

9. Susie has five different pieces of fruit, eight different vegetables, and seven different cookies. If she is going to pack a lunch that contains five items, how many ways can she have exactly two pieces of fruit or exactly three cookies?
10. How many different ten digit numbers can be formed from three 2's, one 7, five 8's, and a 9?
11. An experiment consists of randomly choosing 5 paper clips from a box containing 12 green paper clips, 9 red paper clips, and 3 blue paper clips. In how many ways can this be done if exactly 4 of the paper clips selected are the same color?
12. Four Longhorns, five Aggies, and three Red Raiders travel to the Big 12 Basketball Tournament. If they all want to sit in the same row together, how many ways can this happen if each school wants to sit as a group?
13. Determine graphically the solution set for the following system of linear inequalities. Label all corner points.

$$x + y \leq 4$$

$$2x + y \leq 6$$

$$2x - y \geq -1$$

$$x \geq 0, y \geq 0$$

14. Clean-Hair Inc. produces three kinds of shampoos. It takes 2.5 hours to produce 1,000 bottles of formula I, 3 hours to produce 1,000 bottles of formula II, and 4 hours to produce 1000 bottles of formula III. The profits for each 1000 bottles of formula I, formula II, and formula III are \$180, \$200, and \$300 respectively. Suppose for a certain production run, there are enough ingredients on hand to make at most 9,000 bottles of formula I, 12,000 bottles of formula II, and 6,000 bottles of formula III. Furthermore, suppose the time for the production run is limited to a maximum of 70 hours. How many bottles of each formula should be produced in order to maximize the profit? Set-up the Linear Programming Problem but DO NOT SOLVE.

15. Given the following linear programming problem:

$$\begin{array}{ll} \text{Maximize} & P = 10x + 2y \\ \text{Subject to} & x + y \leq 12 \\ & 2x + y \leq 16 \\ & x \geq 0, y \geq 0 \end{array}$$

The optimal solution occurs at the intersection of which two lines?

16. At what simple interest rate will an investment triple in 20 years?
17. If Lindsay invests \$3,000 in an account that earns 5.25%/year compounded continuously, how much will be in the account after 15 years?
18. What is the effective rate of 4.35%/year compounded weekly?
19. Travis and Jennifer bought a house in 2003 for \$180,000. They put 5% down and then financed the remaining balance with a 30 year mortgage that had an interest rate of 7.9% per year compounded monthly on the unpaid balance. After making payments for 2 years they decided to refinance the house in 2005 with a 30 year mortgage that has an interest rate of 6.5% per year compounded monthly on the unpaid balance.
- (a) What are their current monthly payments?
- (b) How much total interest will they end up paying for this house?

20. Using the following sets, determine whether each statement is True or False.

$$U = \{1, 2, 3, 4, 5, 9, 12, 15, 18\}$$

$$A = \{2, 4, 9, 15\}, B = \{1, 3, 15, 18\}, C = \{5, 9, 15\}$$

- (a) $\{2, 15\} \in A$
- (b) $(B \cup C)^c \cap A^c = \emptyset$
- (c) $\emptyset \subset B$
- (d) A has 16 subsets
- (e) $\emptyset \cup C = \{5, 9, 15\}$
- (f) A and B are disjoint sets

21. A survey was conducted with 200 freshmen in college to learn of their vegetable preferences. Use a Venn Diagram to represent the following information:

- 60 freshmen will only eat broccoli
- 60 freshmen will eat exactly 2 of the vegetables
- 155 freshmen will NOT eat spinach
- 9 freshmen will eat all 3 vegetables
- 63 freshmen will eat okra
- 36 freshmen will eat okra and broccoli
- 12 freshmen will only eat okra and spinach

How many freshmen will not eat okra?