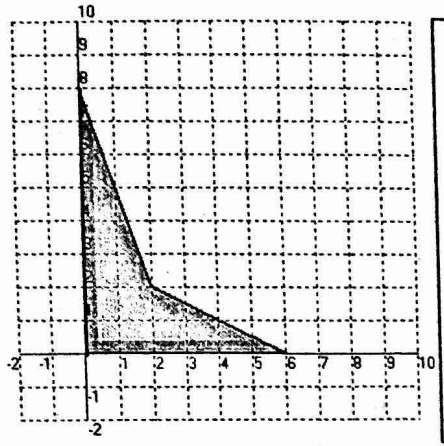
Algebra 2 TEST 2.1 Review 2016

I. Find the values of x and y that minimize or maximize the objective functions for each feasible region. Also find the value of the maximum or minimum.

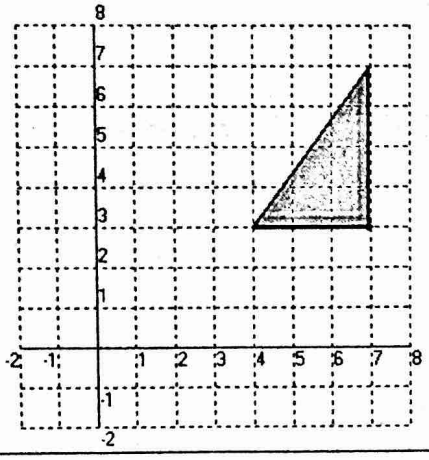
1. Identify the vertices, then **maximize** $P = 3x + 2y$



Vertices:
(0, 0)
(6, 0)
(2, 2)
(0, 8)

Max is 18
At (6, 0)

2. Identify the vertices, then **minimize** $C = 4x + 2y$



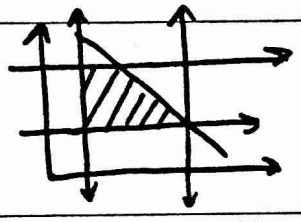
Vertices:
(4, 3)
(7, 3)
(7, 7)
(—, —)

Min is 22
At (4, 3)

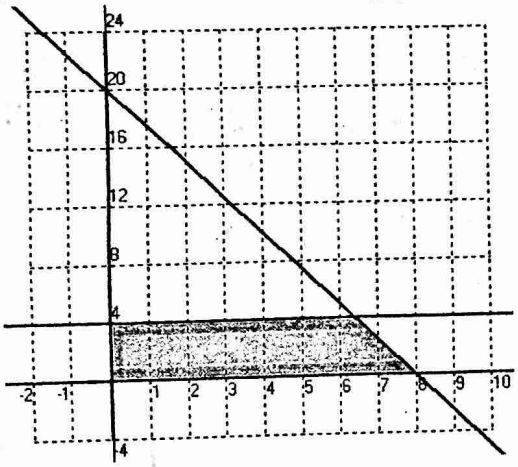
Graph each system of restrictions.

3. $\begin{cases} x + y \le 8 \\ y \le x \\ y \ge 0,\ x \ge 0 \end{cases}$

4. $\begin{cases} 2 \le y \le 4 \\ 1 \le x \le 3 \\ 2x + y \le 8 \end{cases}$



5. Watch the scales on each axis! 7List the restrictions for the following graph.



$0 \le y \le 4$
$0 \le x \le 8$
$y \le -\frac{5}{2}x + 20$

6. A gold processor has two sources of gold ore, source A and source B. In order to keep his plant running, at least three tons of ore must be processed each day. Ore from source A costs \$20 per ton to process, and ore from source B costs \$10 per ton to process. Costs must be kept to less than \$80 per day. Moreover, Federal Regulations require that the amount of ore from source B cannot exceed twice the amount of ore from source A. If ore from source A yields 2 oz. of gold per ton, and ore from source B yields 3 oz. of gold per ton, how many tons of ore from both sources must be processed each day to maximize the amount of gold extracted subject to the above constraints?

State the dimensions and identify the indicated element of each matrix.

7. $\begin{bmatrix} 2 \\ -3 \\ -6 \end{bmatrix}$; $a_{21} = -3$

8. $\begin{bmatrix} 5 & -7 & 23 & 10 \\ -9 & 3 & 5 & -2 \\ 1 & 9 & 0 & 2 \end{bmatrix}$; $a_{23} = 5$

9. $\begin{bmatrix} x & y & z \\ d & e & f \\ p & q & r \end{bmatrix}$; a_{32} q

10. Solve for each variables.

$$\begin{bmatrix} a & 2b \\ c-2 & d+3 \end{bmatrix} = \begin{bmatrix} 5 & -7 \\ 10 & 10 \end{bmatrix}$$

$a = 5$
$b = -\frac{7}{2}$
$c = 12$
$d = 7$

Solve each matrix. $X = B + A$

12. $X - \begin{bmatrix} 0 & 0 & 1 \\ 1 & -2 & -2 \\ -2 & -3 & 3 \end{bmatrix} = \begin{bmatrix} 3 & 12 & 1 \\ -6 & -4 & 2 \\ -3 & 6 & 7 \end{bmatrix} = \begin{bmatrix} 3 & 12 & 2 \\ -5 & -6 & 0 \\ -5 & 3 & 10 \end{bmatrix}$

13. $2X = \begin{bmatrix} -4 & 24 \\ 7 & 15 \end{bmatrix}$ $X = \begin{bmatrix} -2 & 12 \\ 7/2 & 15/2 \end{bmatrix}$

Use the provided matrices to find the following, if possible. You may use your graphing calculator.

$A = \begin{bmatrix} 1 & -1 \\ 3 & -2 \end{bmatrix}$ $B = \begin{bmatrix} 0 & 2 \\ -2 & 1 \\ -1 & 0 \end{bmatrix}$ $C = \begin{bmatrix} 3 & -3 & -1 \\ 2 & -2 & 4 \end{bmatrix}$ $D = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ $E = \begin{bmatrix} 3 \\ -3 \\ 2 \end{bmatrix}$ $F = \begin{bmatrix} 10 & -1 \\ 0 & 2 \\ -3 & 5 \end{bmatrix}$

14. AB $2\times2 \cdot 3\times2$ N.P.

15. $B - 3A$ $\begin{bmatrix} -3 & 5 \\ -2 & -5 \\ 3 & -15 \end{bmatrix}$

16. EC $3\times1 \cdot 2\times3$ NP

17. $CB - 5A$ $\begin{bmatrix} 28 \\ -15 \end{bmatrix}$ 12

18. $2D$ $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$

19. CE $\begin{bmatrix} 16 \\ 20 \end{bmatrix}$

20. A^2 $\begin{bmatrix} -2 & 1 \\ -3 & 1 \end{bmatrix}$

21. C^2 $2\times3 \cdot 2\times3$ NP

22. BC $3\times2 \cdot 2\times3$ NP

23. $2A - C$ $2\times2 - 2\times3$ NP

Use a calculator to find the inverse of each matrix, if it exists.

24. $\begin{bmatrix} 6 & 2 \\ 2 & 1 \end{bmatrix}$ $6\cdot1=6$ $2\cdot2=4$ $6-4=2$ $\frac{1}{2}\begin{bmatrix} 1 & -2 \\ -2 & 6 \end{bmatrix} = \begin{bmatrix} .5 & -1 \\ -1 & 3 \end{bmatrix}$

25. $\begin{bmatrix} 1 & 3 & -1 \\ 0 & 1 & -2 \\ -1 & 2 & 1 \end{bmatrix}^{-1}$ $\begin{bmatrix} .5 & -.5 & -.5 \\ .2 & 0 & .2 \\ .1 & -.5 & .1 \end{bmatrix}$

Solve for matrix X.

26. $\begin{bmatrix} 3 & 5 \\ 6 & 2 \end{bmatrix} X = \begin{bmatrix} -2 & 6 \\ 4 & 12 \end{bmatrix}$ A B $A^{-1} \cdot B = \begin{bmatrix} 1 & 2 \\ -1 & 0 \end{bmatrix}$

27. $\begin{bmatrix} 1 & 1 & -1 \\ 0 & 2 & -1 \\ 1 & 3 & 0 \end{bmatrix} X = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}$ $X = \begin{bmatrix} -2 \\ 1 \\ 0 \end{bmatrix}$

28. Write as a matrix equation. Then solve by inverse matrices.

$\begin{cases} 3x + 5y = 4 \\ 2x - 7y = 13 \end{cases}$ $\begin{bmatrix} 3 & 5 \\ 2 & -7 \end{bmatrix} \begin{bmatrix} 4 \\ 13 \end{bmatrix}$ A B

$A^{-1} \cdot B = (3, -1)$

29. Write as a matrix equation. Then solve by inverse matrices.

$\begin{cases} 3x - y + 2z = 4 \\ x + 5z = -13 \\ 2x + 2y - z = -1 \end{cases}$ $\begin{bmatrix} 3 & -1 & 2 \\ 1 & 0 & 5 \\ 2 & 2 & -1 \end{bmatrix} \begin{bmatrix} 4 \\ -13 \\ -1 \end{bmatrix}$ A B $A^{-1} \cdot B = (2, -4, -$

30. Write a system of equations, then write a matrix equation to solve.

On Monday, Mr. Graff bought 8 packs of yellow chalk and 4 packs of white chalk for \$7.40. On Tuesday, Mrs. Graff went to the same store and bought 6 packs of yellow and 12 packs of white chalk for \$10.50. How much does each type of chalk cost?

$8x + 5y = 7.40$
$6x + 12y = 10.50$

A B $\begin{bmatrix} 8 & 5 \\ 6 & 12 \end{bmatrix} \begin{bmatrix} 7.40 \\ 10.50 \end{bmatrix}$

$A^{-1} \cdot B = (.55, .60)$

31. Jenny has 10 fewer quarters than dimes and five fewer nickels than quarters. The total value of the coins is \$4.75. Write a system of 3 equations and solve for the number of nickels, dimes, and quarters Jenny has in her possession.

$5n + 10d + 25q = 475$
$d - q = 10$
$-n + q = 5$

A $\begin{bmatrix} 5 & 10 & 25 \\ 0 & 1 & -1 \\ -1 & 0 & 1 \end{bmatrix}$ B $\begin{bmatrix} 475 \\ 10 \\ 5 \end{bmatrix}$

$A^{-1} \cdot B =$ (5N, 20D

Solve the following system of equations using elimination and substitution. SHOW YOUR WORK.

32. $3a - 2b + 4c = 35$
$-4a + y - 5c = -36$
$5a - 3b + 3z = 31$

$a = -1$ $b = -5$ $C = 7$

33. $-4x - 2y - z = 15$
$12x + 6y + 3z = 45$
$2x + 5y + 7z = -29$

NO SOL

6.) Let x = tons from Source A
y = tons from Source B

$x + y \geq 3$

$20x + 10y \leq 80$

$y \leq 2x$

$y \leq -10x + 80$

$y \leq -2x + 8$

$y \geq -x + 3$

$x \geq 0$

$y \geq 0$

$P = 2x + 3y$

$P(1,2) = 2(1) + 3(2) = 5$

$P(0,0) = 0$

$P(3,0) = 6$

$x = 3$

$y = 0$