

**ANSWER SHEET**

\*\*\*\*\* MATH 111 - FINAL EXAM - SPRING 2005 \*\*\*\*\*

Thursday, May 5, 2005 – 8:00 AM – 12:00 NOON

PRINT NAME: \_\_\_\_\_  
IN LARGE CAPITALS                      Last,                      First name

PRINT INSTRUCTOR'S NAME: \_\_\_\_\_  
IN LARGE CAPITALS

CIRCLE YOUR LAB DAY:                                      TUESDAY                                      THURSDAY

DETACH THIS ANSWER SHEET from the exam and fill in all the required information printing in LARGE CAPITAL LETTERS on both the front cover sheet of the exam and on this answer sheet.

QUESTION	ANSWER	QUESTION	ANSWER
1.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	17.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
2.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	18.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
3.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	19.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
4.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	20.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
5.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	21.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
6.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	22.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
7.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	23.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
8.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	24.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
9.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	25.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
10.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	26.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
11.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	27.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
12.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	28.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
13.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	29.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
14.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	30.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
15.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	31.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
16.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	32.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
		33.	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E

SCORE: \_\_\_\_\_

FINAL EXAM MATH 111 SPRING 2005

SECTION #: LAST NAME:  
(PRINT ABOVE IN LARGE CAPITALS)

May 5, 2005 FIRST NAME:  
(PRINT ABOVE IN CAPITALS)

ID #: INSTRUCTOR NAME:  
(PRINT ABOVE IN CAPITALS)

CIRCLE LAB DAY: TUESDAY: THURSDAY

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**RULES:** You are permitted to have a calculator and writing instruments. No books or notes allowed. This exam is conducted under Tulane honor code; all work is to be your own. Detach the answer sheet from the back of the exam question booklet and fill in all the required information printing in LARGE CAPITAL LETTERS on both the front cover sheet of this exam and on the answer sheet. The exam is multiple choice. For each question, circle the letter of the correct answer on the answer sheet. The answer E) NOT means NONE OF THESE and is to be selected if none of the possible answers A) through D) is correct. Numerical calculations should be correct to 3 significant digits. At the end of the exam turn in both the answer sheet and the exam booklet of questions.

1. The number of license plates with identifications consisting of 4 letters (not necessarily all different) followed by 2 digits (not necessarily different) is:

A) 45,697,000 B) 13,405,600 C)  $26!4!10!2!$  D) 672,750 E) NOT.

2. If  $P(A) = .65$ ,  $P(B) = .25$ , and  $P(A \text{ or } B) = .9$ , then it must be true that  $A$  and  $B$  are:

A) independent events B) shocking events C) certain events  
D) mutually exclusive events E) NOT.

The next 4 questions refer to the sample data consisting of the following 10 test scores:

6	4	-5	2	2
10	13	1	0	7

3. The sample mean is:

A) 2 B) 4 C) 40 D) 3 E) NOT.

4. The sample median is:

A) 2 B) 4 C) 6 D) there is no median E) NOT.

5. The third quartile is:

A) 1 B) 3 C) 7 D) .75 E) NOT.

6. To three decimal place accuracy, the standard deviation is:

A) 4.940 B) 5.551 C) 24.4 D) 5.207 E) NOT.

7. If  $P(A) = .7$ ,  $P(B) = .5$ , and  $P(A|B) = .6$ , then  $P(A \text{ and } B)$  is:

A) .35 B) .3 C) .42 D) not enough information given to determine this E) NOT.

8. If  $P(A) = .45$ ,  $P(B) = .60$ , and  $P(A \text{ or } B) = .80$ , then  $P(A \text{ and } B)$  is:

A) .25 B) .48 C) .20 D) 1.85 E) NOT.

9. If  $P(A) = .3$ ,  $P(B) = .5$ , and  $P(A \text{ and } B) = .2$ , then the probability that neither  $A$  nor  $B$  happens is:

A) .2 B) .6 C) .4 D) 1 E) NOT.

10. If a box contains 2 white blocks, 3 blue blocks, and 5 red blocks and 4 blocks are drawn one after another without replacement, then the probability that exactly 2 of the last three blocks drawn are red, to three decimal place accuracy, is:

A) .375 B) .667 C) .500 D) .417 E) NOT.

11. The time at which an EPA inspector stages a surprise inspection at a chemical plant is uniformly distributed over the 8AM to 4PM shift. The probability the inspection happens between 10AM and 1PM, to three decimal place accuracy, is:

- A) .500 B) .250 C) .625 D) .375 E) NOT.

12. We wish to give a 96 percent confidence interval for the true proportion  $p$  of students who suffer an adverse reaction to the math-anxiety drug Probstatin<sup>TM</sup>. In a random sample of 100 students treated with Probstatin<sup>TM</sup>, 35 were observed to have adverse reactions to the drug. Using this data, the confidence interval, to three decimal place accuracy, is:

- A) (36.459, 62.400) B) (-.098, .098) C) (.252, .448) D) (.200, .500) E) NOT.

The next 2 questions refer to an astronomer at a mountaintop observatory who notes that the average number of meteorites seen during the dark hours is 15 per hour and that the number seen is independent of the time of night or the number seen in the previous hour, with the time between observations of meteorites being 4 minutes on average.

13. The probability that MORE THAN 15 are seen during a given hour, to three decimal place accuracy, is:

- A) .432 B) .664 C) .335 D) .568 E) NOT.

14. The probability you must wait more than five and a half minutes for the next meteorite, to three decimal place accuracy, is:

- A) .253 B) .747 C) .518 D) 1, this event is certain E) NOT.

15. We wish to estimate the mean of a population to within a maximum margin of error of 2 units with 99 percent confidence, and we know that the standard deviation is no more than 10 units. Based on this information, the minimum size sample we can use to accomplish this task is:

- A) 166 B) 96 C) 68 D) 13 E) NOT.

16. A box of 25 light bulbs contains 6 defective light bulbs. Then the number of ways 8 bulbs can be chosen from the box so as to get exactly 3 defective bulbs out of the 8 bulbs chosen is:

- A)  $\frac{25!}{6!8!}$  B)  $\frac{\binom{25}{8}}{\binom{8}{6}}$  C)  $\binom{19}{5} \binom{6}{3}$  D)  $\frac{\binom{19}{5}}{\binom{6}{3}}$  E) NOT.

17. Suppose that we have a box of  $n$  distinguishable things and we take  $m$  of those things and place them in a second box. The number of ways of different possible results is

- A)  $n! - m!$
- B)  $n!/m!$
- C)  $\frac{n!}{m!(n-m)!}$
- D)  $\frac{n!}{(n-m)!}$
- E) NOT.

18. Suppose that  $R + B + G = N$  colored blocks are stacked of which  $R$  are red,  $B$  are blue, and  $G$  are green-the blocks otherwise are identical in size shape and weight. Then the number of (color) distinguishable ways in which the blocks can be stacked on top of each other is:

- A)  $R!B!G!$
- B)  $N!/(R!B!G!)$
- C)  $\binom{N}{R} \binom{N}{B} \binom{N}{G}$
- D) both B and C
- E) NOT.

19. In hypothesis testing, the level of significance ( $= \alpha$ ) is the probability of:

- A) not rejecting a false null hypothesis
- B) rejecting a true null hypothesis
- C) accepting a true null hypothesis
- D) proving a true alternative hypothesis
- E) NOT.

20. Suppose that we suspect that Acme 60 watt light bulbs have DIFFERENT mean bulb life than the advertised 750 hours. A random sample of 4 bulbs had a sample mean life of 790 hours with a sample standard deviation of 20 hours. At level of significance  $\alpha = .05$ , the p-value or significance of this data, to three decimal place accuracy, as proof of our suspicion is:

- A) .025
- B) .014
- C) .986
- D) .028
- E) NOT.

For the next four questions assume that height of adult American men is a normal random variable with  $\mu = 68$  inches and  $\sigma = 2.5$  inches.

21. The proportion of men that are less than 67 inches tall, to three decimal place accuracy, is:

- A) .500 B) .230 C) .345 D) .770 E) NOT.

22. Of 1000 randomly selected men, to the nearest whole number, the number of these selected men expected to be between 67 and 69 inches tall is:

- A) 311 B) 345 C) none D) all 1000 E) NOT.

23. Of the tallest ten percent of American males, the height of the shortest one, to the nearest tenth of an inch, is:

- A) 69.7 B) 72.1 C) 73.2 D) 71.2 E) NOT.

24. If a random sample of size  $n = 36$  of adult American males are all measured for height and the average is computed, then the probability that this average is between 67 inches and 69 inches, to three decimal place accuracy, is:

- A) .311 B) .984 C) .491 D) .991 E) NOT.

The next 3 questions refer to  $X$  a binomial random variable with  $n = 20$  and  $p = .4$ .

25. To three decimal place accuracy,  $P(6 \leq X < 10)$  is:

- A) .08 B) .630 C) .747 D) .622 E) NOT.

26. To three decimal place accuracy, the standard deviation of  $X$  is:

- A) 2.191 B) .240 C) .490 D) .632 E) NOT.

27. To three decimal place accuracy, the standard deviation of the average of 12 independent observations of  $X$  is:

- A) 2.191 B) .240 C) .490 D) .632 E) NOT.

28. If Joe and Sam are both using the same sample data to make a confidence interval for the mean of an unknown population, and if Joe is using a higher confidence level than Sam, then

- A) Joe's estimate has a smaller margin of error than Sam's  
B) Joe's interval has a larger margin of error than Sam's  
C) Joe's estimate of the true mean will be larger than Sam's  
D) Joe's estimate of the true mean will be smaller than Sam's  
E) NOT.

29. If a population has known mean  $\mu$  and standard deviation  $\sigma$ , but UNKNOWN probability distribution, then for the interval  $(\mu - 2\sigma, \mu + 2\sigma)$  it must be true that:

A) the probability that a randomly selected individual falls in this interval is determined by  $\mu$  and  $\sigma$  alone and can be determined using mathematics

B) we know that 95 percent of the population falls in this interval

C) by Chebyshev's Rule we know that at least 75 percent of the population must fall in this interval

D) we can use the normal distribution for mean  $\mu$  and standard deviation  $\sigma/100$  to approximate the probability that the mean of a random sample of size 100 falls in this interval.

E) NOT.

30. In a random sample of 10,000 ducks in Duckburg, 7,400 felt Uncle Scrooge McDuck is too stingy with his money. From this data we can conclude that:

A) the true percentage of ducks in Duckburg who feel Uncle Scrooge McDuck is too stingy with his money is about 2.09 percent

B) at the .05 level of significance the fraction of the ducks in Duckburg who feel Uncle Scrooge McDuck is too stingy with his money is not equal to 75 percent

C) at the .01 level of significance the fraction of the ducks in Duckburg who feel Uncle Scrooge McDuck is too stingy with his money is not equal to 75 percent

D) we have insufficient evidence to reject the Hypothesis that the fraction of the ducks in Duckburg who feel Uncle Scrooge McDuck is too stingy with his money is equal to 75 percent, at the .05 level of significance

E) NOT

31. We test the null hypothesis that Atlantic sharks have the SAME mean weight as Pacific sharks. It is assumed that the standard deviation in shark weight is the same for Atlantic sharks as for Pacific sharks, even though that standard deviation in weight is unknown in either population of sharks. A random sample of 9 Atlantic sharks had a mean weight of 548 pounds and a standard deviation of 65 pounds whereas a random sample of 4 Pacific sharks had a mean weight of 497 pounds with a standard deviation of 12 pounds. To three decimal place accuracy, the p-value of this data as evidence against this null hypothesis is:

A) .156 B) .049 C) .078 D) .922 E) NOT.

32. The manufacturer of Vertigo Brand alpine climbing rope asserts that the mean breaking strength of their premium 1/2 inch nylon rope is at least 1880 pounds. A consumer advocacy group, always suspicious of a manufacturer's claims, will take legal action if the evidence contrary to a manufacturer's claims is persuasive. The alternative hypothesis they should work with in their hypothesis testing of mean breaking strength of this rope is:

A) the mean breaking strength of Vertigo Brand premium 1/2 inch nylon rope exceeds 1880 pounds

B) the mean breaking strength of Vertigo Brand premium 1/2 inch rope is less than 1880 pounds

C) the mean breaking strength of Vertigo Brand premium 1/2 inch rope is different than 1880 pounds

D) it is more fun to climb with Vertigo Brand premium 1/2 inch rope

E) NOT.

33. If we are testing the null hypothesis  $H_0$ , at level of significance  $\alpha = .05$ , and the p-value of our data is .35, then:

A) there is a 35 percent probability that  $H_0$  is true

B) we definitely reject  $H_0$

C) our data is very contradictory of  $H_0$

D) there is 35 percent chance that  $H_0$  is false

E) NOT.