Algebra II Six weeks test review Name_____

Graph each system of inequalities:

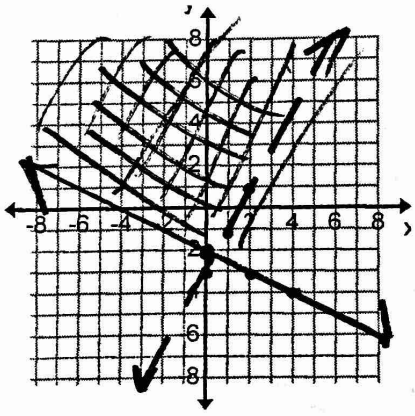
1. $\begin{cases} 2x+4y \geq -8 \\ 4x-2y < 6 \end{cases}$

$\frac{4y}{4} \geq \frac{-2x}{4} - \frac{8}{4}$

$y \geq -\frac{1}{2}x - 2$

$\frac{-2y}{-2} < \frac{-4x}{-2} + \frac{6}{-2}$

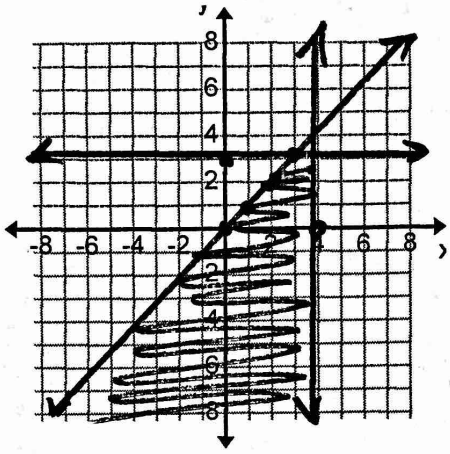
$y > 2x - 3$



2. $\begin{cases} -2x \geq -8 \\ 3y \leq 9 \\ y \leq x \text{ below} \end{cases}$

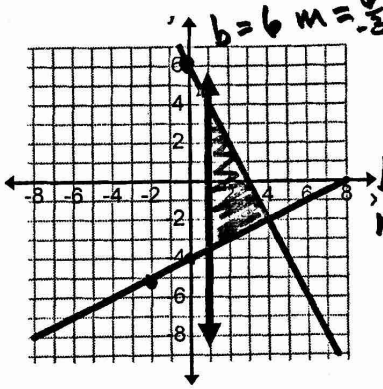
$x \leq +4$ left

$y \leq 3$ below



3. Write the restristins for the feasiable region.

$b = 6$ $m = \frac{6}{-3} = 2$



$b = -4$

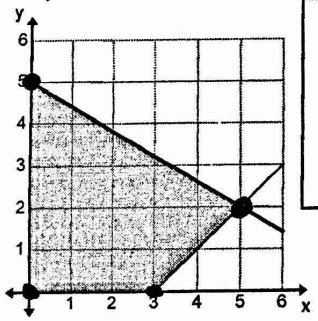
$m = 1/2$

$x \geq 1$

$y \geq 1/2x - 4$

$y \leq -2x + 6$

4. A) Give the vertices of the shaded region.



Vertices of Shaded Region:

(5,2), (3,0)

(0,0), (0,5)

C) Find the Maximum for P = 3x + 4y. (Show your work!)

$3(5)+4(2)=23$

$3(3)+4(0)=9$

$3(0)+4(0)=0$

$3(0)+4(5)=20$

Maximum of P is 23 and occurs at the vertex (5,2).

D) Find the Minimum for $C = 2x - 5y$ (Show your work!)

$2(5)-5(2)=0$

$2(3)-5(0)=6$

$2(0)-5(0)=0$

$2(0)-5(5)=-25$

Minimum of C is -25 and occurs at the vertex (0,5).

5. Becky makes Piñatas are made to sell at a craft fair. It takes 2 hours to make a mini piñata and 3 hours to make a regular-sized piñata. Becky makes a profit of $12 for each mini piñata and $24 for each regular-sized piñata sold. Becky has no more than 30 hours to make piñatas and wants to have at least 12 piñatas to sell.

Write the objective function to maximize Becky's profit.

$P = 12x + 24y$

mini Reg

Write the restrictions in order to help Becky determine the number of each size piñata to make.

$2x + 3y \leq 30$

$x + y \geq 12$

$x \geq 0, y \geq 0$

State the dimensions of each matrix. Identify the indicated element.

6. $\begin{bmatrix} -12 & 3 & 5 \\ 0 & -6 & 9 \\ 1 & 10 & 14 \end{bmatrix}$ 3x3

$a_{32} =$ 10

7. $\begin{bmatrix} -4 & 5 & 0 & 3 \\ 9 & -2 & -7 & 6 \end{bmatrix}$

2x4

$a_{21} =$ 9

8. $\begin{bmatrix} 0 & -9 \\ 5 & -6 \\ 1 & 7 \\ -4 & 2 \end{bmatrix}$ 4x2

$a_{31} =$ 1

Determine if each pair of matrices is equal or not. Justify your answer.

9. $\begin{bmatrix} 5 \\ -6 \end{bmatrix}$ and $\begin{bmatrix} 5 & -6 \end{bmatrix}$ no

Not same size

10. $\begin{bmatrix} 3 & -6 \\ 2 & 4 \end{bmatrix}$ and $\begin{bmatrix} 2(1.5) & -\frac{2}{12} \\ \frac{4}{2} & (-2)^2 \end{bmatrix}$

no

11. $\begin{bmatrix} 100 \\ -36 \end{bmatrix}$ and $\begin{bmatrix} (-10)^2 \\ -6^2 \end{bmatrix}$ yes

Solve for the indicated variables.

12. $\begin{bmatrix} 2x+3 & x-4y \\ 10 & w^2 \end{bmatrix} = \begin{bmatrix} 23 & 2 \\ z-25 & 49 \end{bmatrix}$

$2x+3=23$

$x=10$

$w^2=49$ $z-25=10$ $10-4y=2$

$w=7$ $z=35$ $-4y=-8$

$y=2$

13. $\begin{bmatrix} 12 & 5y-3 & 4z+2 \end{bmatrix} = \begin{bmatrix} 8x & 4y-10 & 22 \end{bmatrix}$

$12=8x$ $5y-3=4y-10$

$x=\frac{3}{2}$ $y=-7$ $4z+2=22$

$z=5$

Find the inverse.

14. $\begin{bmatrix} 2 & -6 \\ 2 & 4 \end{bmatrix}$ $8+12=20$

$\frac{1}{20}\begin{bmatrix} 4 & 6 \\ -2 & 2 \end{bmatrix} = \begin{bmatrix} \frac{1}{5} & \frac{3}{10} \\ -\frac{1}{10} & \frac{1}{10} \end{bmatrix}$

Determine if the two matrices are inverses. Explain why or why not.

15. $\begin{bmatrix} 3 & -2 & 5 \\ 0 & 2 & 8 \\ -1 & 1 & 3 \end{bmatrix}$ and $\begin{bmatrix} -1/10 & -13/10 & 11/20 \\ -2/5 & -6/5 & 7/10 \\ 1/10 & 3/10 & -1/20 \end{bmatrix}$ no

$A \cdot A^{-1} \neq \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Perform the indicated operations. If they cannot be performed EXPALIN why not.

$A = \begin{bmatrix} -4 & 7 & 8 \\ 0 & 1 & 2 \\ -6 & -4 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 6 \\ 10 & 5 \\ 3 & 1 \end{bmatrix}$ $C = \begin{bmatrix} -9 & 3 & -2 \\ 7 & -6 & -4 \end{bmatrix}$ $D = \begin{bmatrix} 19 & 32 & -12 \\ 7 & 36 & -40 \end{bmatrix}$ $E = \begin{bmatrix} 12 & -6 \\ 10 & 51 \\ 43 & 1 \end{bmatrix}$

16. $B+C$

N.P

not same size to add

17. $2B-E$

$\begin{bmatrix} -8 & 18 \\ 10 & -41 \\ 37 & 1 \end{bmatrix}$

18. $5A$

$\begin{bmatrix} -20 & 35 & 40 \\ 0 & 5 & 10 \\ -30 & -20 & 15 \end{bmatrix}$

19. $C-\frac{1}{2}D$

$\begin{bmatrix} -\frac{37}{2} & -13 & 4 \\ \frac{7}{2} & -24 & 16 \end{bmatrix}$

20. $E+4C$

N.P. must be same size to add

21. BC	22. $2BE$	23. A^2	24. C^2	25. EC
$\begin{bmatrix} 24 & -30 & -28 \\ -55 & 0 & -40 \\ -20 & 3 & -10 \end{bmatrix}$	N.P. not match middle $3\times2 \cdot 3\times2$	$\begin{bmatrix} -32 & -53 & 6 \\ -12 & -7 & 8 \\ 6 & -59 & -47 \end{bmatrix}$	NP $2\times3 \cdot 2\times3$ no match	$\begin{bmatrix} -150 & 72 & 0 \\ 267 & -276 & -224 \\ -380 & 123 & -90 \end{bmatrix}$

Solve each:

26. $X+\begin{bmatrix} 2 & 0 & -7 \\ 1 & 4 & 3 \end{bmatrix}=\begin{bmatrix} 12 & -9 & -6 \\ 7 & 4 & 5 \end{bmatrix}$

$X=\begin{bmatrix} 10 & -9 & 1 \\ 6 & 0 & 2 \end{bmatrix}$

27. $2X=\begin{bmatrix} 24 & -16 & -8 \\ 4 & 0 & -1 \\ 3 & 6 & -7 \end{bmatrix}$

$\begin{bmatrix} 12 & -8 & -4 \\ 2 & 0 & -1/2 \\ 3/2 & 3 & -7/2 \end{bmatrix}$

28. $\begin{bmatrix} 3 & -5 \\ 2 & 7 \end{bmatrix} \cdot X=\begin{bmatrix} -26 \\ 20 \end{bmatrix}$ $A^{-1}\cdot B$

$X=\begin{bmatrix} -\frac{82}{31} \\ \frac{112}{31} \end{bmatrix}$

29. $\begin{bmatrix} 18 & 3 \\ -4 & 10 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} -57 \\ 66 \end{bmatrix}$ $A^{-1}\cdot B$

$(-4,5)$

30. $5x-2y=-23$
$2x+6y=18$ $(-3,4)$

$\begin{bmatrix} 5 & -2 \\ 2 & 6 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} -23 \\ 18 \end{bmatrix}$ $A^{-1}\cdot B$

31. $3x=40-2y$
$5x-34=6y$

$3x+2y=40$
$5x-6y=34$

$\begin{bmatrix} 3 & 2 \\ 5 & -6 \end{bmatrix}\begin{matrix} x \\ y \end{matrix}=\begin{bmatrix} 40 \\ 34 \end{bmatrix}$

$(11, 3.5)$

32. $3x+y-2z=-7$
$x-y+3z=15$
$6x+3y-z=-4$

$\begin{bmatrix} 3 & 1 & -2 \\ 1 & -1 & 3 \\ 6 & 3 & -1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} -7 \\ 15 \\ -4 \end{bmatrix}$

$A^{-1}\cdot B$

$(1,-2,4)$

33. Joan has 18 coins consisting of dimes and quarters, totaling \$3.75. Determine the number of dimes and quarters she has. (Write a system of equations and solve.)

$x+y=18$
$10x+25y=375$

$\begin{bmatrix} 1 & 1 \\ 10 & 25 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} 18 \\ 375 \end{bmatrix}$

5 Dimes
13 Quarters

34. On Monday, Brad bought 3 drinks and 5 sandwiches totaling \$19.75. On Tuesday he bought 4 drinks and 2 sandwiches totaling \$10.00. Determine the cost of each drink and sandwich (All drinks and all sandwiches cost the same.)

$3x+5y=19.75$
$4x+2y=10$

$\begin{bmatrix} 3 & 5 \\ 4 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} 19.75 \\ 10 \end{bmatrix}$

Drinks = .75
Sand = 3.50