

Fall 2006
Math 141 Week-in-Review #6
Exam 2 Review

courtesy: Kendra Kilmer

(covering Sections 3.1-3.3, 5.1-5.3, and Chapter 6)
(Please note that this review is not all inclusive)

1. There are six issues on the county election ballot. If a voter can mark YES, NO, or choose not to vote on each issue, how many ways can the ballot be marked?
2. A group of 8 people are going on a trip in an 8 seater van that was rented. If Jack and Jill were the only people that signed the papers to drive the van, how many different seating arrangements are possible?
3. How many three digit numbers can be formed from the digits 1, 3, 4, 5, 6, 9 if the numbers formed must all be even and no digit can be repeated?
4. Nick, an enthusiast of books, is doing some cleaning. He has found that he has two identical copies of *The Never Ending Story*, five identical copies of *There and Back Again*, and three identical copies of *Dreamcatcher*. How many different ways can he arrange these books on his shelf?
5. A shipping carton has 30 games in it. If it is known that there are 8 defective games in the carton, how many ways can you select 4 games and get exactly 1 defective game?
6. Johnny has been chosen to be one of the team captains for the weekly kickball game. There are 19 other kids in his class and he must choose 9 of them to be on his team. If he is good friends with 4 of the kids, how many ways can he choose his team so that he has at least 2 of his good friends on his team?
7. A National Honor Society Club consists of a president, vice-president, 3 treasurers, and 2 secretaries. The president and vice-president are to be chosen from 6 candidates, the 3 treasurers from 7 candidates, and the 2 secretaries from 12 candidates. How many different groups can be formed?
8. A women's softball conference consists of 7 teams. If all teams play each other three times in the season, how many conference games are there?
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?