Name: Answers Hour: _____ Unit 2 - Systems - Review

Unit 2 - Systems - Review for Test

Solve the linear system algebraically.

1. $3x + y = 17$
   $-4x - y = -21$

$-x = -4$
$x = 4$

$3(4) + y = 17$
$12 + y = 17$
$y = 5$

$(4, 5)$

2. $y = -4x + 4$
   $y = -x - 5$

$-4x + 4 = -x - 5$
$9 = 3x$
$3 = x$

$y = -4(3) + 4$
$y = -8$

$(3, -8)$

3. The ordered pair (–6, 2) is a solution of which system?

a. $4x - 3y = 7$ $-24 - 6 = 7$? NO
   $x + y = -4$

b. $2x - 3y = -18$ $-12 - 6 = -18$? yes
   $x - y = 8$ $-6 - 2 = 8$? NO

c. $10x + 13y = -34$ $-60 + 26 = -34$? yes
   $-15x - 17y = 56$ $80 - 34 = 52$? yes

d. $x + y = 10$ $-6 + 2 = 10$? NO
   $x - y = -8$

4. Use an inverse matrix to solve the linear system.

$16x + 5y = 211$
$16x + y = 183$

$\begin{bmatrix} 11 \\ 7 \end{bmatrix}$

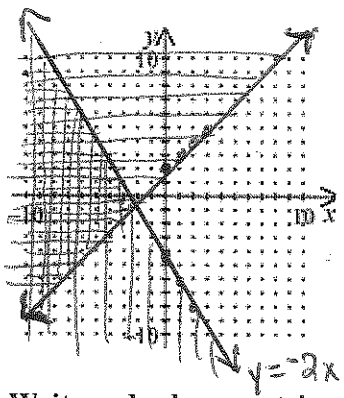
Make sure you know how to use your calculator to do this!

Graph the system of inequalities.

5. $y \le -2x - 4$
   $y \ge x + 2$

$y \le -2x - 4$
Test (0,0)
$0 \le 0 - 4$?
$0 \le -4$ NO

$y \ge x + 2$
Test (0,0)
$0 \ge 2$? NO



Write and solve a matrix equation to solve the system of equations.

6. $2x + 3y - z = 1$
   $x + y + z = 3$
   $3x - y + z = 15$

$\begin{bmatrix} 4 \\ -2 \\ 1 \end{bmatrix}$

$(4, -2, 1)$

$A^{-1} * B$ on calculator

$A = \begin{bmatrix} 2 & 3 & -1 \\ 1 & 1 & 1 \\ 3 & -1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 1 \\ 3 \\ 15 \end{bmatrix}$

7. $x + y + z = 13$
   $-2x - y + z = -4$
   $x - 2y - z = -18$

$A = \begin{bmatrix} 1 & 1 & 1 \\ -2 & -1 & 1 \\ 1 & -2 & -1 \end{bmatrix}$ $B = \begin{bmatrix} 13 \\ -4 \\ -18 \end{bmatrix}$ $X = \begin{bmatrix} 1 \\ 7 \\ 5 \end{bmatrix}$

$(1, 7, 5)$

Solve the matrix equation for x and y.

8. $\begin{bmatrix} 2 & -3 \\ 3 & -4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -8 \\ -9 \end{bmatrix}$

A B

$A^{-1} * B = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$

$(5, 6)$

9. How many solutions does the following system have?

$x + y = 4$ → $-2x - 2y = -8$

$2x + 2y = 8$ $\quad 2x + 2y = 8$

$0 = 0$ true statement

a. no solution
b. infinitely many solutions
c. two solutions
d. one solution

10. The Figure Skating Team is running a brat stand to raise money for costumes. They have $300 to spend on food. Cases of hamburgers cost $30 and cases of brats cost $25. They know they will buy at least three cases of hamburgers and two cases of brats.

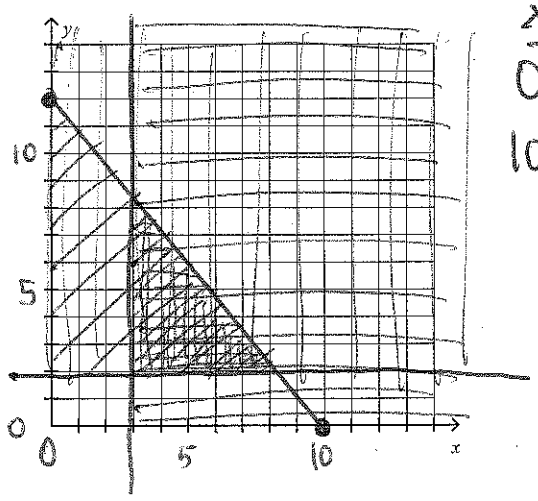
a. Write a system of linear inequalities that describes the given information. Use x for the number of cases of hamburgers and y for the number of cases of brats. (You should write three inequalities.)

$x \geq 3$

$y \geq 2$

$30x + 25y \leq 300$

b. Graph the system you wrote in part (a).



x	x
0	12
10	0

c. Can the team buy 6 cases of hamburgers and 5 cases of brats? Explain.

$6(30) + 5(25)$

$180 + 125$

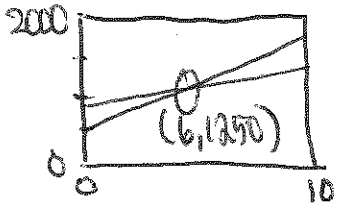
305 No. They do not have enough money.

11. The cost of buying a front-loading washing machine is $800 at it uses $75 in electricty per year.
The cost of buying a top-loading washing machine is $500 and it uses $125 in electricty per year.

a. Find when the total costs are equal. Use your graphing calculator. Show your solution using BOTH a graph and a table. Sketch, label, and number your graph. Show at least three table entries.

Front: $y = 800 + 75x$

Top: $y = 500 + 125x$



	Front	Top
x	Y_1	Y_2
5	1175	1125
6	1250	1250
7	1325	1375

b. When is a top-loading machine cheaper? Explain how you know.

Before the 6th year - the line is lower than the Front-loader and the table values are also lower.

12. Tickets to a local movie were sold at $4.00 for adults and $2.50 for students. 410 tickets were sold for a total of $1505.00. Write a system of equations to model this situation. Find the number of adult tickets sold and the number of student tickets sold.

x = # adult $\quad y$ = # student

$x + y = 410$

$4x + 2.50y = 1505$

$x = 410 - y$

$4(410 - y) + 2.50y = 1505$

$1640 - 4y + 2.50y = 1505$

$135 = 1.5y$

$90 = y$

90 students
320 adults