Name:_____   Date:_____
PC: Solving Systems of Equations Algebraically   Ms. Loughran

Do Now:

1. Solve the following system of equations:

$$y = x + 1$$
$$2x + y = -2 \rightarrow y = -2x - 2$$

<u>Substitution</u>

$$x + 1 = -2x - 2$$

$$3x = -3$$
$$x = -1$$

$$y = -1 + 1 = 0$$

$$(-1, 0)$$

<u>elimination</u>

$$-1 \left(-x + y = 1 \right)$$
$$2x + y = -2$$

$$x - y = -1$$
$$\underline{2x + y = -2}$$

$$3x = -3$$
$$x = -1 \qquad (-1, 0)$$
$$y = -1 + 1 = 0$$

Models:

1. Solve the system of equations: $-2 \left(\begin{array}{l} 3x + y = 3 \\ 7x + 2y = 1 \end{array} \right.$

$$-6x - 2y = -6$$
$$\underline{7x + 2y = 1} \qquad (-5, 18)$$

$$x = -5$$

$$3(-5) + y = 3$$
$$-15 + y = 3$$
$$y = 18$$

Classwork:

1. Solve the system of equations algebraically by ~~substitution~~ and then by elimination:

$$2x - y = -1$$
$$2x + y = -7$$

$$4x = -8 \qquad (-2, -3)$$
$$x = -2$$

$$2(-2) + y = -7$$
$$-4 + y = -7$$
$$y = -3$$

2. Solve the system of equations algebraically by ~~substitution~~ and then by elimination:

$$2x + 2y = 3$$
$$x = 4y - 1$$

$$2\left(2x + 2y = 3\right)$$
$$x - 4y = -1$$

$$4x + 4y = 6$$
$$\underline{x - 4y = -1}$$

$$5x = 5$$

$$x = 1$$

$$2(1) + 2y = 3$$
$$2y = 1$$
$$y = \frac{1}{2}$$

$$\left(1, \frac{1}{2}\right)$$

3. Solve the system of equations algebraically by substitution and then by elimination:

$$2 \left(x - 2y = 3 \right)$$
$$-2x + 4y = 1$$

$$2x - 4y = 6$$
$$\underline{-2x + 4y = 1}$$
$$0 \neq 7$$

no solution

why? $\quad x - 2y = 3$

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

$$\frac{1}{2}x - \frac{3}{2} = y$$

$$m = \frac{1}{2}$$

$$-2x + 4y = 1$$

$$\frac{4y}{4} = \frac{2x}{4} + \frac{1}{4}$$

$$y = \frac{1}{2}x + \frac{1}{4}$$

$$m = \frac{1}{2}$$

these lines are ||, therefore they donot intersect

4. Solve the system of equations algebraically by substitution and then by elimination:

$$-2 \left(2x - y = 1 \right)$$
$$4x - 2y = 2$$

$$-4x + 2y = -2$$
$$\underline{4x - 2y = 2}$$
$$0 = 0$$

infinitely many solutions

general solution: $(x, 2x-1)$ needy in terms of x

$$2x - y = 1$$
$$2x - 1 = y$$

why?

$$y = 2x - 1$$

$$4x - 2y = 2$$
$$4x - 2 = 2y$$

$$2x - 1 = y$$

same line

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

$$\left(\frac{y+1}{2}, y \right)$$

need x in terms of y

5. Solve the system of equations algebraically by ~~substitution~~ and then by elimination:

$$-5 \begin{pmatrix} 3x + 2y = 2 \\ 5x + 7y = -4 \end{pmatrix} 3$$

$$-15x - 10y = -10$$
$$\underline{15x + 21y = -12}$$
$$11y = -22$$
$$y = -2$$

$$3x + 2(-2) = 2$$
$$3x - 4 = 2$$
$$3x = 6$$
$$x = 2$$

$$(2, -2)$$

Summary

For a system of linear equations, there can be:

1. no solution (bc the lines are ||)

2. one unique solution

3. infinitely many solutions (bc they are the same line)

Answer the following question on your index card:
Which method (substitution or elimination) do you think is easier? Explain why

Name: _Key_

Date:_____

PC: Solving Rational Equations and Inequalities Graphically Homework

Please answer BOTH questions showing all necessary steps in the spaces provided on this sheet. It will be _collected_ tomorrow.

1. Solve the following equation graphically by doing each of the following:
    (a) Draw a complete graph of the function showing all intercepts and asymptotes.
    (b) Write the window settings you use on your graph.
    (c) Find the solution set

$$\frac{10}{x^2} + \frac{30}{(10-x)^2} = 4$$

label x and y

~need to change standard window

- 3 decimal places

$$\frac{10}{x^2} + \frac{30}{(10-x^2)} - 4 = 0$$

$$PVA : x = 0, 10$$

$$EB : y = 0 + 0 - 4 = -4$$
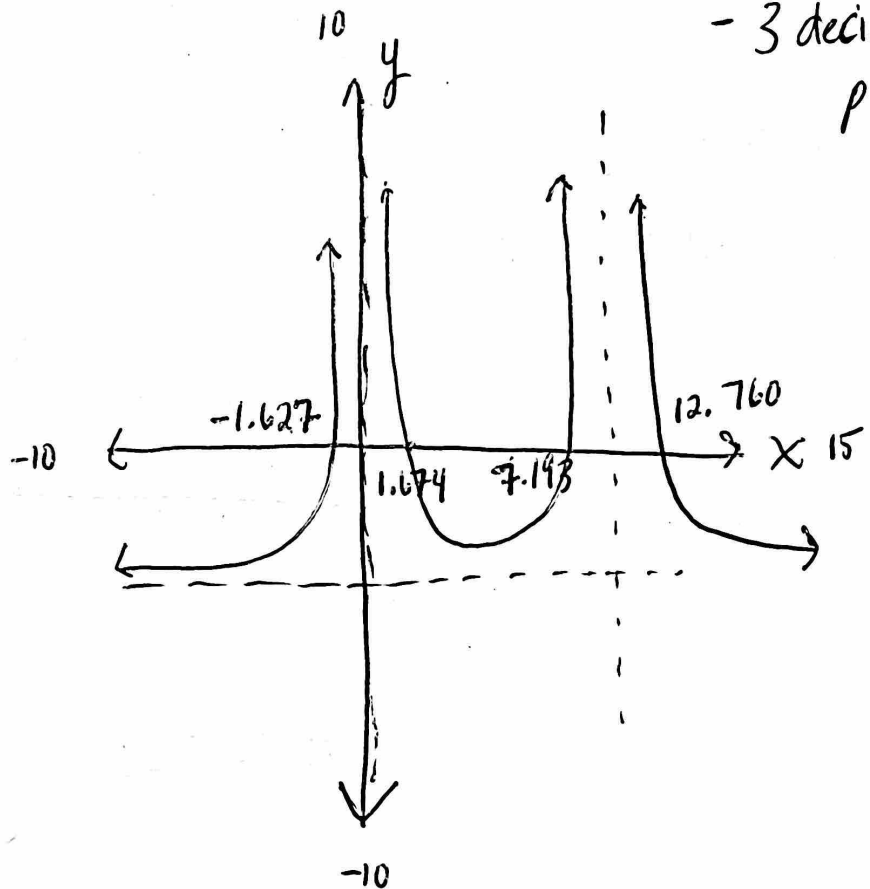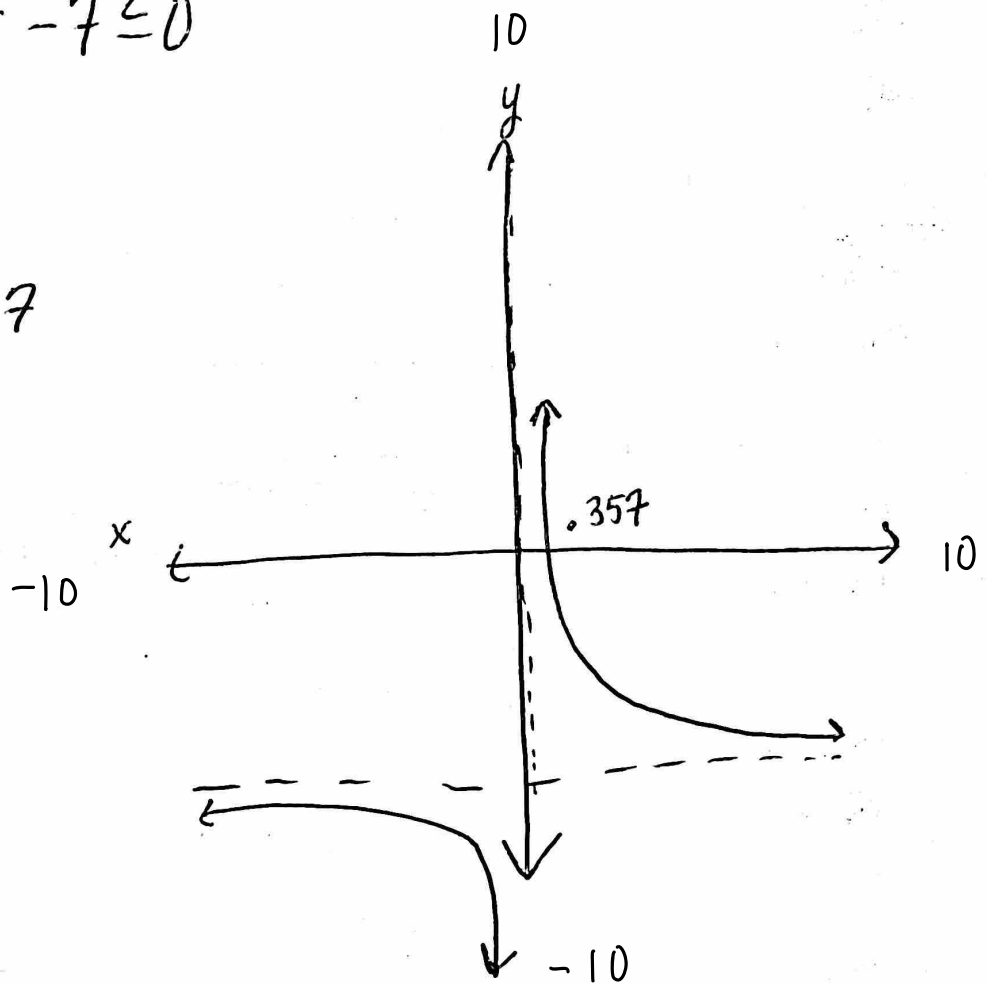

$$\{-1.627, 1.674, 7.193, 12.760\}$$

2. Solve the following rational inequality below graphically by doing the following:
    (a) Draw a complete graph of the function showing all intercepts and asymptotes.
    (b) Write the window settings you use on your graph.
    (c) **(Optional)** Using your graph, draw a number line with critical points that shows the values of x that satisfy the inequality.
    (d) State the solution set using both set builder notation and interval notation.

$$\frac{2}{x} + \frac{1}{2x} \leq 7$$

$$\frac{2}{X} + \frac{1}{2x} - 7 \leq 0$$

PVA: $X = 0$

EB: $y = 0 + 0 - 7 = -7$

$$(-\infty, 0) \cup [.357, \infty)$$