

Systems Review

1. Sketch the feasible region. Then find the maximum and minimum values.

$$\begin{aligned}y &\leq 8 \\x - y &\leq 2 \\y &\geq 2x - 8 \\y &\geq -4x + 8 \\f(x, y) &= 3x - 8y\end{aligned}$$

2. The partial solution to the system of equations is $(-2, x, 1, z)$. Solve for x and z .

$$\begin{aligned}2w + 3x - y + z &= 5 \\w - x + 2y - 3z &= -6 \\w + x - y + 4z &= 4 \\-w + 2x + y - 2z &= 71\end{aligned}$$

3. Solve.

$$\begin{aligned}x + y - z &= 6 \\3x - 2y + z &= -5 \\x + 3y - 2z &= 14\end{aligned}$$

4. Solve the system of inequalities graphically.

$$\begin{aligned}y &\geq |x| - 3 \\y &\leq |x| + 2\end{aligned}$$

5. Solve each system using Cramer's Rule

a)

$$\begin{aligned}3x + 6y &= -27 \\-2x + y &= -2\end{aligned}$$

b)

$$\begin{aligned}-5y + 2z &= -19 \\x - 2y - 4z &= -1 \\x + y + 4z &= -8\end{aligned}$$

6. The Northern Wisconsin Paper Mill can convert wood pulp to either notebook paper or newsprint. The mill can produce at most 200 units a day. At least 10 units of notebook paper and 80 units of newspaper are required daily by regular customers. If the profit on a unit of notebook paper is \$500 and the profit on a unit of newsprint is \$350, how many units of each type of paper should the manager have the mill produce each day to maximize profits.

7. The three American universities with the greatest endowments are Harvard, Yale and Princeton. Their combined endowments are \$12.09 billion. Together, Yale and Princeton have \$0.53 billion more in endowments than Harvard. Princeton's endowments trail Harvard's by \$2.70 billion. What are the endowments of each of these universities?

8. Mr. Farmer wrote an impossible Algebra 2 test consisting of true/false, multiple choice and free response questions. Denise aced the test scoring a 94%; she only missed one true/false and one multiple choice question. Laura did second best with a score of 86%; she missed one free response question, one multiple choice, and two true/false questions. Jessica came in third with a score only 2% lower than Laura's; she missed one true/false, two multiple choice and one free response question. Assuming Mr. Farmer does not give partial credit and the test is out of 100 points, how many points are each type of question worth?

9. Ms. Stupp's dog Lucky likes two types of canned dog food. "Gourmet Dog" costs 40 cents a can and has 20 units of a vitamin complex; the calorie content is 75 calories. "Chow Hound" costs 32 cents a can and has 35 units of vitamins and contains 50 calories. Ms. Stupp likes Lucky to have at least 1175 units of vitamins a month and at least 2375 calories during the same time period. Ms. Stupp only has room to store 60 cans of dog food at a time. How much of each kind of dog food should Ms. Stupp buy each month to minimize her cost. (SET UP ONLY)

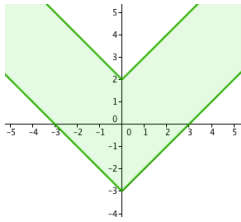
Answers

1. Maximum: 6, Minimum: -64

2. $x=3, z=1$

3. $(1, 3, -2)$

4.



5.

a) $(-1, -4)$

b) $(-3, 3, -2)$

6. 120 units of notebook paper, 80 units of newsprint

7. Harvard has \$5.78 billion, Yale has \$3.23 billion, Princeton has \$3.08

8.

True/False – 2 pts

Multiple Choice – 4 pts

Free Response – 6 pts

9.

$$f(x, y) = .4x + .32y$$

$$x + y \leq 60$$

$$20x + 35y \geq 1175$$

$$75x + 50y \geq 2375$$

$$x \geq 0$$

$$y \geq 0$$

