

MATH 141 (Extra Practice 2)

1. A computer system has code words consisting of 6 characters using only digits and letters. How many code words are possible if the first and last character must both be a digit and no digit or letter can be repeated?
2. There are 12 different books to place on the shelf. Six written by J.K. Rowling, 4 written by John Grisham, and 2 by Dan Brown. In how many ways can these books be arranged in a row on a shelf if books by the same author must stay together AND the books by J.K. Rowling must be on the right of the shelf.
3. How many distinguishable ways can the letters in the word REDEEMED be arranged?
4. A committee of 5 must be formed from among a group of 7 women and 10 men. In how many ways can this be done if there must be at least 4 men on the committee?
5. Johns Diner makes home-made pudding, vanilla and chocolate, for its deserts. Each serving of vanilla requires 2 teaspoons of sugar and 34 fluid ounces of mineral water, and each serving of chocolate pudding requires 4 teaspoons of sugar and 15 fluid ounces of mineral water. John has available each day 940 teaspoons of sugar and 8295 fluid ounces of mineral water. Also John will not make any more than 225 servings of vanilla pudding, as that is the most they can sell each day. If there is a profit of 9 cents on each serving of vanilla pudding and 2 cents on each serving of chocolate, how many servings of each should be made in order to maximize the profit? SET UP the problem. Then solve it. Also list corner points of the solution set.
6. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{x|x \text{ is divisible by } 3\}$, $B = \{x|x \text{ is an even number}\}$, $\{1, 2, 3, 4\}$, $D = \{1, 5\}$

Using the sets above, circle either TRUE or FALSE for each of the following statements below.

TRUE FALSE $\{6\} \subset A$

TRUE FALSE $\{\emptyset\} = \emptyset$

TRUE FALSE $A \cup B = \{6\}$

TRUE FALSE D has a total of 4 subsets.

TRUE FALSE $B^c \cap C = \{1, 3\}$

7. James has a casserole and a salad dinner. Each serving of casserole contains 325 calories, 4 grams of vitamins, and 8 grams of protein. Each serving of salad contains 45 calories, 5 grams of vitamins, and 2 gram of protein. James wants to consume at least 36 grams of vitamins and 24 grams of protein as well as keep the calories at a minimum. How many

servings of each food should he eat. DEFINE YOUR VARIABLES and JUST SET UP this linear programming problem. DO NOT SOLVE.

8. Let $n[U] = 26$, $n[(A \cup B)^c] = 6$, $n[A^c] = 14$, $n[B] = 11$, find $n[A]$.
9. A sample of three apples taken from Cavalleros Fruit Stand are examined to determine whether they are good or rotten. (Let g stand for “good apple” and r stand for “rotten apple”)
 - (a) What is an appropriate sample space for this experiment?
 - (b) Describe the event, E , that exactly one of the apples picked is rotten.
10. Shade the Venn diagram representing the following set operations:
 - (a) $A \cup B^c$
 - (b) $(A \cap B)^c$
 - (c) $(A \cup B)^c \cap C$
 - (d) $A^c \cup (B \cap C)^c$
11. At a Halloween party some of the guests brought cookies, drinks, or candy. Fill in the Venn Diagram according to the following information.
 - 5 guest brought cookies, candy and drinks
 - 19 guests brought exactly 2 items
 - 21 guests brought drinks
 - 20 guests did not bring cookies
 - 8 guests brought only candy
 - 2 guests did not bring a drink or candy
 - 5 guests brought only cookies and drinks
 - 11 guests brought drinks and candy
12. One-hundred people were asked what they ate the last time they went to a fast food establishment. Fill in the Venn diagram according to the results below:
 - 21 did not have any of these items
 - 2 had only a milkshake
 - 47 had french fries
 - 10 had a hamburger and milkshake, but not fries
 - 38 had french fries, but not a milkshake

- 48 had a hamburger
 - 23 had only french fries
13. An inspector selects 10 transistors from the production line and notes how many are defective. Determine the event, F , that “at most 4 are defective”.
 14. A survey of 85 shoppers reveals that in the past week, 25 bought pop-tarts, 41 bought cereal, and 19 bought both pop-tarts and cereal. How many of the shoppers bought EXACTLY one of these two items?
 15. An experiment consists of rolling a 10 sided die (#d 1-10) one time. Let E denote the event that the number landing uppermost was even and let F be the event that the number landing uppermost is greater than 4. Are E and F mutually exclusive events? Why or why not?
 16. The Pretty Pet Parlor makes designer dog collars. The small collars sell for \$18 each and the large collars sell for \$40 each. The small collars require 7 rhinestones and take 14 minutes to make. The large collars require 10 rhinestones and take 16 minutes to make. They want to make at least three times as many large collars as small collars. They have 2500 rhinestones and 9 hours available to make these collars. How many collars of each size should be made in order to maximize the revenue (how much money they make on sells)? Set Up the problem, do not solve.
 17. Solve the following problem using the Method of Corners. List out your corner points (round to 2 decimals if necessary) and your Max/Min as well as where they occur.
 Maximize and Minimize: $P = 6x + 2y$
 $y \leq 2x + 0.5$
 subject to: $y \geq 2.75$
 $x \leq 3.5$
 $x \geq 0, y \geq 0$
 18. A survey was conducted among 250 female athletes as to which sports (among basketball, softball, and volleyball) they played in high school. The results are as follows:
 - 29 did not play any of these three
 - 36 played softball only
 - 102 played basketball
 - 25 played softball and volleyball, but not basketball
 - 72 played basketball, but not softball
 - 131 played volleyball
 - 42 played only basketball

How many people surveyed played all three of these sports in high school?

19. Drew makes two kinds of desk chairs, model I and model II. Each model I he sells makes him \$100, whereas each model II he sells makes him only \$60. Drew has 8 units of wood and 30 hours of time available to make all of his chairs. If each model I (x) requires 2 units of wood and 300 minutes of time and each model II (y) requires 1 unit of wood and 100 minutes of time, set up the linear programming problem in which you would figure out how much of each model Drew must produce in order to maximize profits. DO NOT SOLVE THE PROBLEM.
20. Amy is the Queen of Organized ! She has 2 CDs by the Squeegees, 3 CDs by the Goo Goo Dolls, and 4 Best of the 80s CDs. If Amy wants to place all the CDs on a shelf, how many ways is this possible if she wants the CDs by the same artist grouped together?
21. A survey of 70 shoppers reveals that in the past week, 20 bought pop-tarts, 35 bought cereal, and 12 bought both pop-tarts and cereal. How many of the shoppers bought exactly one of these two items?
22. In how many ways can 4 boys and 7 girls be seated in a row if a girl must be in both end seats?
23. From among 90 booster chairs, 6 are defective. In how many ways can a sample of 5 have exactly 2 defective chairs?
24. An experiment consists of rolling a red 4-sided die and a blue 4-sided die at the same time.
 - (a) What is the sample space for this experiment?
 - (b) What is the event, E, that sum of 6 is rolled?
 - (c) What is the event, F , that the red dice rolled a 2?