

Practice Test

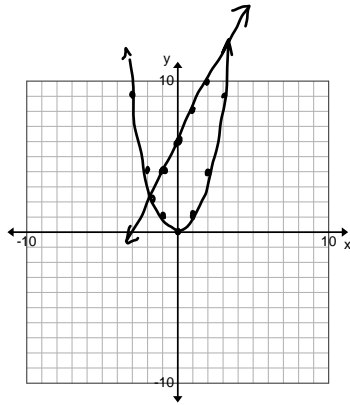
Name: _____

A. Solve the following Linear -- Quadratic Systems

1. Solve the following system by graphing manually and then verify the solution with the TI83/84.

$$y = 2x + 6$$

$$y = x^2$$



solns: $(-1.65, 2.71)$ and $(3.65, 13.30)$

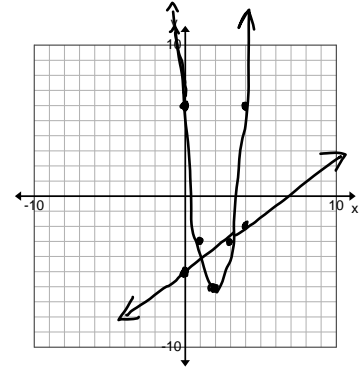
2. Solve the following system by graphing manually and then verify the solution with the TI83/84.

$$y = 3(x-2)^2 - 6$$

$$3x - 4y = 20$$

$$-4y = -3x + 20$$

$$y = \frac{3}{4}x - 5$$



solns: $(1.2, -4.1)$ and $(3.05, -2.72)$

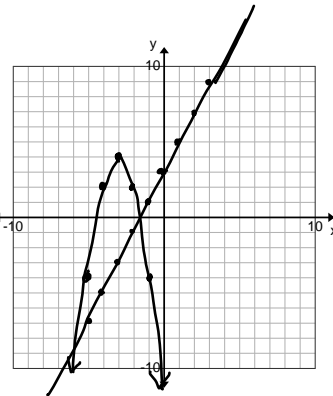
3. Solve the following system by graphing manually and then verify the solution with the TI83/84.

$$y = 2x + 3$$

$$y = -2x^2 - 12x - 14$$

$$y = -2(x^2 + 6x + 9 - 9) - 14$$

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



solns: $(-5.44, -7.87)$ and $(-1.66, -0.18)$

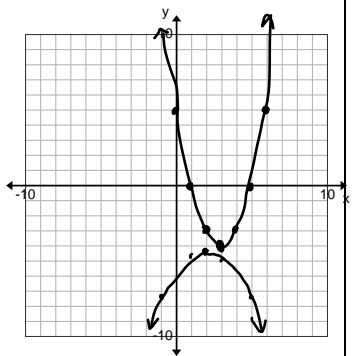
4. Solve the following system by graphing manually and then verify the solution with the TI83/84.

$$y = x^2 - 6x + 5$$

$$x^2 - 4x + 3y + 17 = 0$$

$$y = (x^2 - 6x + 9 - 9) + 5$$

$$y = (x-3)^2 - 4$$



$$-3y = x^2 - 4x + 17$$

$$-3y = (x^2 - 4x + 4 - 4) + 17$$

$$-3y = (x-2)^2 + 13$$

$$y = -\frac{1}{3}(x-2)^2 - \frac{13}{3}$$

~~solns: $(-0.09, 5.54)$ and $(5.59, 2.71)$~~ No Solution

<p>5. Solve the following system algebraically.</p> $y = 5x + 6$ $y = x^2$ $x^2 = 5x + 6$ $x^2 - 5x - 6 = 0$ $(x - 6)(x + 1) = 0$ $x = 6, -1$ $(6, 36) \quad (-1, 1)$ <p>solns : (6, 36) and (-1, 1)</p>	<p>6. Solve the following system algebraically.</p> $y = -\frac{1}{2}x - 4$ $y = \frac{1}{2}(x+2)^2 - 4$ $-\frac{1}{2}x - 4 = \frac{1}{2}(x+2)^2 - 4$ $-x - 8 = (x+2)^2 - 8$ $-x - 8 = x^2 + 4x + 4 - 8$ $0 = x^2 + 5x + 4$ $0 = (x+4)(x+1)$ $x = -4, -1$ $(-4, -2)$ $(-1, -\frac{7}{2})$ <p>solns : (-4, -2) and $(-1, -\frac{7}{2})$</p> $y = \frac{1}{2}x - 4$ $y = \frac{1}{2} \cdot \frac{-8}{2} = \frac{1-8}{2}$ $y = -\frac{7}{2}$
<p>7. Solve the following system algebraically.</p> $y = 2x + 3$ $y = 3x^2 + x - 1$ $2x + 3 = 3x^2 + x - 1$ $0 = 3x^2 - x - 4$ $0 = (3x - 4)(x + 1)$ $x = \frac{4}{3}, -1$ $(-1, 1)$ $y = 2(\frac{4}{3}) + 3$ $y = \frac{8}{3} + \frac{9}{3} = \frac{17}{3}$ $(4/3, 17/3)$ <p>solns : (-1, 1) and $(\frac{4}{3}, \frac{17}{3})$</p>	<p>8. Solve the following system algebraically. (Calc Assisted)</p> $y = x^2 + 17x - 12$ $-y = -2x^2 + 7x + 3$ $0 = 3x^2 + 10x - 15$ $x = \frac{-10 \pm \sqrt{100 - 4(3)(-15)}}{6}$ $= \frac{-10 \pm \sqrt{280}}{6}$ $= \frac{-10 \pm 2\sqrt{70}}{6}$ $= \frac{-5 \pm \sqrt{70}}{3}$ $(-\frac{5+\sqrt{70}}{3}, 8.34)$ $(-\frac{5-\sqrt{70}}{3}, -67.90)$ <p>solns : (1.12, 8.34) and (-4.46, -67.90)</p>

B. Solve the following system with your Graphing calculator. solutions: $(-14.3, -21.2)$ and $(31.2, 175)$

$$432x - 100y + 4052 = 0$$

$$y = 0.27x^2 - 0.2376x - 79.707728$$

$$\begin{aligned} 100y &= 432x + 4052 \\ y &= 4.32x + 40.52 \end{aligned}$$

C. Application of a System [Calculator Assisted ALGEBRA – Do not graph to solve!]

On her last trip to Vietnam, Ms. Bowater boarded a flight with Broken Wing Airline and wondered why they handed out parachutes during the pre-flight announcements. During their descent into Cambodia, the plane began to shake and make loud noises when the stewardess rushed towards the front of plane and pushed the door open. The captain simultaneously announced that they would be unable to land at the airport and that they would have to parachute their way down to the ground. Never being one to shy away from adventure, Ms. Bowater was first in line at the door and has already calculated the potential equations for her descent!

Ms. Bowater had calculated that her free fall would be parabolic and have the equation

$$h(t) = -4.9t^2 + 1175$$

Where 'h' is the height in metres from the ground and 't' is the time in seconds from the time she jumped from the plane. Ms. Bowater had also calculated that the equation for her descent after the deployment of her chute would be

$$h(t) = -4.9t + 926$$

Determine how much time passed after jumping from the plane before Ms. Bowater deployed her parachute and how high above the ground she was when this occurred.

$$\begin{aligned} -4.9t^2 + 1175 &= -4.9t + 926 \\ 0 &= 4.9t^2 - 4.9t - 249 \end{aligned}$$

$$\begin{aligned} x &= \frac{4.9 \pm \sqrt{4.9^2 - 4(4.9)(-249)}}{9.8} \\ &= \frac{4.9 \pm \sqrt{4904.41}}{9.8} \end{aligned}$$

$$x = 7.65, \quad -\cancel{6.65}$$

time
↓
(7.65, 888.53)

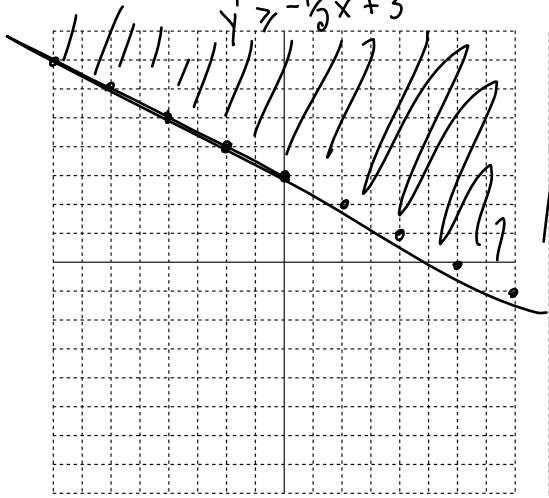
height
↓

D. Inequalities in Two Variables

1. Graph the inequalities:

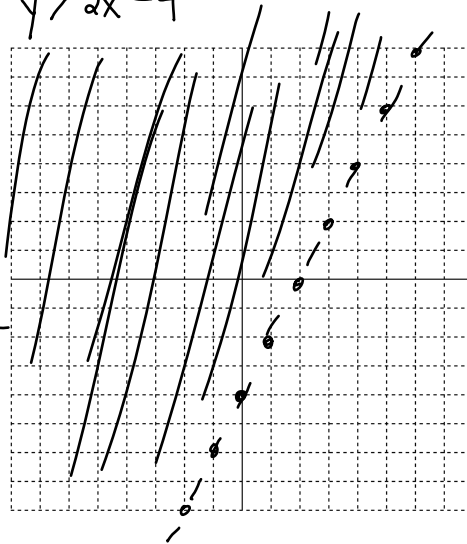
a) $3x + 6y \geq 18$

$6y \geq -3x + 18$
 $y \geq -\frac{1}{2}x + 3$



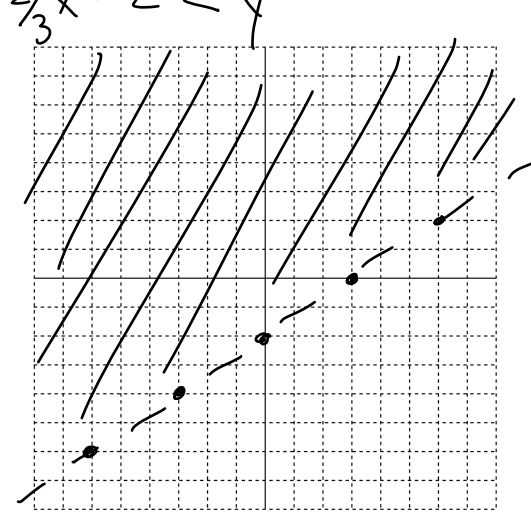
b) $-4y < -8x + 16$

$y > 2x - 4$

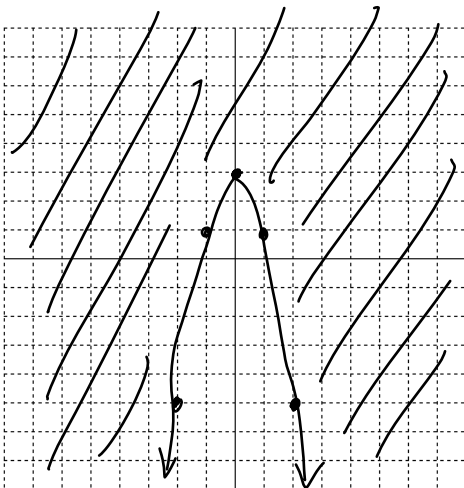


c) $2x - 3y < 6$

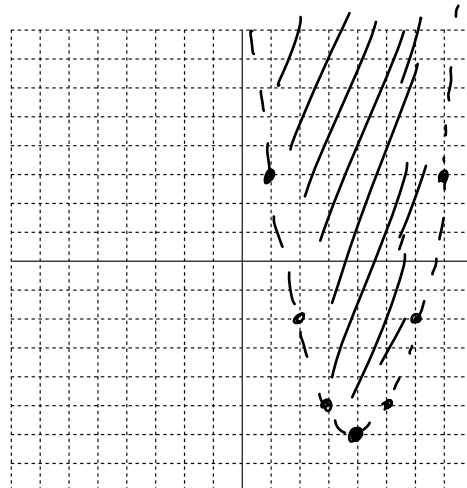
$\frac{2}{3}x - 2 < y$



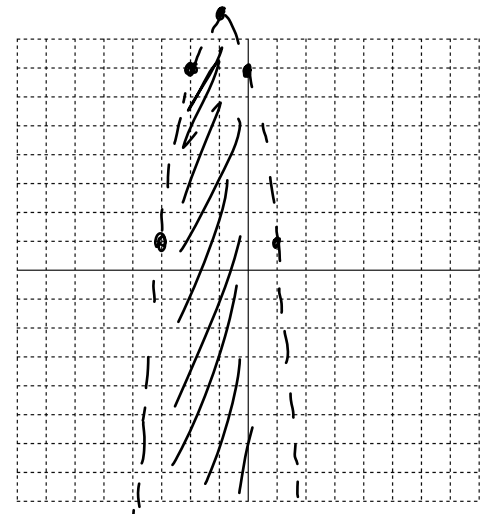
d) $y \geq -2x^2 + 3$



e) $y > x^2 - 8x + 10$



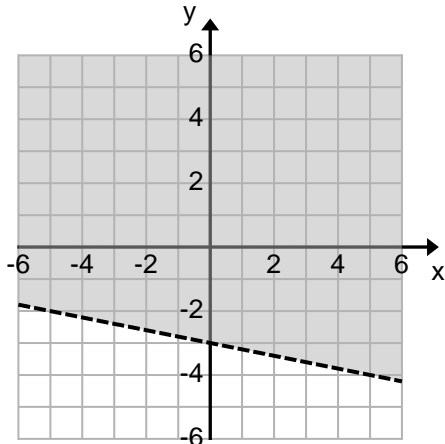
f) $y < -2x^2 - 4x + 7$



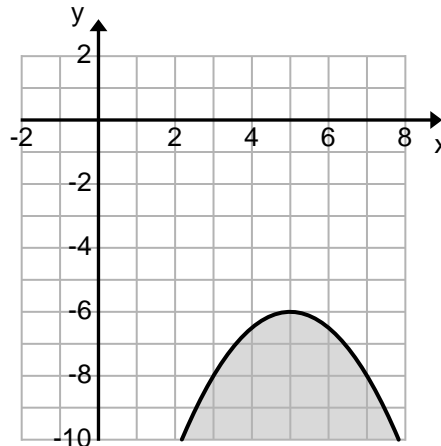
$y > x^2 - 8x + 16 - 16 + 10$
 $y > (x - 4)^2 - 6$

$y < -2(x^2 + 2x \quad) + 7$
 $y < -2(x^2 + 2x + 1 - 1) + 7$
 $y < -2(x + 1)^2 + 9$

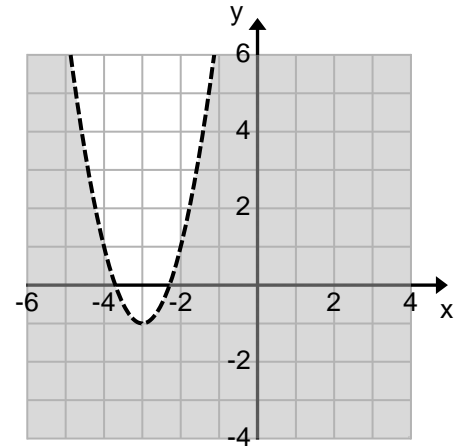
2. Write an inequality to represent each graph.



$$y > -\frac{1}{5}x - 3$$



$$y \leq -\frac{1}{2}(x-5)^2 - 6$$



$$y < 2(x+3)^2 - 1$$

3. Applications

a) Carmen has up to \$15 to buy seeds. A package of vegetable seeds cost \$1.50 and a package of flower seeds costs \$2.

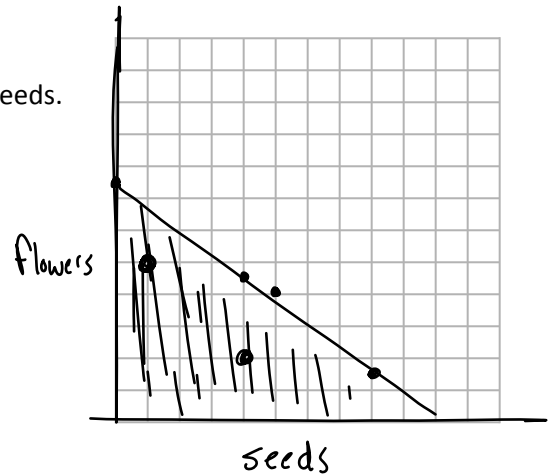
- i) Write an inequality that describes the total cost of the seeds. State any restrictions on the variables.

$$1.5x + 2y \leq 15$$

$$\frac{3x}{2} + 2y \leq 15$$

$$2y \leq -\frac{3}{2}x + 15$$

- ii) Graph the inequality $y \leq -\frac{3}{4}x + \frac{15}{2}$



- iii) Use the graph to determine two possible ways Carmen can spend up to \$20.

1 pack of seeds + 5 packs of flowers
 4 packs " " " 2 " " " (Lots of options)

- iv) Can Carmen buy 5 packages of seeds and 4 packages of flower seeds?

No

b) Two times the square of one number is greater than 4 times the sum of the other number and 2.

i) Graph an inequality that represents this relationship

$$2x^2 > 4(y+2)$$

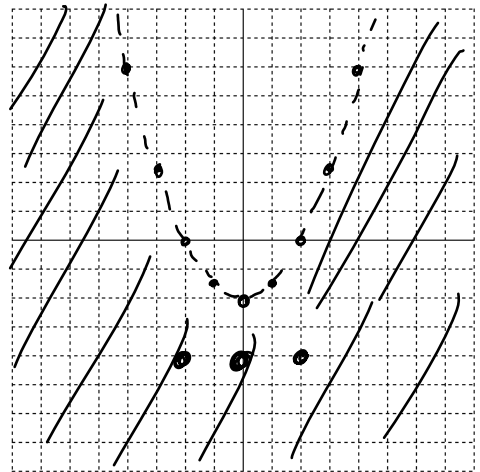
$$2x^2 > 4y + 8$$

ii) Use the graph to list three pairs of integer values for the two numbers.

$$2x^2 - 8 > 4y$$

$$\frac{1}{2}x^2 - 2 > y$$

$(0, -4)$ $(2, -4)$ $(-2, -4)$
 (Lots of options)



$\frac{2}{1}$
 $\frac{-1}{3}$

E. Inequalities in One Variable

1. Solve the following inequalities. Represent the solutions algebraically.

a) $x^2 - 2x - 3 < 0$
 $(x-3)(x+1) < 0$
 $-1 < x < 3$

b) $2x^2 - 7x > -3$
 $2x^2 - 7x + 3 > 0$
 $(2x-1)(x-3) > 0$
 $x < \frac{1}{2}$ or $x > 3$

$\frac{5 \pm 3}{1 \pm 4}$

c) $-5x^2 \geq 17x - 12$
 $0 \geq 5x^2 + 17x - 12$
 $0 \geq (5x-3)(x+4)$
 $-4 \leq x \leq \frac{3}{5}$

d) $4x^2 - 1 \geq 3x + 25$
 $4x^2 - 3x - 26 \geq 0$
 $x = \frac{3 \pm \sqrt{9 - 4(4)(-26)}}{8}$
 $x = \frac{3 \pm \sqrt{425}}{8}$
 $= \frac{3 \pm 5\sqrt{17}}{8}$

2. Give an inequality that has the solution $x < -\frac{1}{4}$ or $x > \frac{2}{5}$.

$$(4x+1)(5x-2) > 0$$

$$20x^2 - 3x - 2 > 0$$