Practice

Math 141 Summer II 2011 Exam 2 **Print** Name_____
class time or section_____

There are 10 problems. Partial credit will be given only if work is shown.

"An Aggie does not lie, cheat, or steal or tolerate those who do"

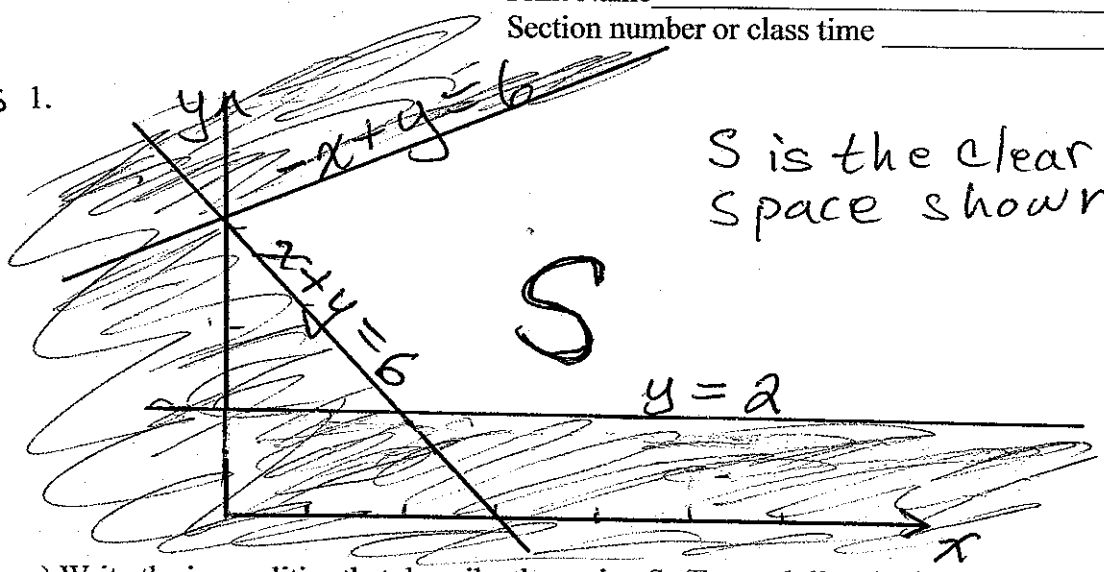
"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."

Your signature _____

Exam 2 Math 141 Summer '11 Print Name _____

Section number or class time _____

12 pts 1.



S is the clear space shown.

a) Write the inequalities that describe the region S. (For each line, indicate which way the inequality goes for (x, y) to belong to S.)

b) Does P=5x + 2y have a maximum on S? If yes, where is it attained?

c) Does P=5x + 2y have a minimum on S? If yes, where is it attained?

15 pts

2. A company is making two products, A and B. Each requires storage space, time for assembly and time for finishing. Each product A requires 5 cu. ft. of storage space, 2 hours for assembly, and 1 hour for finishing. Each product B requires 8 cu. ft. of storage space, 1 hour for assembly, and 1 hour for finishing. They company has 200 cubic feet of storage space, 42 hours in the assembly department and 28 hours in the finishing department. Profit per unit of A is $30 and profit per unit of B is $40.

a) Set up the inequalities and objective function. Define your variables clearly.

b) Find the optimal solution. Include any leftover resources in your answer.

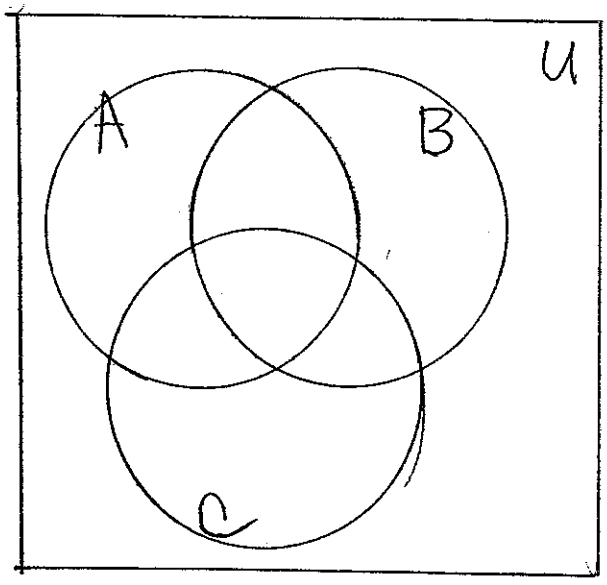
14 pts 3. To be eligible for a certain job an applicant must have a perfect 1-year driving record **or** be at least 18 years old, **and** he/she must have delivery drivers insurance.

A is the set of applicants who have a perfect 1-year record.
B is the set of applicants who have the required insurance.
C is the set of applicants who are at least 18 years old.

For a and b, use union, intersection and/or complement symbols, not sentences. You must use any required parentheses.
a) Describe the set of qualified applicants.

b) Describe the set of applicants who have the required insurance and are at least 18 years old but do not have a perfect 1-year record.

c) Shade the set $(A \cap B^C) \cup C$ in the Venn diagram.



5 pts

4. A={ 1, 2, 3, 4} B={5, 6 } U={ 1, 2, 3, 4, 5, 6 }

Fill in each blank with one a symbol from the list; $\in, \varnothing, \subseteq, \cap, \cup$ or U to make a true statement.

2 _____ A {2, 3 }_____ A $A \cap B =$ _____ $A \cup B =$ _____

A_____{ 3, 4, 6 } = { 3, 4 }

6 pts

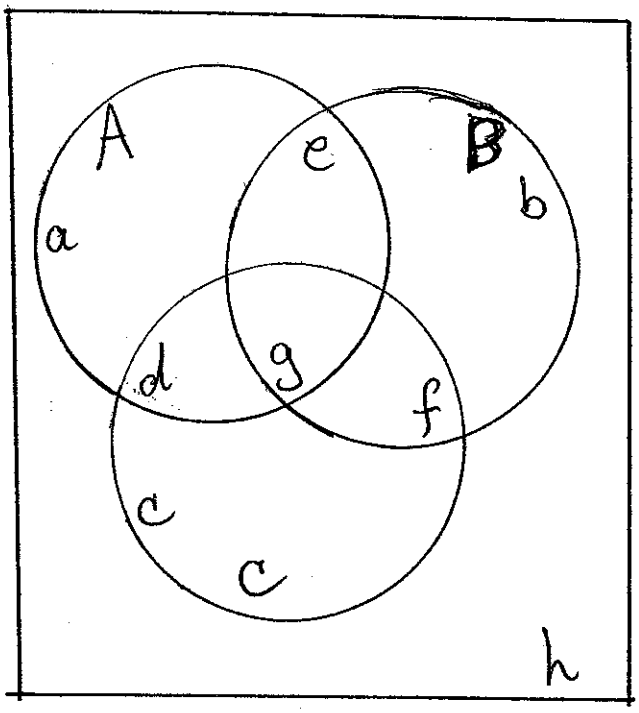
5. 100 people were given the opportunity to watch a movie and/or read the accompanying book. 60 of them watched the movie, 70 read the book and 10 did neither. How many watched the movie and read the book?

9 pts

6. Fifty three people shopped at a bakery one Saturday. The bakery sold only apple, blueberry and cherry pie.
A is the set of shoppers who bought apple pie, B is the set of shoppers who bought blueberry pie and C is those who bought cherry pie.

7 of the 53 shoppers bought none of the three kinds of pie.
9 bought apple and blueberry but not cherry pie.
5 only bought cherry pie.
3 bought all three kinds of pie.
18 bought at least one of apple or cherry but did not buy blueberry.
24 bought exactly one kind of pie.
21 who bought blueberry did not buy cherry.

Write the equations for this information according to the labeling in the Venn diagram below. Each lower case letter represents the number of elements in its region.
Fill in the diagram with the appropriate numbers.



15 pts 7. An experiment consists of drawing 5 cards from a box containing **17 cards. Each card has one symbol. The symbols are ; A, B, C, D, E, F, G, 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.** (7 different letters and 10 digits)

I) Assume the cards are chosen **without replacement and kept in order.**
a) How many outcomes are in the sample space?

b) How many outcomes correspond to the event that exactly two letters and exactly 3 digits are chosen.

II) Assume the cards are chosen all at once and **without replacement. No order** is observed.
a) How many outcomes are in the sample space?

b) How many outcomes correspond to the event that at least 4 digits are chosen?

III) Assume the cards are chosen **with replacement and kept in order** .
a) How many outcomes are in the sample space?

b) How many outcomes correspond to the event that **at least** one letter is chosen?

6 pts 8. A shelf contains 20 books consisting of 5 biology, 8 math, and 7 psychology books. How many distinguishable arrangements of the books are there if **books on the same subject are identical but like subjects do not have to be together**? You do not need to evaluate the counting expression.

6 pts 9. A probability sample space is S={ x, y, z, w }. Some of the probabilities are P(x)=0.2, P(y)=0.3 and P({x, z})=0.3. Find P({x , w}).

12pts 10. A 4 sided die and a 5 sided die are tossed and the top numbers are observed. Assume all pairs of top numbers are equally likely. The probability space is shown.

(1,1)	(1,2)	(1,3)	(1,4)
(2,1)	(2,2)	(2,3)	(2,4)
(3,1)	(3,2)	(3,3)	(3,4)
(4,1)	(4,2)	(4,3)	(4,4)
(5,1)	(5,2)	(5,3)	(5,4)

A is the event that the sum of the top numbers is less than or equal to 6.
Find P(A), the probability of event A.

B is the event that at least one of the top numbers is a 3.
Find P(B), the probability of event B.

Find P(A $\cup$ B), the probability of A union B.