

Math 141 **NEATLY PRINT NAME:** _____

Exam 2 **STUDENT ID:** _____

Fall 2006 **DATE:** _____

Scarborough **PHONE:** _____

FORM C **EMAIL:** _____

SECTION: 513 (1:50pm) 514 (3pm)

"On my honor, as an Aggie, I have neither given nor received unauthorized aid
on this academic work."

Signature of student

Academic Integrity Task Force, 2004
<http://www.tamu.edu/aggiehonor/FinalTaskForceReport.pdf>

My signature in this blank allows my instructor to pass back my graded exam in class or allows me to pick up my graded exam in class on the day the exams are returned. If I do not sign the blank or if I am absent from class on the day the exams are returned, I know I must show my Texas A&M student id during my instructor's office hours to pick up my exam.

Signature of student _____

WRITE ALL SOLUTIONS IN THE SPACE PROVIDED; FULL CREDIT WILL NOT BE GIVEN WITHOUT CORRECT ACCOMPANYING WORK. FULLY SIMPLIFY ALL ANSWERS AND GIVE EXACT ANSWERS UNLESS OTHERWISE STATED. WHERE PROVIDED, PUT YOUR FINAL ANSWER IN THE BLANK PROVIDED. REMEMBER YOUR UNITS!

1. All the constraints of a linear programming problem produce a bounded feasible region with corners at $(0, 2)$, $(0, 7)$, $(4, 6)$, $(8, 3)$, $(8, 0)$, and $(4, 0)$ with objective function $P = 6x + 8y$.

a. (3pts) Complete the chart.

Corner Point	$P = 6x + 8y$
$(0, 2)$	
$(0, 7)$	
$(4, 6)$	
$(8, 3)$	
$(8, 0)$	
$(4, 0)$	

b. (5pts) If the objective function is to be maximized, write a sentence that gives the solution.

_____ 2. (6pts) If you invest \$2006 in a savings account earning 6% interest per year compounded continuously, how much will you have in your account in 4 years?

_____ 3. (6pts) Four couples attend a theater play. If they all sit next to each other in a row of eight chairs, how many ways can it be done if all couples are seated together and Kelsey, one of the wives, sits on one of the end seats?

4. (8pts) Grandmama crochets two sizes of afghans. Her small afghan requires 7 skeins of yarn and 15 crocheting hours to make. Her large afghan requires 16 skeins of yarn and 32 hours of crocheting time to make. She has 133 skeins of yarn. Due to her arthritis, Grandmama figures she has at most 250 hours of crocheting time before the fair, where her afghans will sell for \$60 for the small ones and \$130 for the large ones. How many of each size of afghan should she crochet in order to maximize her revenue? Set up this linear programming problem but DO NOT SOLVE IT. Remember to first define your variables. (Reference: Sherry's mom)

5. A bald cypress, which would sell for \$50, needs 5 gallons of water and 10 grams of fertilizer each week. A live oak, which would sell for \$80, needs 2 gallons of water and 3 grams of fertilizer each week. Each week there are 90 gallons of water and 150 grams of fertilizer available. If a local plant nursery wants to maximize their revenues, how many of each type of tree should they grow?

Let x = the number of bald cypress trees

Let y = the number of live oak trees

Maximize $R = 50x + 80y$

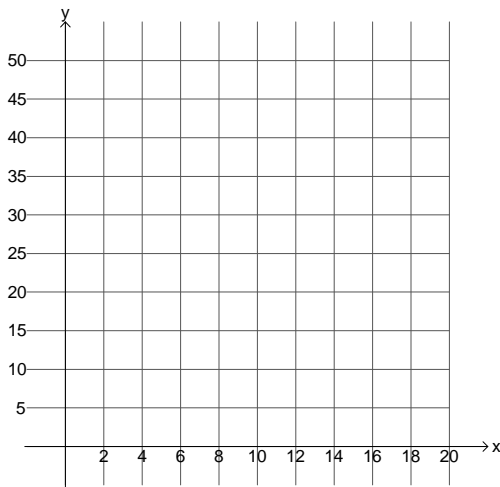
Constraints $5x + 2y \leq 90$

$10x + 3y \leq 150$

$x \geq 0$

$y \geq 0$

- a. (7pts) Graph the constraints, shade the feasible region, and label your corner points (vertices).



- b. (7pts) Make an appropriate chart, and then write a sentence that gives the solution.

- c. (4pts) Discuss any left-over resources.

_____ 6. (6pts) In how many ways can the letters of **evergreen** be permuted?

7. A committee has 5 adult men, 7 adult women, 4 youth girls and 5 youth boys.

- a. (4pts) If a subcommittee of four members is chosen at random, how many different ways can this be done?

- b. (7pts) If a subcommittee of four members is chosen at random, how many ways is it possible to get exactly 2 females, or at least 2 adult men?

8. Nine years ago, the Great Pumpkin put 20% down on a \$360,000 pumpkin patch and secured a bank loan for the balance owed. The term of the mortgage was 30 years with an interest rate of 7% per year compounded monthly. Because the interest rate has now dropped to 5% per year compounded monthly, the Great Pumpkin is thinking of refinancing the remaining principal of the pumpkin patch loan with a 15-year mortgage.

- a. _____(2pts) What is the bank's effective yield, as a percentage to 3 decimal places, on the original 30-year mortgage?

- b. _____(5pts) What is the Great Pumpkin's current monthly mortgage payment?

- c. _____(8pts) If the Great Pumpkin decides to refinance, what would be the new monthly payment?

_____ 9. (4pts) If at the end of 8 years, you wanted your investment of \$12000 to double, at what annual interest rate, as a percentage to 3 decimal places, compounded quarterly, would you want?

10. (6pts) Let $A = \{s, a, n\}$, $B = \{l, o, v, e\}$, and $P = \{n, u, m, b, e, r, s\}$ where $U = A \cup B \cup P$. Circle the correct answer.

TRUE FALSE a. Set A has 7 proper subsets.

TRUE FALSE b. $A \cap B = \emptyset$

TRUE FALSE c. $(P \cup A)^C = \{l, o, v\}$

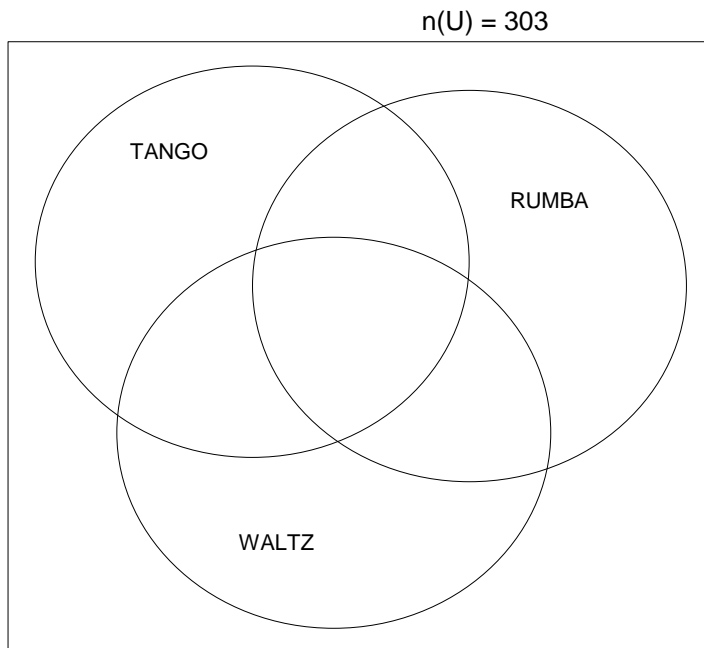
TRUE FALSE d. $n(B \cup P^C) = 7$

TRUE FALSE e. $m \in P$

TRUE FALSE f. $\emptyset \subseteq U$

11. (8pts) Use the information to fill in the provided Venn diagram regarding 303 ballroom dancers.

- 123 are taking tango
- 66 are taking rumba with tango or with waltz
- 62 are taking just waltz
- 182 are taking only one of tango, waltz, or rumba
- 32 are taking rumba and tango but not waltz
- 141 are taking rumba or waltz but not tango
- 9 were taking all three of these dances (tango, rumba, waltz but no others)



_____ (4pts) How many were taking exactly two of the three (tango, waltz, rumba) named dances?