

Math 141 **NEATLY PRINT NAME:** _____

Exam 3 **STUDENT ID:** _____

Fall 2006 **DATE:** _____

Scarborough **PHONE:** _____

FORM F **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 _____

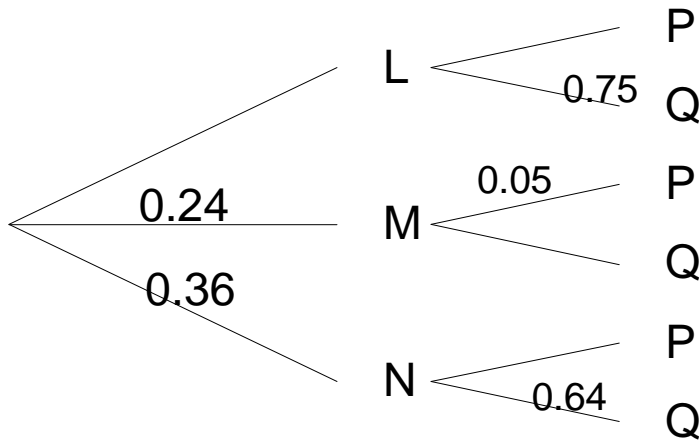
WRITE ALL SOLUTIONS IN THE SPACE PROVIDED; FULL CREDIT WILL NOT BE GIVEN WITHOUT CORRECT ACCOMPANYING WORK. GIVE YOUR CALCULATOR COMMANDS. FULLY SIMPLIFY ALL ANSWERS AND GIVE EXACT ANSWERS UNLESS OTHERWISE STATED. WHERE PROVIDED, PUT YOUR FINAL ANSWER IN THE BLANK. REMEMBER YOUR UNITS!

When possible, all probabilities should be given as exact fractions in lowest terms (or exact decimals); when impossible to do so, round answers to four decimal places.

THERE IS NO PARTIAL CREDIT ON THE MULTIPLE-CHOICE QUESTIONS. YOU MUST CIRCLE THE ONE CORRECT ANSWER ON EACH TO RECEIVE CREDIT ON THE MULTIPLE-CHOICE QUESTIONS.

1. (5pts) Which one of the following is a uniform sample space?
- a. A pair of fair dice is rolled, and the *sum* of the numbers that falls uppermost is observed.
 - b. A card is drawn from a standard deck of 52 playing cards and it is noted whether the card is an honor (ace, king, queen, jack) card or not is observed.
 - c. A pair of fair dice is rolled, and the *product* of the numbers that falls uppermost is observed.
 - d. A ball is selected at random from an urn containing nine maroon balls, nine teal balls, and nine salmon balls, and the color of the ball is observed.
 - e. none of these
2. (5pts) There are 5 regular (straight-blade) screwdrivers, 8 Phillips screwdrivers, and 2 square-tipped screwdrivers. Find the probability that if Joel grabs 4 screwdrivers at random, that he will have 2 regular, 1 Phillips, and 1 square-tipped.
- a. $\frac{16}{45}$
 - b. $\frac{8}{819}$
 - c. $\frac{16}{273}$
 - d. $\frac{32}{273}$
 - e. none of these
3. (5pts) The probability of tu outscoring Texas A&M in football this year is 0.65. What are the odds against this occurring?
- a. 6 to 7
 - b. 6 to 13
 - c. 13 to 7
 - d. 7 to 13
 - e. none of these

4. (2pts) Fill in the probability tree and then answer the questions on this page.



5. (5pts) Exactly find $P(L^c)$.

- 0.76
- 0.60
- 0.25
- 0.86
- none of these

6. (5pts) Exactly find $P(M \cup P)$.

- 0.2900
- 0.0120
- 0.4696
- 0.4816
- none of these

7. (5pts) Find $P(N | Q)$ to four decimal places.

- 0.3038
- 0.0497
- 0.2304
- 0.6400
- none of these

YES NO 8. (3pts) Are events P and Q mutually exclusive?

YES NO 9. (5pts) Are events N and Q independent? You must show work here!

For the next two problems, E and F are two events of an experiment where $P(F) = 0.64$, $P(E \cup F) = 0.96$, and $P(E^C \cap F) = 0.45$.

10. (5pts) Exactly find $P(E^C \cap F^C)$.

- a. 0.04
- b. 0.55
- c. 0.36
- d. 0.19
- e. none of these

11. (5pts) Find $P(E | F)$ to four decimal places.

- a. 0.5938
- b. 0.4222
- c. 0.5778
- d. 0.1979
- e. none of these

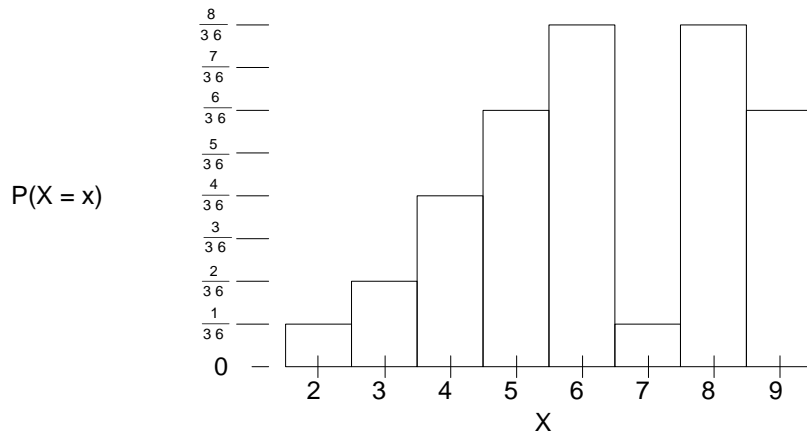
12. A 4-sided die (tetrahedron) has numbers 1, 2, 3 and 4 on its faces. A coin has heads (H) and tails (T). An experiment consists of rolling the 4-sided die, followed by a flipping a coin.

a. (5pts) What is the sample space S?

b. (2pts) List the elements in the event E that an odd number is rolled.

13. (8pts) The local food bank is hosting a fund-raising raffle. One thousand tickets have been sold for \$10 each. There will be one first place prize of \$1000, 10 second-place prizes of \$100 and 20 third-place prizes for \$50. What are the expected net earnings of a person who buys one ticket?

14. The random variable X represents the number of dried cranberries found in one serving of cranberry whole-grain cereal.



a. (2pts) Shade the part of the histogram that corresponds to $P(6 \leq X < 9)$.

b. (2pts) $P(X = 5) =$

c. (3pts) (Show work here!) $P(X < 6) =$

d. (3pts) (Show work here!) $P(4 \leq X < 7) =$

e. (2pts) What type of random variable is X ? Circle one.

finite discrete

infinite discrete

continuous

f. (5pts) How many dried cranberries would you expect to find in 108 servings of this cranberry whole-grain cereal? (Show work here!)

15. The following data was obtained from Alan Jackson's "*like red on a rose*" music CD. The length, in seconds, of each song is to the nearest multiple of ten.

Song length in seconds	180	210	220	240	250	260
Frequency	1	4	1	3	3	1

Probability

- (3pts) Let the random variable X denote the number of seconds of a song from this Jackson album as given in the table above. Complete the above probability distribution table by finding the exact probability as a fraction.
- (3pts) What is the standard deviation to 4 decimal places? Remember your units. Show your calculator command.
- (3pts) Exactly what is the mode? Remember your units. No work needs to be shown.

16. (9pts) A new test for holidayitis will detect the disease 78% of the time in a person who has holidayitis. The test will give a false positive 12% of the time. Forty percent of the population has holidayitis. If the test is given to a person selected at random, what is the probability that the person has holidayitis if the test detects the disease?