Name:_____   Date:_____

PC: Solving Systems of Equations Algebraically   Ms. Loughran

Do Now:

1. Solve the following system of equations:

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

Substitution :

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

$$y = -1 + 1 = 0 \quad (-1, 0)$$

Elimination

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

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

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

Models:

1. Solve the system of equations: $-2 \left(3x + y = 3 \right)$
$$7x + 2y = 1$$

$$-6x - 2y = -6$$
$$7x + 2y = 1$$

$$x = -5$$

$$(-5, 18)$$

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

Classwork:

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

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

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

$$2(-2) - y = -1$$
$$-4 - y = -1$$
$$-y = 3$$
$$y = -3$$

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

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

$$(1, \tfrac{1}{2})$$

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

$$4x = -4y + 6$$
$$x = 4y - 1$$

$$5x = 5$$
$$x = 1$$

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

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

$$2\left(\begin{array}{c} x - 2y = 3 \\ -2x + 4y = 1 \end{array}\right)$$

$$2x - 4y = 6$$
$$-2x + 4y = 1$$
_____
$$0 \neq 7$$

no solution

or

$\varnothing$

$$x - 2y = 3$$
$$-2y = -x + 3$$
$$y = \tfrac{1}{2}x - \tfrac{3}{2}$$

$\therefore$ These lines are ||, so they never intersect.

$$-2x + 4y = 1$$
$$4y = 2x + 1$$
$$y = \tfrac{1}{2}x + \tfrac{1}{4}$$

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

$$-2\left(\begin{array}{c} 2x - y = 1 \\ 4x - 2y = 2 \end{array}\right)$$

infinite # of solutions

$$-4x + 2y = -2$$
$$4x - 2y = 2$$
_____
$$0 = 0$$

$$2x - y = 1$$
$$-y = -2x + 1 \quad \text{OR} \quad 2x - 1 = y$$
$$y = 2x - 1$$

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

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

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

$-15x - 10y = -10$
$15x + 21y = -12$
_____
$11y = -22$
$y = -2$

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

$(2, -2)$

Summary

For a system of linear equations, there can be:

1. no solution

2. infinite # of solutions

3. one unique solution

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

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

$PVA: x=0, 10$

$EB: y=0+0-4=-4$
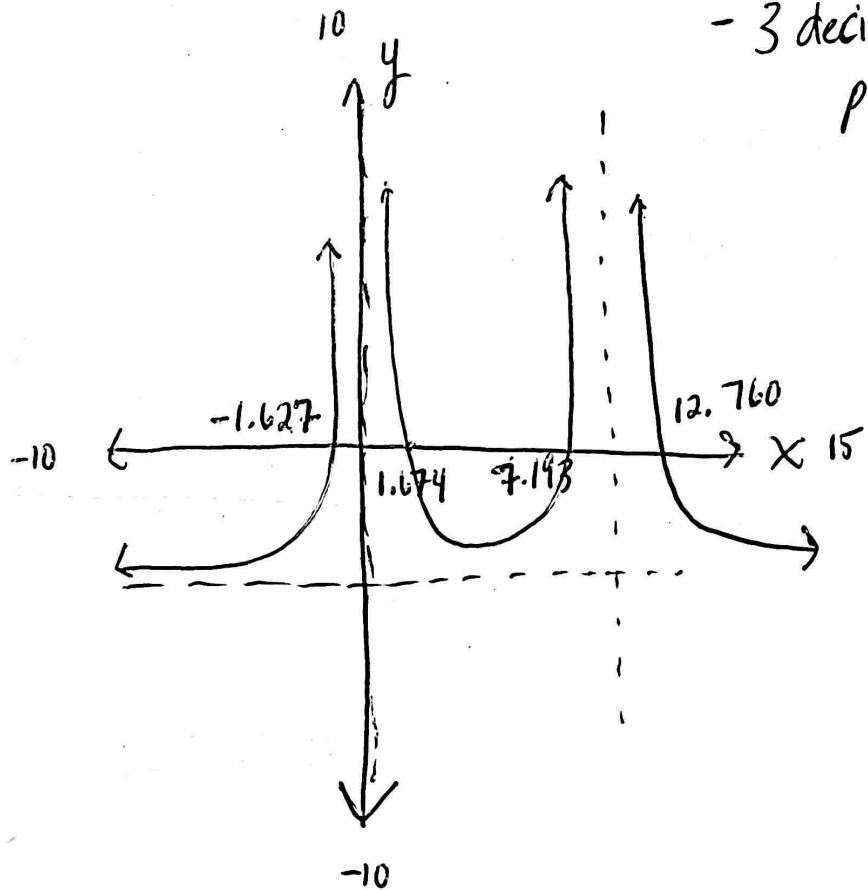
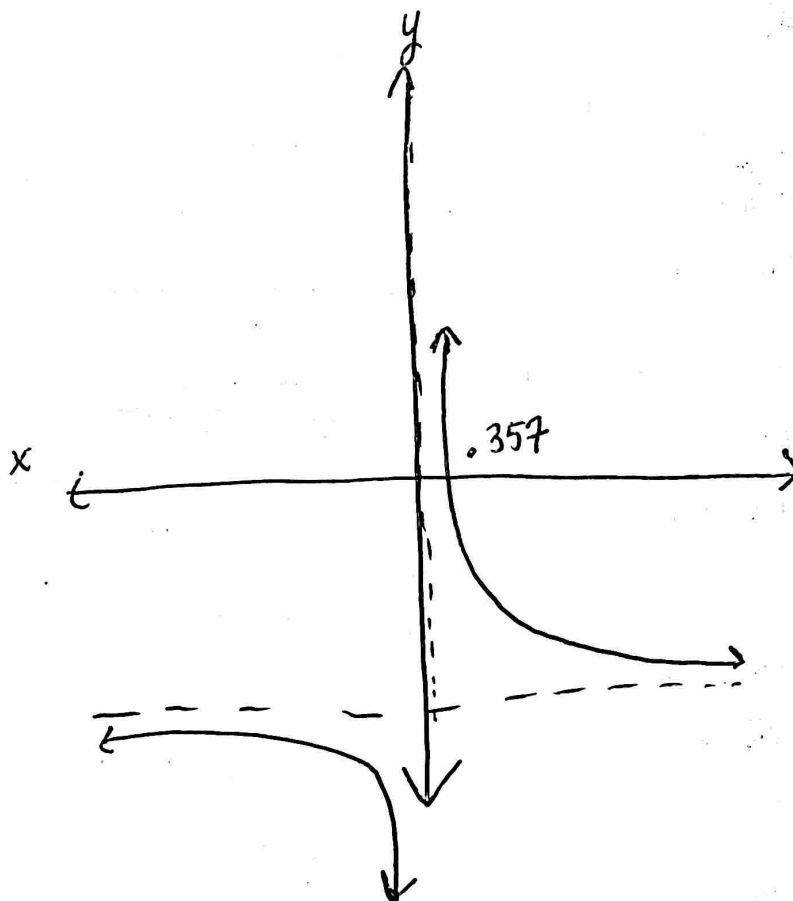$\left\{-1.627, 1.674, 7.193, 12.760\right\}$

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

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