

# TMATYC - Statistics Test – 2011

## Instructions for the Answer Sheet

**DO NOT BEGIN UNTIL YOU ARE TOLD TO DO SO**

To the student:

Complete **all** information on answer sheet. Carefully answer the eligibility questions. You will be disqualified if you take an incorrect test. If you are unsure of your eligibility status, ask your test monitor **NOW**, before starting the test. No questions may be asked once the test begins.

You have one hour to take this test. You are allowed to use a non-symbolic calculator (such as the TI-83, TI-84, or TI-86). Calculators that perform symbolic manipulations are **not** allowed (these include the TI-89, TI-92, or TI-Nspire). Blank scratch paper is allowed. **A set of statistical formulas and tables will be provided.** No books, notes, or any other electronic devices are allowed. Please refrain from using any cell phone during the test. Such devices should be muted or put on silent mode.

There are 25 questions on the test. Each question is worth 4 points for a correct answer, but 1 point will be subtracted for each incorrect answer. There is no penalty for unanswered questions.

You are not expected to answer every question in the time allowed. If you are having difficulty with a question, skip it and, if time permits, return to it after you finish the others.

Place the letter for your choice of the correct response on the answer sheet under the column entitled "Student's Response". **Write your letters in block capital form (i.e. write as A B C D E).**

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# TMATYC - Statistics Test – 2011 Answer Sheet

Name: \_\_\_\_\_ School: \_\_\_\_\_

Address: \_\_\_\_\_

Current Math Class: \_\_\_\_\_

Math Teacher: \_\_\_\_\_

	Student's Response	Scorer
1		
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Email: \_\_\_\_\_

Phone: \_\_\_\_\_

**Have you received a two-year or higher college degree? Yes No**

**Have you ever been enrolled in a second semester of college-level statistics?**

**Yes No**

**For Scorer:**

Number Correct = \_\_\_\_\_

Number Incorrect = \_\_\_\_\_

Number Blank = \_\_\_\_\_

Num Correct  $\times$  4 = \_\_\_\_\_

– Num Incorrect = \_\_\_\_\_

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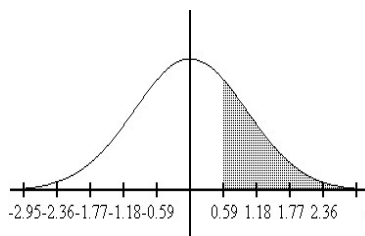
Score on Test = \_\_\_\_\_

TMATYC  
**STATISTICS EXAMS**  
2011

1. Which level of measurement is most appropriate for movie lovers rating movies on a scale from 0 star to 5 stars?

- A. Interval                      B. Nominal                      C. Ratio                      D. Ordinal

2. The graph depicts the standard normal distribution with mean 0 and standard deviation 1. Find the area or the probability of the shaded region.



- A. 0.2190                      B. 0.2224  
C. 0.7224                      D. 0.2776

3. Which of the following is **not** a required condition for a discrete probability function?

- A.  $f(x) \geq 0$  for all  $x$       B.  $f(x) \leq 1$  for all  $x$       C.  $\sum f(x) = 0$               D.  $\sum f(x) = 1$

4. A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. Find  $Q_3$ , the rate which separates the top 25% applicants from the others.

- A. 211.3                      B. 227.7                      C. 233.7                      D. 245.2

5. Delta Airlines quotes a flight time of 2 hours, 5 minutes for its flights from Cincinnati to Tampa. Suppose we believe that actual flight times are uniformly distributed between 2 hours and 2 hours, 20 minutes. What is the probability that the flight will be no more than 5 minutes late?

- A. 0.25                      B. 0.45                      C. 0.50                      D. 0.60

6. Which statement is true about the normal probability distribution?

- A. The mean value of the distribution cannot be negative.  
B. The normal distribution is skewed to the right.  
C. The mean value of the distribution is always zero.  
D. The standard deviation determines how flat and wide the normal curve is.



13. If you pick a card at random from a well shuffled deck, what is the probability that you get a face card or a spade?

- A.  $\frac{3}{52}$       B.  $\frac{11}{26}$       C.  $\frac{1}{2}$       D.  $\frac{25}{52}$

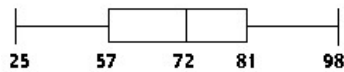
14. Suppose that from a population of 50 bank accounts, we want to take a simple random sample of five accounts in order to learn about the population. How many different random samples of five accounts are possible?

- A. 2,118,760      B. 94,109,400  
C. 254,251,200      D. 312,500,00

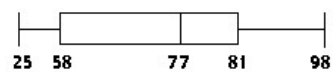
15. The test scores of 40 students are listed below. Construct a boxplot for the data set.

25 35 43 44 47 48 54 55 56 57  
59 62 63 65 66 68 69 69 71 72  
72 73 74 76 77 77 78 79 80 81  
81 82 83 85 89 92 93 94 97 98

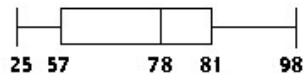
A.



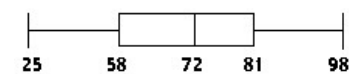
B.



C.



D.



16. When a pair of dice are rolled there are 36 different possible outcomes: 1-1, 1-2, ..., 6-6. If a pair of dice is rolled, what is the probability of getting a sum of 5?

- A.  $\frac{1}{9}$       B.  $\frac{1}{6}$       C.  $\frac{1}{5}$       D.  $\frac{5}{36}$

17. A IRS auditor randomly selects 3 tax returns from 45 returns of which 15 contain errors. What is the probability that she selects none of those containing errors?

- A. 0.0321      B. 0.037      C. 0.2763      D. 0.2861

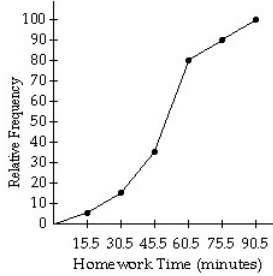
18. Identify the correct statement about the basic properties of probability.

- A. An event that is certain to happen has a probability of 1.  
B. Probabilities are numbers whose values can be any number from -1 to 1.  
C. The total probability assigned to a sample space must be less than 1.  
D. The probability of any single event occurring must be less than 0.

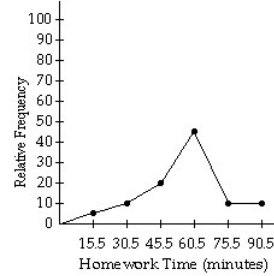
19. The table contains data from a study of daily study time for 40 students from Statistics 101. Construct an ogive from the data.

Minutes on homework	Number of students	Relative frequency	Cumulative frequency
0-15	2	0.05	2
16-30	4	0.10	6
31-45	8	0.20	14
46-60	18	0.45	32
61-75	4	0.10	36
76-90	4	0.10	40

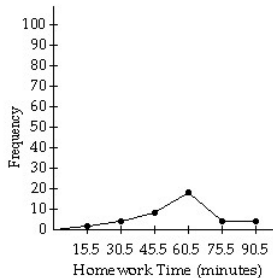
A.



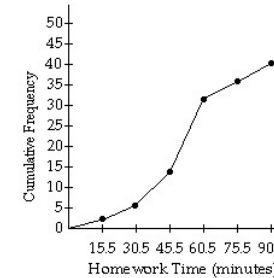
B.



C.



D.



20. Which of the following statements concerning the linear correlation coefficient are true?

- I. A linear correlation coefficient of  $-0.72$  suggests a stronger linear relationship than a linear correlation coefficient of  $-0.68$ .
- II. The value of the linear correlation coefficient is always positive.
- III. If the slope of the regression line is negative, then the linear correlation coefficient is negative.
- IV. If we interchange all of the  $x$ - and  $y$ -values, then the value of  $r$  will change.

- A. I and II      B. I and IV      C. I and III      D. III and IV

21. A factory wants to evaluate how many products are defective each year on average. The company constructs a 95% confidence interval based on a random sample of 10,000 products. The given interval is  $(150, 390)$ . What is the population standard deviation divided by the sample mean (round to the nearest tenth)?

- A. 2.3      B. 22.7  
C. 27.0      D. 30.6

22. The sample data below are the typing speeds (in words per minute) and reading speeds (in words per minute) of nine randomly selected secretaries. Here,  $x$  denotes typing speed, and  $y$  denotes reading speed.

X	60	56	52	63	70	58	44	79	62
Y	370	551	528	348	645	454	503	618	500

Use this data and what you know about linear regression to predict the reading speed of a secretary whose typing speed is known to be 59 words per minute.

- A. 482  
B. 493  
C. 497  
D. 502

23. A box contains 3 red marbles and 6 green marbles. If you draw 2 at random, without replacement (draw the first and hold onto it, then draw the second), what is the probability of getting two red marble?

- A.  $\frac{1}{24}$   
B.  $\frac{1}{12}$   
C.  $\frac{2}{9}$   
D.  $\frac{2}{3}$

24. A machine has 12 identical components which function independently. The probability that a component will fail is 0.2. The machine will stop working if more than three components fail. Find the probability that the machine will be working.

- A. 0.133  
B. 0.206  
C. 0.795  
D. 0.927

25. In a hypothesis test, the claim is  $p = .32$  and the test statistic is  $z = 2.01$ . If the significance level is 5%, which of the following is correct?

- A. p-value of 0.0444 indicates that there is sufficient evidence to warrant rejection of the claim.  
B. p-value of 0.0222 indicates that there is sufficient evidence to warrant rejection of the claim.  
C. p-value of 0.9778 indicates that there is not sufficient evidence to warrant rejection of the claim.  
D. p-value of 0.0444 indicates that there is not sufficient evidence to warrant rejection of the claim.