MATH 141   EXAM 3   VERSION A

Printed LAST NAME_____   FIRST NAME_____

"On my honor, as an Aggie, my signature shows that
I have neither given, nor received, unauthorized aid on this test."

SIGNATURE:_____   UIN_____   Seat Number_____

- Check to see that you have 4 pages front/back.

- This exam consists of 11 multiple choice problems, 9 problems in the work out section.
  Clearly indicate your answers to the multiple choice questions on your exam.

- **You must show all appropriate work to receive full credit.**

- Be sure to read the instructions to each problem *carefully*.

- Use a pencil and be neat. On the workout problems, if I can't read your answers, then I
  can't give you credit.

- There are 100 points possible. Point values for each problem are as indicated.

- **You must clear your calculator: MEM (2nd +), Reset (7), cursor right to ALL,
  All Memory (1), Reset (2)**.

- SCHOLASTIC DISHONESTY WILL NOT BE TOLERATED.

Good Luck!

1-11	12	page 5	page 6	page 7	GRADE
44	5	14	15	22	100

Part I - Multiple choice Please clearly circle your answers. Partial credit will not be given for these questions.

Attention: All answers are rounded to 4 **decimal places where applicable.**

1. [4pts] Which of the following is <u>NOT</u> a binomial experiment?

   I. Roll a die until a 3 lands up.

   II. Toss a coin 10 times and record whether or not heads land up.

   III. A bag contains 12 blue and 3 yellow marbles. Draw 4 marbles, one at a time without replacement, and record whether the ball is yellow or not.

   (a) I only   (b)I and II   (c) III only   (d) I and III   (e) I, II and III

2. [4pts] For a price $300 paid to a certain insurance company, a man purchased a 1-year life insurance policy in which the insurance company will pay $22,000 to the man's beneficiary in the event that the man dies within the next year. If the probability the man will live another year is 0.99, find the insurance company's expected gain.

   (a) $77

   (b) $517

   (c) $80

   (d) $520

   (e) none of these

3. [4pts] If the odds against having a pop quiz on Tuesday are 13 to 2, what is the probability that there will be a pop quiz on Tuesday?

   (a) 0.1333

   (b) 0.1538

   (c) 2 to 13

   (d) 0.8667

   (e) none of these

4. [4pts] A customer from Cavallaro's Fruit Stand picks a sample of 5 oranges at random from a crate containing 70 oranges, of which 6 are rotten. What is the probability that the sample contains 1 or more rotten oranges?

   (a) 0.3700

   (b) 0.6230

   (c) 0.0714

   (d) 0.3332

   (e) none of these

5. [4pts] Let Z be the standard normal random variable. Find $P(0.5 < Z < 2.5)$.

    (a) 0.6247

    (b) 0.3023

    (c) 0.1359

    (d) 0.1585

    (e) none of these

6. [4pts] A barrel contains 5 apples and 10 pears. An experiment consists of pulling one fruit out at a time, without replacement, until you have 3 pears. Let the random variable X denotes the number of fruits pulled out of the barrel. What values may X assume?

    (a) $2 \leq X \leq 15$

    (b) $X = \{3, 4, 5, 6, 7, 8, 9, 10\}$

    (c) $X = \{3, 4, 5, \ldots\}$

    (d) $X = \{3, 4, 5, 6, 7, 8\}$

    (e) $X = \{3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$

Attention: For the next 3 questions refer to the tree diagram.

7. [4pts] $P(H|E) =$

    (a) 0.69

    (b) 0.35

    (c) 0.32

    (d) 0.128

    (e) none of these
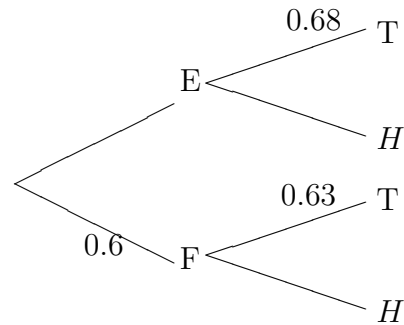
8. [4pts] $P(F|T) =$

    (a) 0.2885

    (b) 0.378

    (c) 0.5815

    (d) 0.9524

    (e) none of these

9. [4pts] $P(E \cup T) =$

    (a) 0.1714

    (b) 0.272

    (c) 0.4358

    (d) 0.778

    (e) none of these

<u>**Attention:**</u> **For the next two questions, use the following information:**

In a particular class, 27% of the students have blonde hair. A group of 15 students is selected at random from this class.

10. [4pts] What is the probability that at most 2 of the 15 students in the group are blonde?

    (a) 0.1863

    (b) 0.9417

    (c) 0.0031

    (d) 0.1280

    (e) none of these

11. [4pts] What is the probability that at least 10 of the 15 students in this group are not blonde?

    (a) 0.0015

    (b) 0.8042

    (c) 0.9927

    (d) 0.1852

    (e) none of these

Part II - Work Out Problems You must show all appropriate work and calculator commands for full credit. In all questions **round your answer to 4 decimal places** if applicable.

12. [5pts] At a factory, the boss has decided to evaluate his employees on a 100 point scale. The average score made was 76 with a standard deviation of 12.3. He decided to assign a rating of EXCELLENT to the top 37%, a rating of SATISFACTORY to the next 43%, and a rating of POOR to the rest. What is the lowest score an employee could get and still be in the SATISFACTORY category? Assume that the scores are normally distributed.

13. [8pts] A box contains 9 red, 7 white, and 12 yellow marbles. What is the probability that in a sample of 8

    (a) all the marbles are the same color.

    (b) exactly 4 red and at least 3 white marbles were chosen? Just set up the problem.

14. [6pts] A group of 60 middle school students was selected and the following information was collected:

    - 8 students have only glasses
    - 24 students have only braces
    - 12 students have glasses and braces.

    Determine whether the event that the student has glasses and the event that the students has braces are independent. *Justify your answer.*

15. [6pts] A dish contains 12 red candies and 5 yellow candies. A bowl contains 5 red candies and 2 yellow candies. A candy is drawn from the dish, and then it is transferred to the bowl. Next, a candy is drawn from the bowl. Draw a probability tree and label it with all exact probabilities.

16. [9pts] A certain Middle School did a survey of its 50 seventh graders to find out how many siblings each of them have. The following table summarizes this information:

# of siblings	0	1	2	3	4	5
# of students	9	20	14	3	3	1

(a) Denote by X an appropriate random variable for this data. What is X? (*Circle one*)

  # of siblings   # of students

(b) Find $P(X > 3)$

(c) Find $P(1 \leq X < 4)$

(d) Find the following for this data set

  Mode = _____   Variance=_____

  Median=_____   Mean=_____

17. [8pts] A quiz consists of 4 TRUE/FALSE questions. Find the probability distribution for the number of correct answers.

18. [10pts] The Acme Prenatal Clinic uses the Acme Pregnancy Text to determine if each patient is pregnant or not. The test is accurately indicates that a woman is pregnant 98% of the time, but the test has a false-positive rate of 3%. According to Acme's records, 79% of all new patients to the Prenatal center are already pregnant.

    (a) Draw a tree diagram illustrating all this information with probabilities on all branches.
    Be sure to clearly define the events you use.

    (b) What is the probability that a woman is pregnant if the pregnancy test says she is not?
    First write the notation for the probability you are being asked to find, and then calculate it.

    Attention: For the next two questions, classify the given random variable. *Circle one.*

19. [2pts] $X=$ the number of hours a child watches television on a given day.

    finite discrete   infinite discrete   continuous

20. [2pts] $Y=$ the number of times a die is thrown until a 3 appears.

    finite discrete   infinite discrete   continuous

LAST NAME_____   FIRST NAME_____