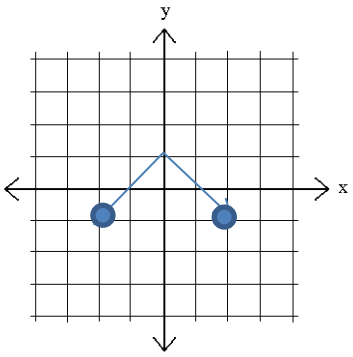
Properties of Functions Review

Name:_____

1.



Domain: _____

Range: _____

Absolute Max: _____ Absolute Min: _____

Relative Max(s): _____ Relative Min(s): _____

y-intercept(s): _____

x-intercept(s): _____

Increase Interval:_____

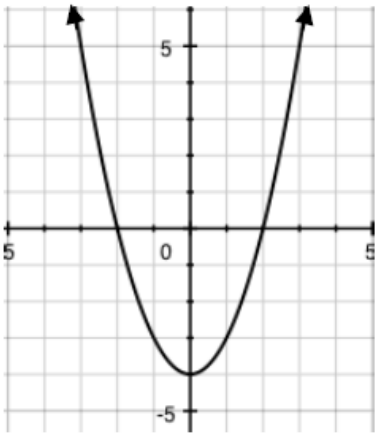
Decrease Interval:_____

2f(2) – f(0)_____

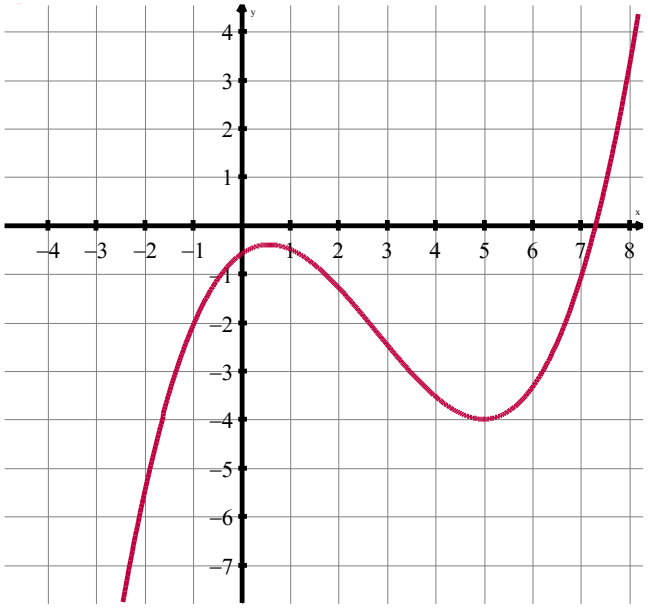
Apply f(x-1)+2 to draw a new graph.

2. What is the effect on the graph if the transformation $-\frac{2}{3}f(x+2)$ is applied to the function f(x)?

3. The graph of $f(x) = x^2 - 4$ is shown. If a transformation of -f(x – 3) is applied to the function, what are the x-intercepts and y intercepts of the new function?



4. Find the following characteristics for the cubic function shown below using the restricted domain [2, 7].



Range: _____

Absolute Max: _____ Absolute Min: _____

Relative Max(s): _____ Relative Min(s): _____

y-intercept(s): _____

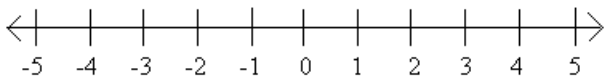
x-intercept(s): _____

Increasing Interval:_____

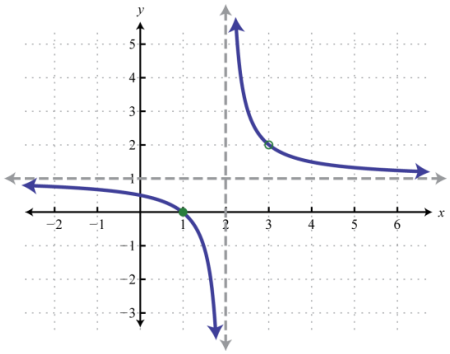
Decreasing Interval:_____

f(5)+2f(7)_____

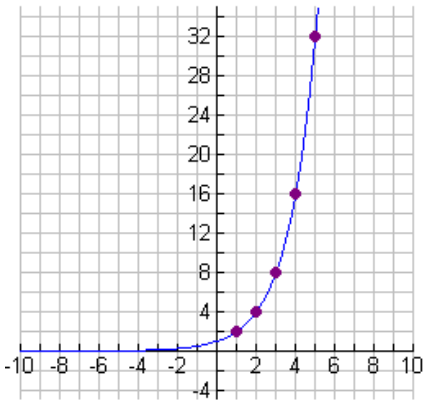
5. Graph $\{x \mid -4 < x \leq 2\}$ on the number line below.



6. What are the intercepts of the following graph? What are the domain and range of the graph? Use interval notation.



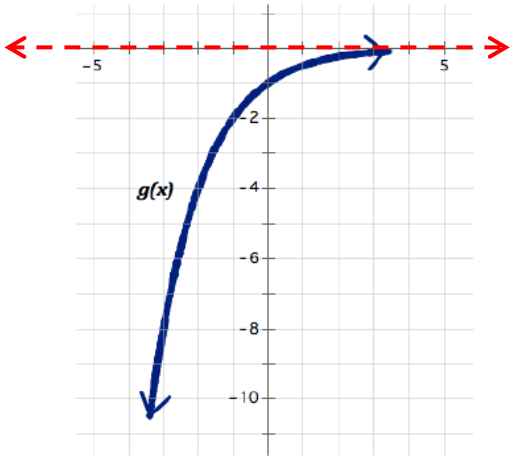
7. For the following function, if a transformation of f(x)+2 was applied, how would the range and y intercept be affected?



8. Given f(x)=-3x+4 and h(x)= $\frac{3}{x-5}$. Evaluate:

a. f(7) b. h(-6) c. h(f(x)) d. f(a+b) e. f(x)=30

9.



Domain: _____

Range: _____

End Behavior: _____

_____

y-intercept(s): _____

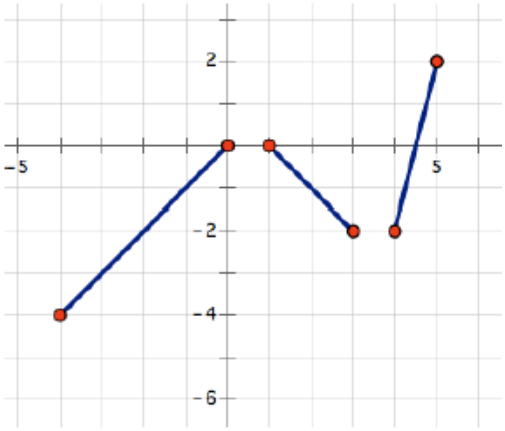
x-intercept(s): _____

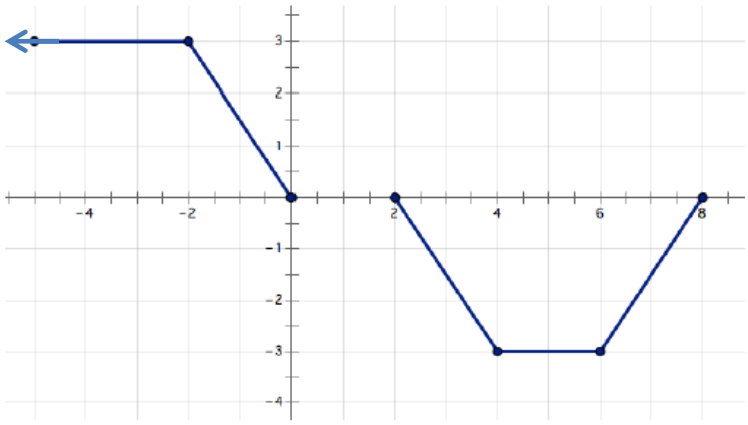
Increase Interval:_____

Decrease Interval:_____

f(-1) - f(-2)_____

10. For the following piecewise functions, identify the domain and range of the function using interval notation.





11. Write the function notation of each transformation.

A horizontal stretch of 3 and a vertical shift up 4_____

A vertical stretch of 5, a reflection about x, and a horizontal shift left 9_____

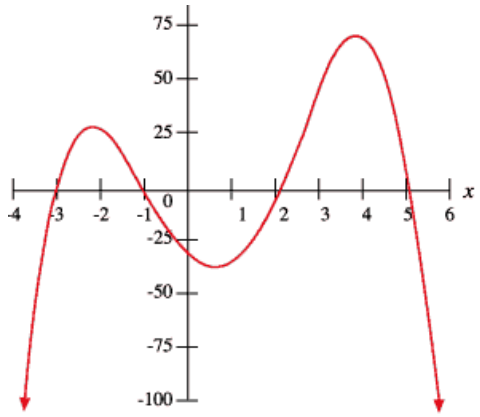
12. Write the description of each transformation that is shown.

-f(x)+3 _____

-1/2f(x+2)_____

3f(3x)-7_____

13. What is the end behavior of the function shown below?



Inverses and Parabolas Review

Name:_____

14. Given the function $f(x) = 2(x+3)^2 - 2$, graph and find the following:
    a. Vertex:
    b. Axis of Symmetry:
    c. p =
    d. Opens:
    e. Focus:
    f. Directrix:

15. Given the function $(x+3) = \frac{1}{4}(y-3)^2$, graph and find the following.
    a. Vertex:
    b. Axis of Symmetry:
    c. p =
    d. Opens:
    e. Focus:
    f. Directrix:

16. Each time Mary rolled a ball down a hallway she recorded its position at five different times.

Time (seconds)	1	2	4	6	8
Position (meters)	9	12	17	21	26

    A. Find the quadratic regression
    B. Sketch the data.

    C. Predict the position of the ball after 13 seconds.

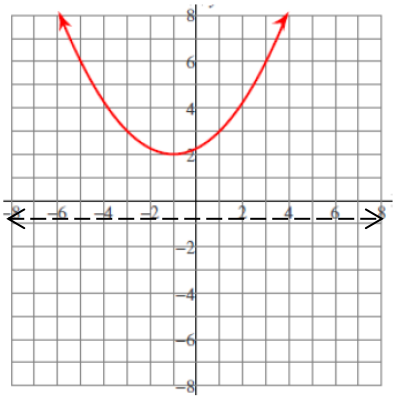
17. Write the equation for the parabola which goes through Vertex: (-1/3, -1/2); and points (-1, 13/6), (2, 193/6).

18. Write the equation for the quadratic function that has a directrix at y=7 and a vertex at (-3, 4).

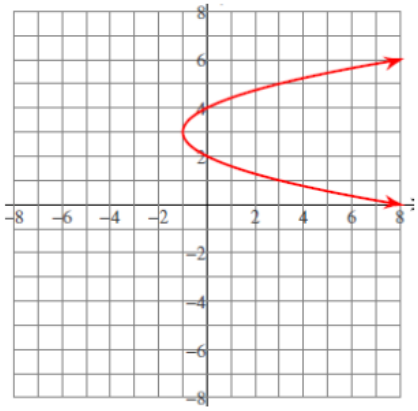
19. Write the equation for the parabola that has focus at (2,3) and directrix at x=7. What is the axis of symmetry?

20. A parabola goes through the points (3, -3), (5, -3), and the vertex (4, -2),. What is the axis of symmetry and the "a" value in the equation?

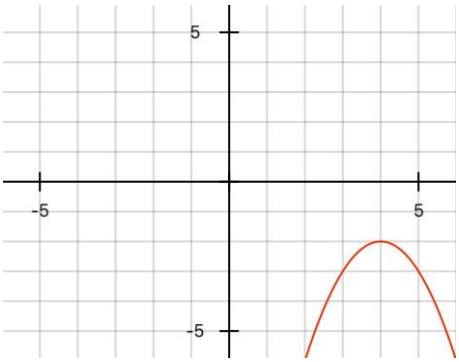
21. Given the following graph, and a directrix of y = -1, what would be the coordinates of the focus?



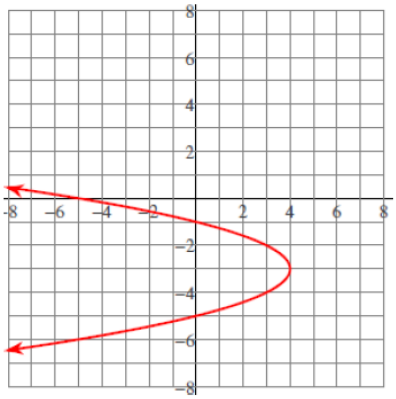
22. Given the following parabola, what is the equation.



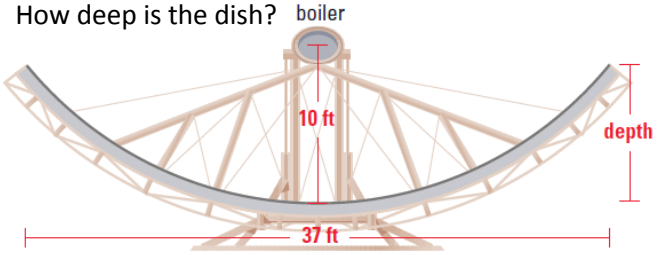
23. For the given parabola, what would be the axis of symmetry?



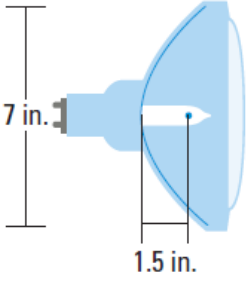
24. Write the standard form equation for the parabola shown, given a = 1.



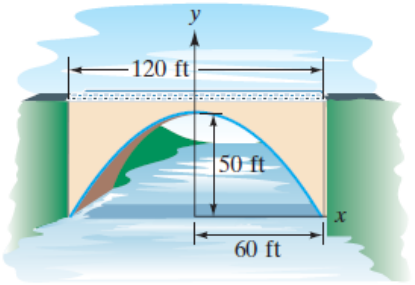
25) Sunfire is a glass parabola used to collect solar energy. The sun's rays are reflected from the mirrors toward two boilers located at the focus of the parabola. When heated, the boilers produce steam that powers an alternator to produce electricity. Write an equation for Sunfire's cross section. How deep is the dish?



26) The filament of a lightbulb is a thin wire that glows when electricity passes through it. The filament of a car headlight is at the focus of a parabolic reflector, which sends light out in a straight beam. Given that the filament is 1.5 inches from the vertex, find the equation for the cross section of the reflector. If the reflector is 7 inches wide, how deep is it?



27) A concrete bridge is designed with an arch in the shape of a parabola. The road over the bridge is 120 feet long and the maximum height of the arch is 50 feet. Write an equation for the parabolic arch. How far above the water is the bridge 10 feet from the shore? Assume the origin is at the bottom left of the bridge.

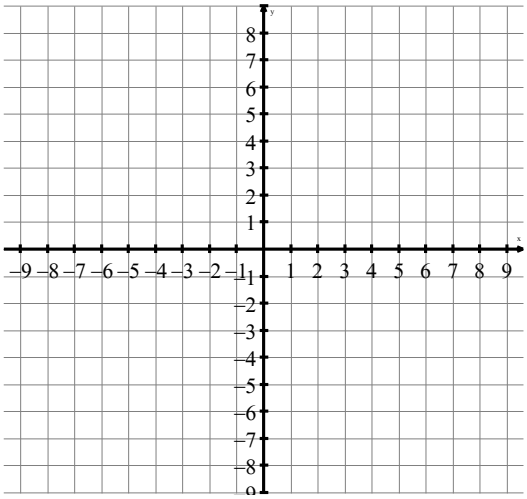


28. For the function $f(x) = \frac{1}{2}(x+4) - 5$:

a. Find $f^{-1}(x)$

b. Show composition for inverse

c. Graph and show the inverse using y=x



29. Find $g^{-1}(x)$ for $g(x)= 4(x-5)^2 + 8$

Name_____Date_____Per_____AlgIIPreAP

Solving Quadratics Test Review

Solve the following equations by factoring.

30) $x^2 + 3x = -2$

31) $25x^2 – 18x = 12x – 9$

32) $4x^2 – 64 = 0$

Solve the following equations by completing the square.

33) $x^2 + 6x – 5 = 11$

34) $x^2 – 10x + 6 = 0$

Solve the following equations by using the quadratic formula.

35) $x^2 – 5x – 7 = 0$

36) $–x^2 = –10x + 1$

Find the discriminant and use it to determine the number and type of solutions for each equation.

37) $3x^2 - 10x + 1 = 0$

38) $x^2 + 2x + 1 = 0$

39) $4x^2 - 5x + 16 = 0$

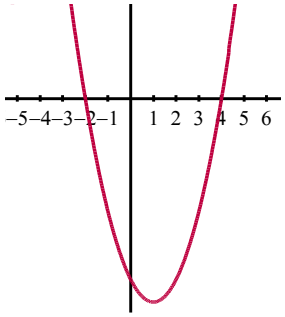
Convert from vertex to standard form.

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

41) $y = -2(x + 4)^2 + 6$

Write the equation in standard form given the graph or points.

42) Write the simplest equation (a = 1)



43) x-intercepts: x = 3 and x = 8; point: (2, 1.5)

Does the following quadratic equation have a double root? Explain in words.

44) $x^2 + 12x + 30 = -6$

Find the vertex of the following quadratic equations.

45) The path of a placekicked football can be modeled by the function $y = -0.026x^2 + 1.196x$ where *x* is the horizontal distance (in yards) and *y* is the corresponding height (in yards). What is the football's maximum height? How far away from the place the football is kicked will the maximum height be reached?

46) The path of a basketball thrown at an angle of 45° can be modeled by $y = -0.02t^2 + t + 6$, where t is the time in seconds and y is the height in feet. What time does the basketball reach its maximum height? What is the maximum height of the basketball?

Systems Test

Name: _____

47. The graph of which equation does not intersect the graph of $y = x^2 - 2x - 1$?

a. $y = 2$ c. $y = -4x - 3$

b. $y = -2$ d. $y = 4x - 10$

48. Which of the following is the solution to the system $\begin{cases} 2a - b + c = -5 \\ a - b = -2 \\ 2a + b = 5 \end{cases}$.

a. $a = -2, b = 0, c = -2$ c. $a = 1, b = 3, c = -4$

b. $a = 1, b = 3, c = -6$ d. $a = -2, b = 0, c = -1$

49. Joe makes a gumbo that uses sausage, rice, and vegetables. The sausage costs $3 a pound, the rice costs $1.50 a pound, and the vegetables cost $0.75 a pound. Joe makes a batch of gumbo that uses a total of 20 pounds of ingredients and costs $1.50 per pound. Joe uses the same weight of rice as he does vegetables. Write a system of equations for this situation where *x* represents the number of pounds of sausage used, *y* represents the number of pounds of rice used, and *z* represents the number of pounds of vegetables used.

50. Solve by Substitution. Does the system of equations below have one solution, infinitely many solutions, or no solution? Explain.

$$\begin{cases} -3x + 24y + 9z = -111 \\ x - 8y - 3z = 37 \\ 2x - 16y - 6z = 75 \end{cases}$$

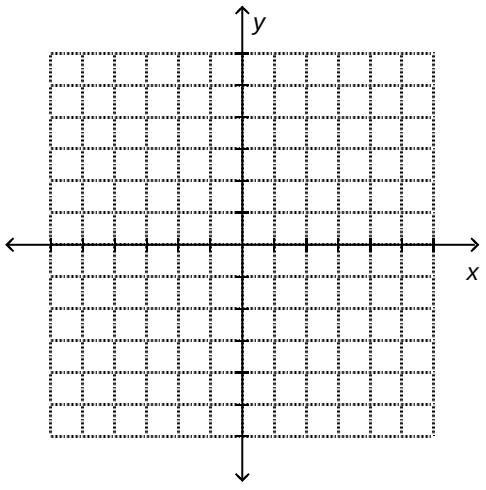
51. Solve by Substitution. Does the system of equations below have one solution, infinitely many solutions, or no solution? Explain.

$$\begin{cases} -2x + y + 3z = 20 \\ -3x + 2y + z = 21 \\ 3x - 2y + 3z = -9 \end{cases}$$

52. Solve the system of inequalities graphically.

$y \geq -2x - 1$

$y > -2$



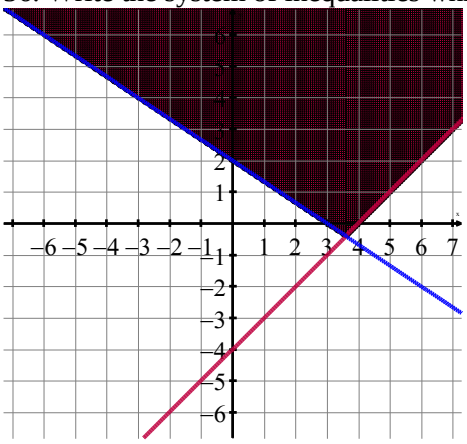
53. Solve the system formed by the equations y= -3x+5 and y= x^2-6x+5 . If necessary, round answers to the nearest hundredth.

54. A glass-enclosed elevator at a sports arena moves upward from the ground floor at a constant speed of $h = 9t$. At the same time the elevator starts to rise, a cannon on the arena floor shoots a souvenir mini-basketball into the air at an initial velocity of 60 feet per second. The height of the mini-basketball (neglecting air resistance) can be modeled by the equation $h = -16t^2 + 60t$. In both equations, *h* is height in feet and *t* is time in seconds.

Find the time for the ball and the elevator to be at the same height again. If necessary, round your answer to the nearest tenth of a second.

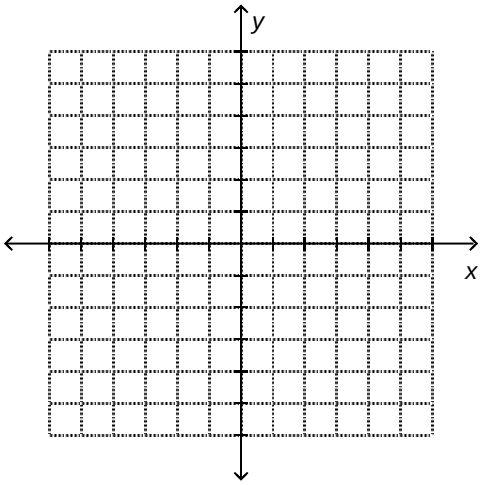
55. How many times do the graphs of $y = -x^2 + 5x + 6$ and $2x + y = 16$ intersect?

56. Write the system of inequalities which represents the solution region shown?



57. Graph the solution set of the system of inequalities:

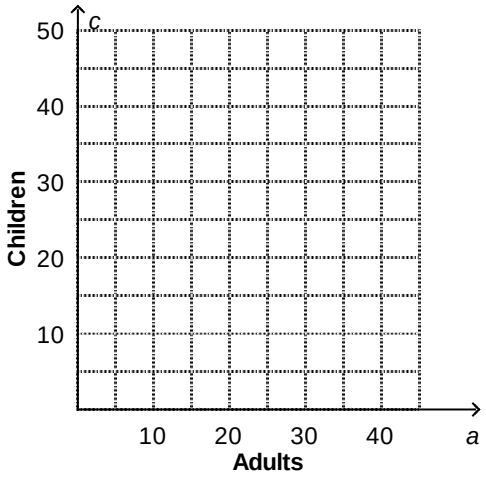
$$\begin{cases} 5x + 3y \geq 15 \\ x \geq y \\ x \leq 6 \end{cases}$$



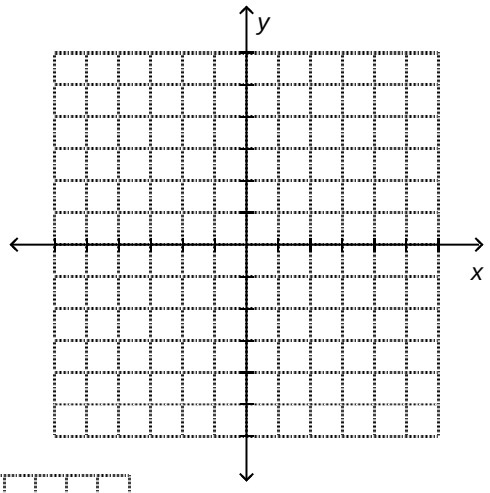
58. Danielle and Inder brought apples, bananas, and oranges to a fruit sale. The bananas were sold for $0.50 each, while the apples and oranges were sold for $0.75 each. They sold 50 pieces of fruit and earned $33.50 total. If Danielle and Inder sold twice as many bananas as oranges, how many apples did they sell? Show your work.

59. A company provides bus trips to various events for a adults and c children. The company charges \$15 for each adult and \$8 for each child for a trip to an upcoming play. The bus has a maximum capacity of 40 people, and the company needs to earn a minimum of $\$400$ from this event to make a profit.

a. Write a system of inequalities that represents this situation.
b. Graph the system of inequalities from part a.
c. 20 adults and 15 children are going to the play. Can the bus hold that many people and does the company make a profit? Explain by using the graph from part b.



60. a. Graph the system of inequalities $\begin{cases} y > \frac{1}{2}x - 4 \\ 4x + y \le 8 \end{cases}$ on the coordinate plane.

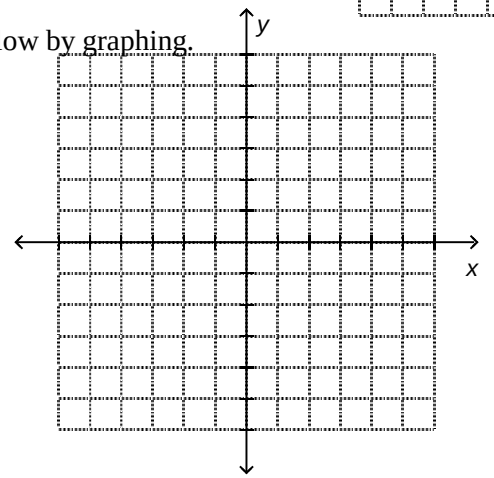


b. Describe the solution set of the system of inequalities from part a.
c. Is $(-2, -5)$ a solution of the system of inequalities? Explain your reasoning.

61. Part A: Solve the system formed by the equations below by graphing.

$y = 3x + 2$

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



Part B: Is it possible for a system of one linear equation and one quadratic equation to have no solutions? Explain why or why not.

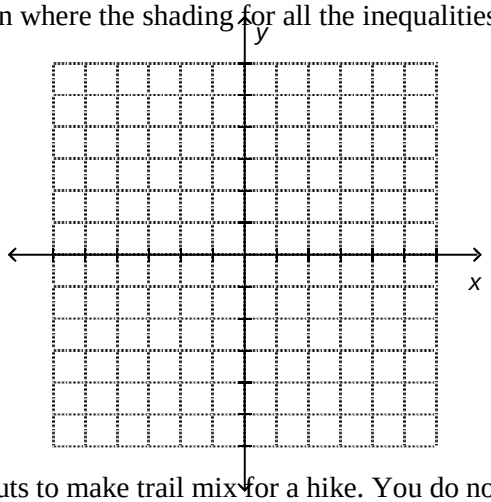
62. Describe the shape of the region where the shading for all the inequalities below overlaps.

$y \geq -4$

$y \leq 2$

$y \geq -2x + 2$

$y \leq -2x + 4$



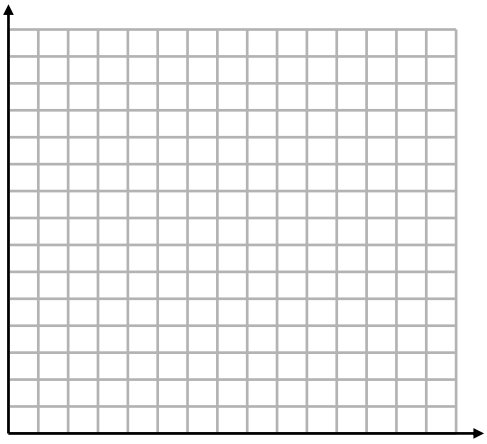
63. You are using raisins and peanuts to make trail mix for a hike. You do not want to carry more than 3 pounds of trail mix. Let *x* be the weight of the raisins and *y* be the weight of the peanuts. Explain how to use a graph to show the possible weights of raisins and peanuts you can use.

64. Members of a school boosters club want to sell at least 10 school jackets and at least 18 caps during a fundraiser to cover their regular club expenses. The club will make $16 for every jacket sold and $2 for every cap sold. The club also wants the total amount of money earned to be at least $300.

Part A: Write a system of inequalities that shows how many jackets and caps the club members need to sell to meet the conditions described above. Let *x* represent the number of school jackets sold and let *y* represent the number of caps sold.

Part B: Graph the system of inequalities from ***Part A***, shading in the region that represents the possible solutions to the system of equations. Locate and label the point (13,37) on the graph.

Part C: Will the club meet its goal of earning $300 if it sells 13 jackets and 37 caps? Explain how you know. How much above or below its goal will the club be?



Name_____Date_____Per_____PreAPAlgII

Matrix Review

Make sure you can do all of the following and understand the rules for multiplying, adding, subtracting, etc. for the always, sometimes, and never type questions.

$$P=\begin{bmatrix}3 & -5 & 2\\ -4 & 1 & 3\end{bmatrix} \quad Q=\begin{bmatrix}2 & 3x\\ 4x & 5\end{bmatrix} \quad R=\begin{bmatrix}6 & -8 & 4x\\ -10 & 2x^2 & 4\end{bmatrix}$$

Use the matrices above to evaluate. If not possible, explain why.

65) $P-2Q$

66) QR

67) $\frac{1}{2}R-\frac{1}{3}P$

68) $\frac{1}{2}(2P+R)$

Find the inverse for problems 5 and 6.

69) $\begin{bmatrix}1 & -1\\ 1 & 1\end{bmatrix}$

70) $\begin{bmatrix}-\frac{1}{4} & 3\\ -\frac{2}{3} & 6\end{bmatrix}$

71) A pet stroller comes in two sizes. Two stores have inventories as shown in the first table. Find the total cost of the pet strollers for each store.

Pet Stroller Inventory		
	Standard	**Large**
Store 1	7	6
Store 2	9	13

Pet Stroller Profits			
	Revenue ($)	**Store Cost ($)**	**Profit ($)**
Standard	125	85	40
Large	175	110	65

Multiply the two matrices together. Identify what entries a_{12} and a_{23} mean in the context of the problem.

Evaluate using the matrices below for problems 72-75. If not possible, explain why.

$$E=\begin{bmatrix}1 & -2 & -1\\ 5 & 3 & 0\\ -1 & -1 & 2\end{bmatrix} \quad F=\begin{bmatrix}0.5 & 0.75 & -1\end{bmatrix} \quad G=\begin{bmatrix}0 & 2x\\ 2x & -1\end{bmatrix} \quad H=\begin{bmatrix}-1 & 4\\ 2 & 0\\ 0 & -1\end{bmatrix}$$

72) *EF*

73) *FH*

74) *HG*

75) G^{-1}

76) Find D= $\begin{vmatrix}4 & -2 & 1\\ 3 & 2 & 1\\ -1 & 1 & 3\end{vmatrix}$

77) Multiply $\begin{bmatrix}1 & x\\ 2x & -x\end{bmatrix} * \begin{bmatrix}3x & 2\\ 0 & 2x\end{bmatrix}$

Write and solve a matrix equation for the system.

78) $\begin{cases}\frac{3}{2}x = 20 + y\\ x + 6y = 80\end{cases}$

79) Find the Determinant of $\begin{bmatrix} 6x^2 & -6x+2x^2 \\ 3x & x-3 \end{bmatrix}$

80) Find the value of x so that the matrix does not have an inverse:

$\begin{bmatrix} 7 & x \\ 3 & 6 \end{bmatrix}$

81) Solve the following system using Gauss Elimination. Use your calculator to check that your answer is correct.

$$\begin{cases} x+3y-3z=12 \\ 3x-y+4z=0 \\ -x+2y-z=1 \end{cases}$$