

Unit 5. Solving Systems of Equations ~ Learning Guide

Name: _____

Instructions:

Using a pencil, complete the following questions as you work through the related lessons. Show ALL work as is explained in the lessons. Do your best and ask your instructor if you don't understand any questions!

Graphing Linear Inequalities in Two Variables

1. Solve each of the following and graph the solution on a number line.

a) $5 < 2x + 1$

b) $2(x + 1) \geq 4x$

c) $-2(x - 3) \leq 3x - 5$



2. Without graphing, determine whether each point is a solution of the given inequality.

a) $0 < x + y$ A: $(-5, 6)$

b) $2x - 3y \leq 0$ B: $(2, -1)$

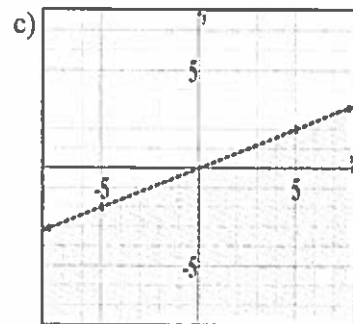
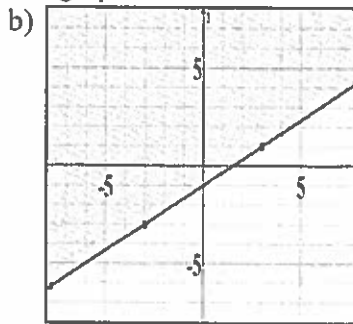
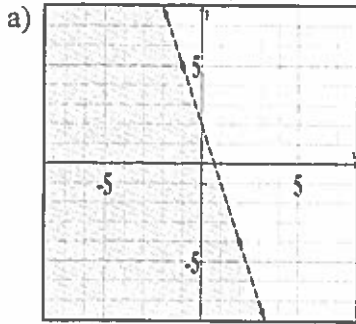
c) $0 \leq y + 3$ C: $(1, -1)$

d) $3x + y < 7$ D: $(2, -3)$

e) $2x \leq -y + 1$ E: $(5, -9)$

f) $-x + 5y + 1 \leq 2$ F: $(-4, 5)$

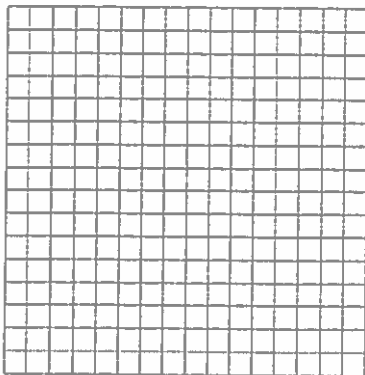
5. Write an inequality to describe each graph.



6. Elli has \$15 to spend on ostrich stickers and emu stickers. Ostrich stickers cost \$2 each, whereas emu stickers cost \$3.

a) Write an inequality that represents the total cost of the stickers. State any restrictions.

b) Sketch the inequality that represents this situation.



c) Determine 2 possible ways that Elli can buy stickers.

d) Can Elli buy 5 ostrich stickers and 3 emu stickers? How much over or under \$15 is she?

i) $0 < 2x^2 + 9x + 4$

j) $9 \leq 4x^2$

k) $4x^2 - 3 \leq -4x$

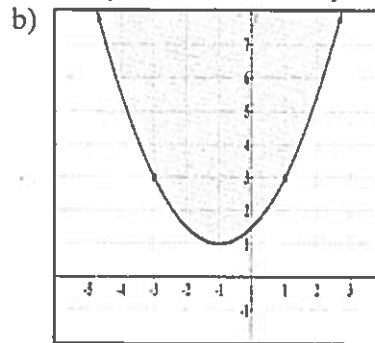
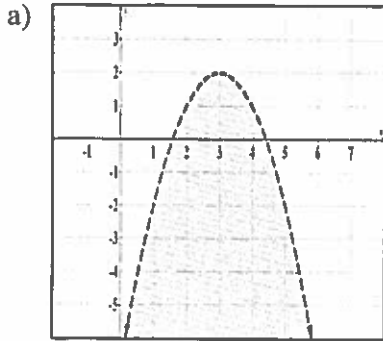
l) $-2 + 2x \leq -3x^2 + 3x$

2. Use the quadratic formula to solve each inequality. Express answers as decimal inequalities.

a) $x^2 + 3x - 7 \leq 0$

b) $0 < 2x^2 - 5x + 1$

5) Given the following graphs, determine the quadratic inequalities that are represented.



6. Determine algebraically whether the point $(2, -3)$ is a solution to any of the following quadratic inequalities.

a) $\bar{y} < (x - 3)^2 - 2$

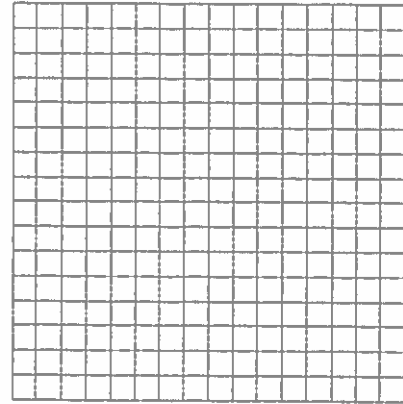
b) $y \geq 2(x + 1)^2 - 3$

c) $y > x^2 + 2x - 5$

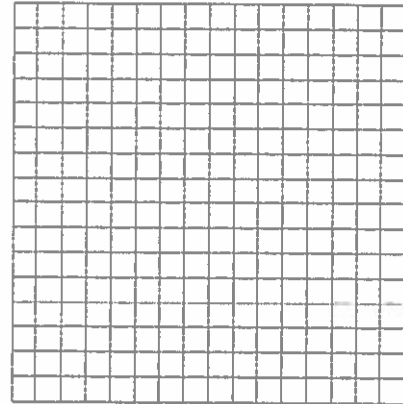
d) $y \leq -2x^2 + 4x + 5$

7. For the point $A(2, a)$ to be a solution for $y \leq -3x^2 + 8$, what must be true about a ?

b) $y = x^2 + 4x + 1$
 $y = -x - 3$



c) $y = -2(x+1)^2 + 3$
 $y = 2x + 1$



3. Solve the following systems of equations algebraically. Use the quadratic formula to solve where necessary and round answers to two decimal places.

a) $y = x^2$
 $2x - y - 1 = 0$

b) $y = x^2 + 2x - 1$
 $x - y + 1 = 0$

g) $6x^2 - 25x - 2y + 26 = 0$
 $x + 2y = 2$

h) $y = 2x^2 - 7$
 $y = -3x - 5$

i) $y = x^2 + 2x - 6$
 $y = \frac{1}{2}x + 2$

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

7. Two numbers are related in this way: The first number is added to 1, this sum is then squared; the result is equal to the second number plus 2. The first number is multiplied by 2 then added to the second number; the result is equal to 4. Determine all possible pairs of numbers that work.

Solving Quadratic-Quadratic Systems in Two Variables

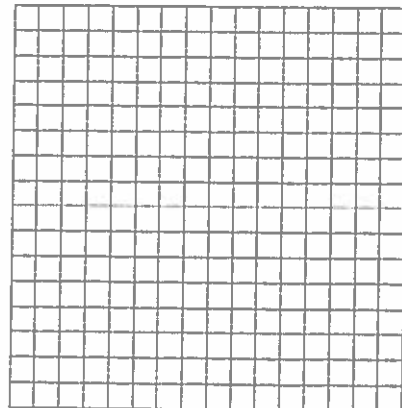
1. Determine algebraically whether the given ordered pair is a solution to the system of equations.

a) $y = x^2 + 1$
 $y = -x^2 + 9$
 $(2, 5)$

b) $y = (x+1)^2 + 2$
 $y = 2x^2 + 11$
 $(-2, 3)$

2. Solve the following systems of equations graphically.

a) $y = (x-1)^2 + 2$
 $y = -x^2 + 4x - 1$



c) $y = x^2 + 4x + 5$
 $y = -(x+2)^2 + 1$

d) $y = x^2 + 6x + 6$
 $y = -\frac{1}{2}x^2 + 6$

e) $y - 9 = x^2 - 6x$
 $y = (x-3)^2$

f) $y = x^2 - 2x - 1$
 $y = -(x-2)^2 + 11$

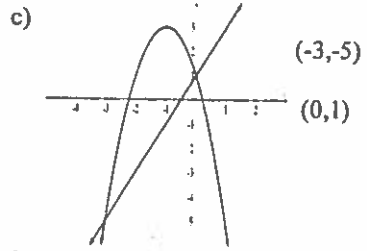
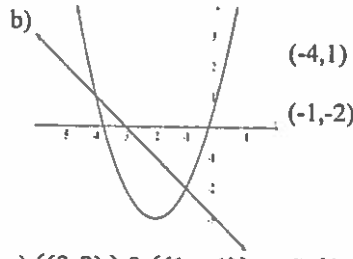
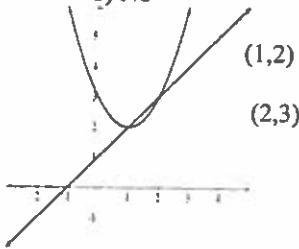
4. Two numbers are related in this way: The first number is squared then added to 2; the result is equal to 2 times the second number. The first number is added to 1, this sum is squared; the result is equal to the second number plus 6. Determine the two numbers accurate to two decimals.

5. Two numbers are related in this way: The number 3 is added to the first number, this sum is squared, then quartered; the result is equal to the second number. The number 1 is subtracted from the first number, this difference is squared; the result is equal to the second number plus 2. Determine the two numbers accurate to two decimals.

5. a) $y < -(x-3)^2 + 2$ b) $y \geq \frac{1}{2}(x+1)^2 + 1$
 6. a) Yes b) No c) No d) Yes 7. $x \leq -4$ 8. $-\sqrt{6} < b < \sqrt{6}$ 9. $5x^2 \leq y + 7$

Solving Linear-Quadratic Systems in Two Variables

1. a) Yes b) No
 2. a)

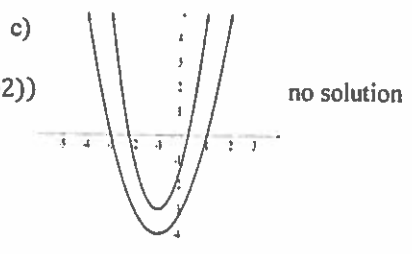
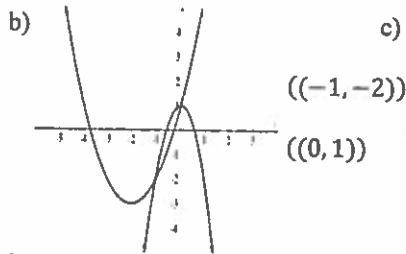
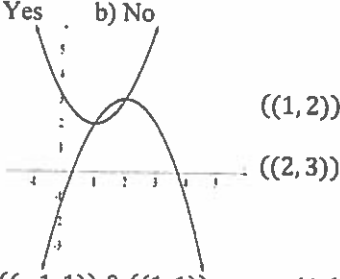


3. a) (1,1) b) ((-2, -1)) & ((1, 2)) c) ((0, 2)) & ((1, -1)) d) ((3, 2))
 e) ((-0.56, 1.44)) & ((3.56, 5.56)) f) no solution g) ((2, 0)) h) (-2, 1) & $(\frac{1}{2}, -\frac{13}{2})$
 i) ((-3.68, 0.16)) & ((2.18, 3.09)) j) $(\frac{1}{2}, -\frac{3}{4})$ & (4, 1)

4. $l = 6\text{cm}$, $w = 3.5\text{cm}$ 5. ((-2, 7)) & ((1, 10)) 6. ((2, 3)) 7. ((-5, 14)) & ((1, 2))

Solving Quadratic-Quadratic Systems in Two Variables

1. a) Yes b) No
 2. a)



3. a) ((-1, 1)) & ((1, 1)) b) ((0, 0)) & ((2, 0)) c) ((-2, 1)) d) ((-4, -2)) & ((0, 6))
 e) Infinitely many f) ((-1, 2)) & ((4, 7)) g) (0, -1) & (2, 3) h) ((1.28, 1.92)) & ((3.39, -3.71))
 4. a) (2, 3) & (-6, 19) 5. (-0.79, 1.22) & (5.46, 17.89)