

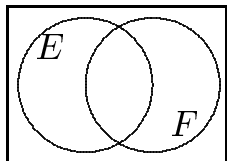
1. An dealer wants no more 100 refrigerators and dishwashers in stock. He makes a profit of \$35 on each refrigerator and \$20 on each dishwasher sold. A refrigerator weighs 200 pounds each and a dishwasher 100 pounds each. The dealer is limited to having 12,000 pounds on his floor. How many refrigerators (x) and dishwashers (y) should be sold in order to maximize profits? What is the objective function in the above problem?

(A) $W = 200x + 100y$ (B) $S = x + y$ (C) $P = 35x + 20y$

(D) $x \geq 0, y \geq 0$ (E) none of the above

2. Find the optimal value(s) of $Z = 2x - y$ on the feasible set S with vertices at $(2,3)$, $(5,3)$ and $(3,1)$

3. Shade the region $E \cup F^c$



4. How many different four letter radio station names are possible if the first letter must be a K or W and no repeats are allowed?
5. A Scrabble hand has 7 tiles. If you have 2 A's, 3 I's, a T and a B, how many different 7 letter "words" are possible? (a word does not need to have meaning)
6. Among 12 eggs 2 are broken. How many ways can a sample of 4 be chosen that contains at least 1 that is broken?
7. How many ways can 6 calculus books, 4 algebra books and 3 geometry books be arranged if each type of book must be together?
8. Use the definition of $P(n, r)$ to find $P(n, 1)$.
9. An experiment consists of choosing a card from a standard deck of playing cards and noting whether it is black or red. How many events are possible in this experiment?

10. Use the following table to find the probability that a person is wearing more than 3 earrings:

number of earrings	0	1	2	3	4	5	6 or more
frequency	44	11	87	10	23	4	3

11. Let E and F be two events of an experiment with sample space S . Suppose that $P(E) = .4$ and $P(F) = .6$ and $P(E \cup F) = .8$. What is $P(E^c \cap F)$?

1. (12 points) Fill the letters (A, B or C) in the blanks.

(A) Simplex is done. Write the value of each variable under the tableau.

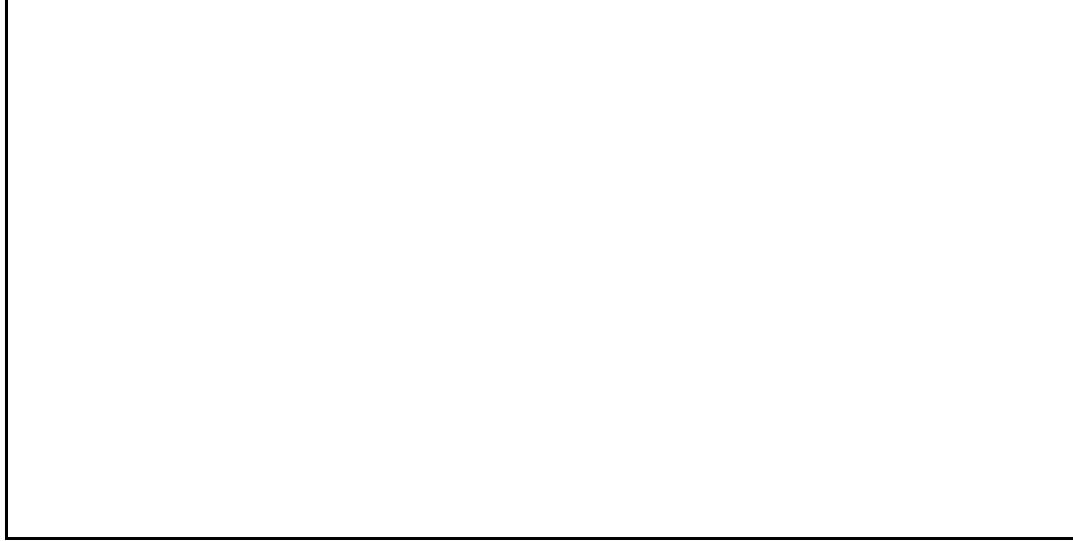
(B) More pivot operations are required. CIRCLE THE PIVOT ELEMENT.

(C) The problem has no solution.

$$\text{---} \left(\begin{array}{ccccc|c} x & y & u & v & f & \\ 6 & -6 & 0 & 1 & 0 & 12 \\ 1 & 1 & 1 & 0 & 0 & 6 \\ -4 & -12 & 0 & 0 & 1 & 0 \end{array} \right) \quad \text{---} \left(\begin{array}{ccccc|c} x & y & u & v & f & \\ 1 & 1 & 3 & 0 & 0 & 0 \\ 0 & 0 & 2 & 1 & 0 & 4 \\ -6 & 0 & -4 & 0 & 1 & 14 \end{array} \right)$$

$$\text{---} \left(\begin{array}{ccccc|c} x & y & u & v & f & \\ -2 & 0 & 1 & 3 & 0 & 6 \\ 0 & 1 & 0 & -3 & 0 & 0 \\ -6 & 0 & 0 & 3 & 1 & 12 \end{array} \right) \quad \text{---} \left(\begin{array}{ccccc|c} x & y & u & v & f & \\ 4 & 0 & 1 & -1 & 0 & 2 \\ 1 & 1 & 0 & 1 & 0 & 3 \\ 2 & 0 & 0 & 2 & 1 & 15 \end{array} \right)$$

2. (8 points) Shade the feasible region and
- $$\left\{ \begin{array}{l} \text{minimize } C = -5x + 2y \\ \text{subject to } 10x + 3y \geq 30 \ (l_1) \\ \phantom{\text{subject to }} 2x + \geq 0 \ (l_2) \\ \phantom{\text{subject to }} y \leq 10, \quad x \geq 0 \end{array} \right.$$

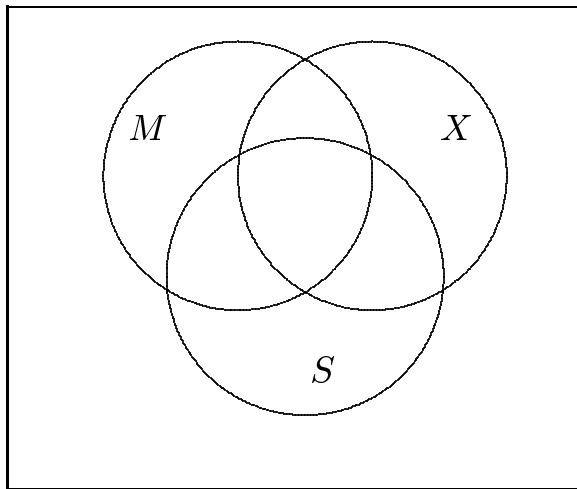


3. (10 points) A company manufactures 3 kinds of computer parts: computer chips, transistors and resistors using copper, glass and zinc. Each computer chip uses 1 gram of copper, .5 gram of glass, .25 grams of zinc and sells for \$2. Each transistor uses 2 grams of copper, 1 gram of glass, 1 gram of zinc and sells for \$1.50. Each resistor uses .5 gram of copper, 2 grams of glass, 1 gram of zinc and sells for \$1. The company has in inventory 200 grams of copper, 200 grams of glass and 200 grams of zinc. How many of each kind of computer part should they make in order to maximize revenue? The initial and final tableaus are give. Please FULLY explain the answer found in the final simplex tableau.

$$\text{initial tableau : } \left(\begin{array}{ccccccc|c} 1 & 2 & .5 & 1 & 0 & 0 & 0 & 200 \\ .5 & 1 & 2 & 0 & 1 & 0 & 0 & 200 \\ .25 & 1 & 1 & 0 & 0 & 1 & 0 & 200 \\ -2 & -1.5 & -1 & 0 & 0 & 0 & 1 & 0 \end{array} \right)$$

$$\text{final tableau : } \left(\begin{array}{ccccccc|c} 1 & 2 & .5 & 1 & 0 & 0 & 0 & 200 \\ .5 & 1 & 2 & 0 & 1 & 0 & 0 & 200 \\ .25 & 1 & 1 & 0 & 0 & 1 & 0 & 200 \\ -2 & -1.5 & -1 & 0 & 0 & 0 & 1 & 0 \end{array} \right)$$

4.



A class of 80 was asked what they like on their pizza and the following results were found:

6 liked only mushrooms

30 liked extra cheese

43 liked sausage

35 liked exactly two things on their pizza

10 liked all three on their pizza

21 liked extra cheese and sausage

19 liked extra cheese and mushrooms

(a) (8 points) Fill in the Venn diagram with the appropriate numbers.

(b) (3 points) Shade the region corresponding to not liking sausage or pepperoni.

(c) (4 points) Express the following using set symbols :

“liked only mushrooms and sausage”