catch Santa and let off a rocket from their chimney. The rocket reached a maximum height of 80 feet but only traveled 50 feet sideways. Did the rocket hit Santa and if so, at what distance from the Smith's chimney (horizontal distance)? Draw a picture to show this situation and leave your "a" values as fractions.



The rocket would hit Santa 46.4 ft away from where it was launched.

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

SANTA: $y = \frac{-3}{1000} (x-100)^2 + 30$

$$y = a(x-100)^2 + 30$$

$$0 = a(0-100)^2 + 30$$

$$\frac{-30}{10000} = \frac{10000a}{10000} \quad a = \frac{-3}{1000}$$

ROCKET: $y = \frac{-16}{125} (x-25)^2 + 80$

$$y = a(x-25)^2 + 80$$

$$0 = a(0-25)^2 + 80$$

$$\frac{-80}{625} = \frac{625a}{625} \quad a = \frac{-16}{125}$$

$$\frac{16}{125}$$

