College of Arts and Sciences

Basic Probability and Statistics

Final Examination – Spring 2012

Course Code: MATH 121 Section:

Instructor: Date: May 31, 2012
(Please circle your instructor's name)

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Student Name:

Student Number: _____

Aids Allowed You can use a calculator, but it cannot be shared.

Instructions:

1. **The exam is double sided.**
2. **There are 2 tables for Normal distribution.**
3. **Formulas and tables are attached to the exam. Do not separate them.**

This examination has a cover page, 10 pages for questions, 2 pages for formula sheets, 2 pages for tables. Total pages is 14 counting double side. Before you start the examination please verify them.

No Questions are allowed during the examination
Student signature: _____ _____

continental United States reported by one long-distance carrier.

Time (in Minutes)	Relative Frequency
0 but less than 5	0.37
5 but less than 10	0.24
10 but less than 15	0.15
15 but less than 20	0.17
20 but less than 25	0.07

a. **(3 points)** If 100 calls were randomly sampled, how many calls lasted under 10 minutes?

b. **(3 points)** If 100 calls were randomly sampled, how many calls lasted 15 minutes or longer?

c. **(3 points)** If 100 calls were randomly sampled, how many of them would have lasted at least 10 minutes but less than 20 minutes

97, 67, 72, 79, 83, 83, 51, 59, 65, 72, 75, 90, 80, 85, 58, 51, 97, 63, 62, 97

a. **(2 points)** Construct the stem-and-leaf display for this data

b. **(2 points)** Compute the median and mode

c. **(4 points)** Compute the range, Q1, Q3 and IQR.

d. **(2 points)** Draw a box plot displaying the five-number summary.

3) Given the following sample of data for the two random variables Demand (**D**) and Sales (**S**)

D	10	15	18	21
S	357	370	395	410

a) **(4 points)** Compute the covariance.

b) **(3 points)** Compute the correlation coefficient.

c) **(2 points)** Describe the relationship between **D** and **S**. Explain.

4) A sample of 300 adults is selected. The contingency table below shows their registration status and their preferred source of information on current events. If an adult is selected at random,

		Preferred source of information			
		Television	Newspapers	Radio	Internet
Voting registration status	Registered	45	30	45	36
	Not registered	35	44	45	20

a. **(3 points)** What is the probability that he/she prefers to get his/her current information from the Internet?

b. **(3 points)** What is the probability that he/she is a registered voter?

c. **(3 points)** What is the probability that he/she is a registered voter and prefers to get his/her current information from the television?

d. **(3 points)** If an adult is selected at random, what is the probability that he/she is a registered voter given that he/she does not prefer to get his/her current information from the Internet?

preferred soda **(S)**. 70% of the patrons are males. 15% of the females **(F)** preferred soda. 80% of the males **(M)** preferred water **(W)** (Hint: you may use decision tree).

a. **(5 points)** Find the probability that a randomly selected patron prefers soda **P(S)**.

b. **(5 points)** Given that we randomly selected patron who prefers water, find the probability that he is a male **P(M/W)**.

6) **(5 points)** A high school debate team of 4 is to be chosen from a class of 20. How many possible ways can the team be formed?

a student guesses on every question, assuming a **binomial** probability distribution model. Given that probability of the event of interest which is getting a right answer is 0.2

a. **(3 points)** Find the probability of getting exactly 3 correct answers in the test.

b. **(4 points)** Find the probability of getting at least 2 correct answers in the test.

c. **(3 points)** Determine the expected number of correct answers and compute the standard deviation.

parameter $\lambda = 1.33$. Let X denotes the number of calls received by the service in a randomly selected hour.

a. **(3 points)** What is the probability that the car towing service will receive exactly 3 calls in an hour?

b. **(3 points)** What is the probability that the car towing service will receive no calls in an hour?

c. **(3 points)** What is the probability that the car towing service will receive fewer than two calls in an hour?

variable with a mean of 15 minutes and a standard deviation of 2 minutes.

a. **(3 points)** What is the probability that a product is assembled in less than 12 minutes?

b. **(3 points)** What is the probability that a product is assembled in between 12 and 16minutes?

c. **(3 points)** Find the assembly time T such that $P(x < T) = 0.45$?

minutes.

a. **(1 points)** Write the probability density function.

b. **(3 points)** Compute the probability that you will wait between 3 and 4.5 minutes.

c. **(3 points)** Compute the probability that you will wait more than 6 minutes

d. **(3 points)** Compute the probability that you will wait exactly 3 minutes.

with a mean of 45 minutes and a standard deviation of 10 minutes. A **random sample of 16** cars is selected.

a. **(3 points)** What would you expect the standard error of the mean to be?

b. **(4 points)** What is the probability that the sample mean is between 45 and 52 minutes?