

Math 141                      **NEATLY PRINT NAME:** \_\_\_\_\_

Exam 2    **STUDENT ID:** \_\_\_\_\_

Fall 2008    **DATE:** \_\_\_\_\_

Scarborough

FORM H                                      **SECTION:**    503 (10:20am)      521 (11:30am)      523 (1:50pm)

"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 \_\_\_\_\_

**MULTIPLE-CHOICE: There is no partial credit on the multiple-choice questions. You must circle the correct answer(s) on each to receive credit on the multiple-choice questions.**

**Work Out: Write all solutions in the space provided as full credit will not be given without complete, correct accompanying work, even if the final answer is correct. Fully simplify all your answers, and give exact answers unless otherwise stated. Justify your answers algebraically whenever possible; state any special features or programs you use on your calculator. Put your final answer in the blank provided. Remember your units!**

**You must clear your calculator. MEM (2<sup>nd</sup> +), Reset, ALL, Reset**

Isaac Newton (1642 - 1727) described his brilliant accomplishments as follows.

"I seem to have been only like a boy playing on the seashore and diverting myself in now and then finding a smoother pebble or prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."

1. (5 pts) How many different ways can a taco be prepared if you have the following choices?

- Corn or wheat tortilla
- Beef or not
- Pinto beans, black beans, or no beans
- Lettuce or no lettuce
- Tomatoes, pico de gallo, cilantro, or none of these
- Cheese or not

2. (5 pts) There are 8 whippets, 6 greyhounds, and 4 Italian greyhounds. If 4 of these dogs are chosen at random, how many ways is it possible to get at least 3 whippets?

- a. 560
- b. 126
- c. None of these
- d. 630
- e. 5040

3. (6 pts) Blake's 12-card hand consists of the following cards:

- Spades: 2, 5, 9, 10, J
- Hearts: 2, 5, J, Q
- Clubs: Q
- Diamonds: 5, Q

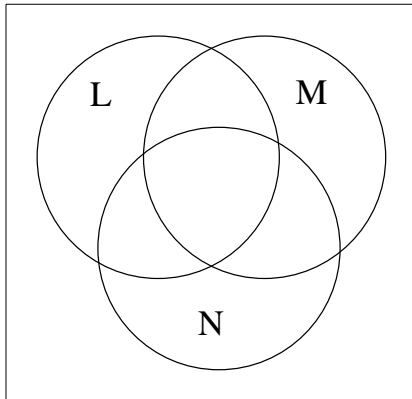
If a game consists of drawing one card at random from Blake's hand and observing its rank (2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K, A), make a probability distribution chart for the outcomes of this game. *Give all probabilities as exact fractions.*

4. (7 pts) Jordan has \$5000 available to invest in three types of accounts: a growth stock, a blend fund, and bonds. The growth stock has an average rate of return of 12% per year, the blend fund has an average rate of return of 8% per year, and the bond fund has an average rate of return of 4% per year. At least 40% of Jordan's total investment is to be invested in the blend fund and bonds. The amount invested in the growth stock must be no more than 3 times the amount invested in the blend fund. How much should Jordan invest in each type of investment to maximize her returns? *Define your variables. Set up the linear programming problem; do not solve.*

5. (5 pts) A restaurant crew consists of a manager, 2 cooks, 8 wait staff, and 4 dish washers. The manager and cooks are selected from 5 salaried employees. The wait staff and dish washers are chosen from a pool of 16 hourly-wage employees. How many different restaurant crews can be formed?

6. (4 pts) Of students who were enrolled in a summer camp, 360 lived in dorm rooms, 410 lived in apartments, 110 lived in rent houses and 120 lived in a spare bedroom in people's homes. If one of these students is chosen at random, what is the probability that he or she would not have lived in a dorm room?

7. (4 pts) Shade the region in the Venn diagram that represents the set  $(L \cup M^c)^c$ .



8. (4 pts) A pair of fair 6-sided dice is rolled. Give the event,  $E$ , that the sum of the uppermost numbers is 4.

$E =$  \_\_\_\_\_

9. (5 pts) Of students that were surveyed, 54% worked while attending school, 42% were a member of a school organization, and 22% did neither. What percentage of these students worked and were a member of a school organization?

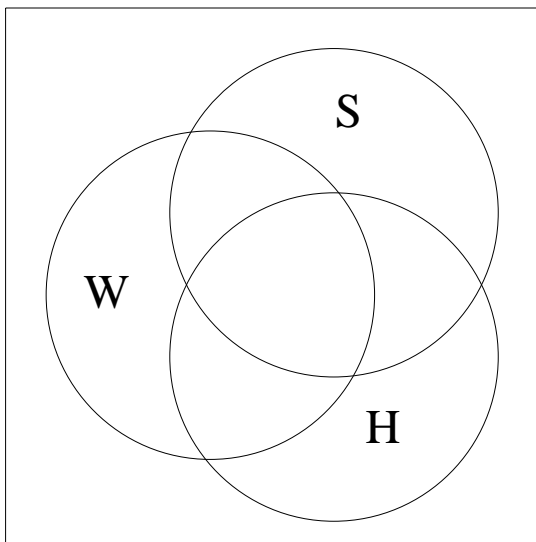
- a. 36%
- b. 18%
- c. 96%
- d. None of these
- e. 78%

10. (5 pts) An experiment first consists of picking a letter from the word *jut*, followed by picking a number from the set  $\{3, 4\}$ . List all outcomes of the experiment.

**For the next two problems:** A survey was completed by 80 Math 141 students to see where they got help for Math 141.

- 39 went to Dr. Sherry's office hours (S)
- 21 did not go to Dr. Sherry's office hours or the Week-In-Reviews (W)
- 15 went to Dr. Sherry's office hours and Week-In-Reviews
- 9 went only to the Help Sessions (H)
- 21 went to exactly two of these three places to get help
- 8 went to all three of these places to get help
- 4 went to the Week-In-Reviews and Help Sessions, but not Dr. Sherry's office hours

11. (8 pts) Use the information to fill in the provided Venn diagram.



\_\_\_\_\_ 12. (3 pts) How many of these students went to the Week-In-Reviews?

13. (5 pts) How many different ways can the letters of the word *riffraff* be permuted?

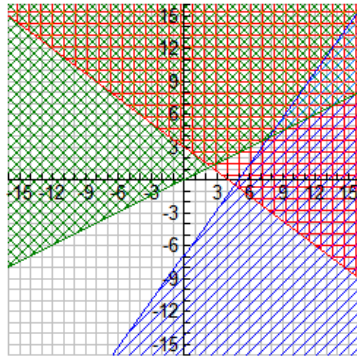
- 840
- 3360
- 5040
- None of these
- 40,320

14. (5 pts) Which of the following graphs represents the solution to the system of inequalities below, given that the solution set is the *unshaded* region.

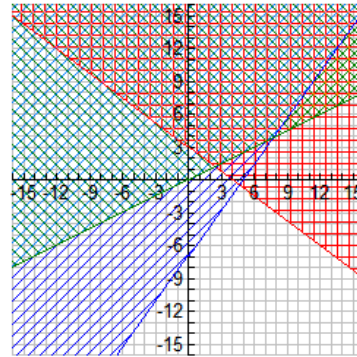
$$7x - 5y \leq 35$$

$$3x + 4y \leq 12$$

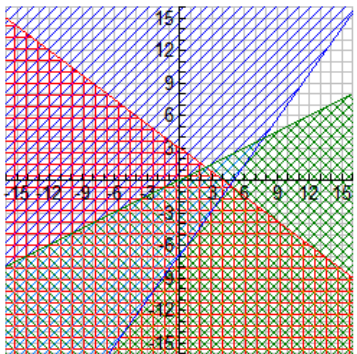
$$x \leq 2y$$



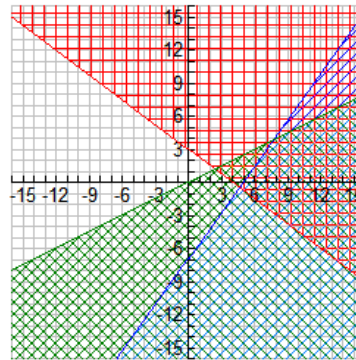
a.



b.



c.



d.

e. None of these

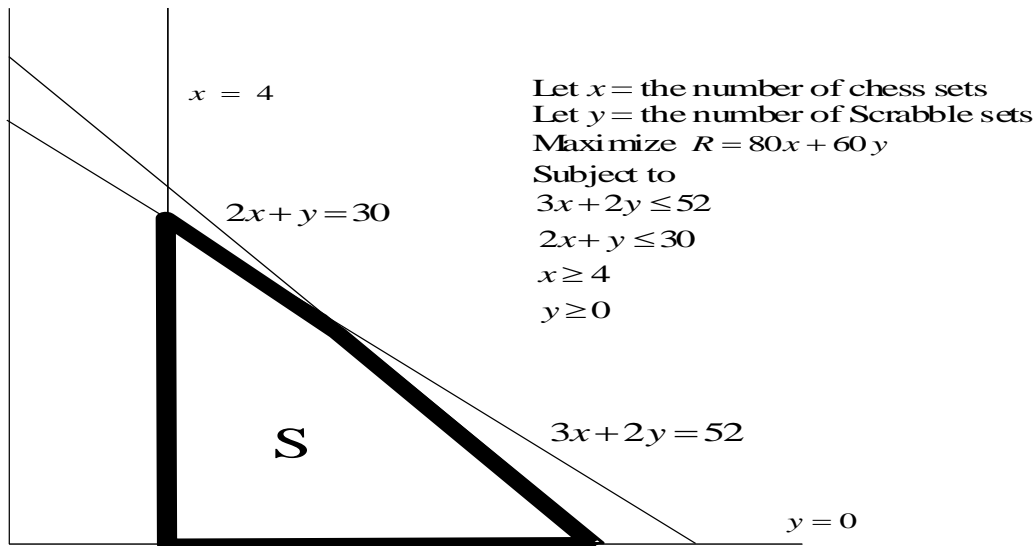
15. (6 pts) The probability distribution table for an experiment is given below.

Simple Event	{a}	{b}	{c}	{d}	{e}
Probability		$\frac{5}{36}$	$\frac{1}{18}$		$\frac{4}{9}$

a. If  $P(\{a\} \cup \{e\}) = \frac{7}{9}$ , complete the chart, giving probabilities as *exact fractions*.

b.  $P(\{d\} \cap \{e\}) =$  \_\_\_\_\_

**For the next 3 problems:** Christopher makes chess sets and Scrabble® sets out of wood. The chess set requires 3 units of boxwood and 2 units of ebony wood. The Scrabble set requires 2 units of boxwood and 1 unit of ebony wood. Since he has an order for 4 chess sets, he knows he must make at least that many. Christopher has 52 units of boxwood and 30 units of ebony wood available. How many of each set should he make to maximize his revenue if the chess sets sell for \$80 and the Scrabble sets sell for \$60? What is the maximum revenue?



16. (5 pts) What are the corner points of the feasible region  $S$ ?

- $(4, 20)$ ,  $(4, 22)$ , and  $(8, 14)$
- None of these
- $(0, 0)$ ,  $(0, 26)$ ,  $(4, 20)$ , and  $(4, 0)$
- $(4, 22)$ ,  $(8, 14)$ , and  $\left(\frac{52}{3}, 0\right)$
- $(4, 0)$ ,  $(4, 20)$ ,  $(8, 14)$ , and  $(15, 0)$

17. (5 pts) Write a complete sentence that gives the answer to this linear programming problem.

18. (5 pts) Which of the following statements is true?

- There is no left over boxwood and no left over ebony.
- There is no left over boxwood, and there are 2 units of ebony left over.
- There is no left over boxwood, and there are 4 units of ebony left over.
- None of these
- There are 4 units of boxwood left over and no units of ebony left over.

19. (8 pts) Circle the correct answer.

TRUE or FALSE      a. If  $p \in A$  and  $A \subset B$ , then  $p \in B$ .

TRUE or FALSE      b. For all sets  $E$  and  $F$ ,  $P(E \cup F) = P(E) + P(F)$ .

TRUE or FALSE      c. If  $A$  and  $B$  are mutually exclusive,  $P(A \cap B) = \emptyset$ .

TRUE or FALSE      d.  $\emptyset \in A \cap A^C$

TRUE or FALSE      e. If  $A = \{0\}$ , then  $0 \subset A$ .

TRUE or FALSE      f. For all sets  $A$  and  $B$ ,  $n(A \cap B) = n(A) + n(B) - n(A \cup B)$ .

TRUE or FALSE      g. If  $n(A) = 5$ , then  $A$  has exactly 31 nonempty subsets.

TRUE or FALSE      h. For all sets  $A$ ,  $A \subseteq A$ .