

# BMCC MAT150.513 Exam 1

March 23, 2010

## Abstract

You will be given all class to complete this test. You are allowed to have one sheet of notes. You may not use any type of calculator, including cell phones, for any reason. Each problem is worth 10 points. Good luck!

## 1 Vocabulary

### 1.1

Match each example in the first column with the appropriate term in the second column which describes it.

- |   |                |
|---|----------------|
| (1.1.1) A collection of data from every member of a population. (You may have received one in the mail recently!)   | (A) Data       |
| (1.1.2) A portion of objects to be studied, but not all of them.  | (B) Statistics |
| (1.1.3) Observations which have been collected.   | (C) Population |
| (1.1.4) The complete collection of objects to be studied.   | (D) Sample     |
| (1.1.5) A collection of methods for planning experiments, obtaining data and organizing, analyzing, interpreting and drawing conclusions based on the data. | (E) Census     |

## 1.2

Match each example in the first column with the appropriate term in the second column which describes it.

- |  |                  |
|--|------------------|
| (1.2.1) All possible outcomes of a given observation are equally likely.   | (A) Center       |
| (1.2.2) Robert Wadlow, the world's tallest man.  | (B) Variation    |
| (1.2.3) Revisions of the estimated average weight of an individual.  | (C) Distribution |
| (1.2.4) The median age of presidential candidates at time of inauguration.   | (D) Outlier      |
| (1.2.5) The average appraised value of an apartment on 103rd street is \$1,000,000 while the average appraised value of a house on 92nd street is \$2,900,000. | (E) Time         |

## 2 Vocabulary

### 2.1

Match each example in the first column with the appropriate term in the second column which helps compute its probability.

- |   |                                   |
|---|-----------------------------------|
| (2.1) The probability a page in a book has color or begins with the sentence “Call me Ishmael.”   | (A) Uniform distribution          |
| (2.2) The probability of landing on “Bankrupt” with a spin of the wheel on the game show <i>Wheel of Fortune</i> .  | (B) Binomial distribution         |
| (2.3) The probability a fortune in a fortune cookie gives a genuine quote from Confucius and the numbers on the fortune win in the state lottery in the next drawing. | (C) Inclusion-exclusion principle |
| (2.4) The probability of having a cookie compared to the probability of not having a cookie.  | (D) Multiplication rule           |
| (2.5) The probability that you share a birthday with someone in at least one of your classes.   | (E) Complement                    |

### 3

The crew of *Family Feud* is spending the day asking 100 people “What ingredient do you normally find in Italian dishes?” At the end of the day they’re hungry for some Italian food and decide to eat before finishing the survey. The response data from the 90 people they interviewed before dinner is recorded below.

	(A)	(B)	(C)	(D)
Tomatoes	35	35	39%	
Pasta	24	59	27%	
Garlic	16	75	—	
Oregano	15	90	17%	

Which column represents

**3.1** a *frequency distribution*?

**3.2** a *cumulative frequency distribution*?

**3.3** a *relative frequency distribution*?

**3.4** Which should be the value for Garlic in column (D)?

(A) 16

(B) 18%

(C) 28%

**3.5** Why is this data ill-suited for drawing conclusions about people who eat Italian dishes?

(A) The sample size is too small.

(B) The crew never finished taking the survey.

(C) It is a voluntary response survey.

(D) Oregano is not normally found in Italian dishes.

## 4

**4.1 Of the following which is the most appropriate center for data with high variation and a skewed distribution?**

- (A) Median
- (B) Mode
- (C) Mean
- (D) Standard Deviation

**4.2 Which measure of variation is represented by the following expression?**

$$\sqrt{\frac{\sum_i (x_i - \bar{x})^2}{n - 1}}$$

- (A) Sample Standard Deviation
- (B) Sample Variance
- (C) Population Standard Deviation
- (D) Population Variance

## 5

For the next two questions, use the following data.

Variable	$\mu$	$\sigma$
Age of hamsters	2 years	1 year
Speed of vehicles on a highway	70 mph	5 mph
Apples in a tree per year	800 apples	100 apples

### 5.1 Which observation has the highest relative score?

- (A) A five-year-old hamster
- (B) A car moving at 50 miles per hour on a highway
- (C) A tree producing 900 apples in a year
- (D) Six hamsters and an apple

### 5.2 *Based on the above data* which of these observations is most unusual?

- (A) A five-year-old hamster
- (B) A car moving at 50 miles per hour on a highway
- (C) A tree producing 900 apples in a year
- (D) Six hamsters and an apple

## 6

**6.1** How many ways can you arrange 5 books on a shelf?

- (A) 5
- (B) 120
- (C) 720
- (D) 5040
- (E) None of these

**6.2** What is  $\frac{1024!}{(512!)^2}$ ?

- (A)  ${}_{512}C_{512}$
- (B)  ${}_{512}C_{1024}$
- (C)  ${}_{1024}C_{512}$
- (D)  ${}_{1024}C_{1024}$
- (E) None of these

**6.3** What is  ${}_{99}C_{42}$ ?

- (A)  $\frac{99!}{57! \cdot 42!}$
- (B)  $\frac{57!}{42! \cdot 99!}$
- (C)  $\frac{42!}{99! \cdot 57!}$
- (D)  $\frac{57! \cdot 42!}{99!}$
- (E) None of these

For the next two questions, use the following portion of Pascal's triangle.

				1						
				1		12				
			1		13		78			
		1		14		91		364		
	1		15		105		455		1365	
1		16		120		560		1820		4386

**6.4** Read  ${}_{15}C_3$  from Pascal's triangle.

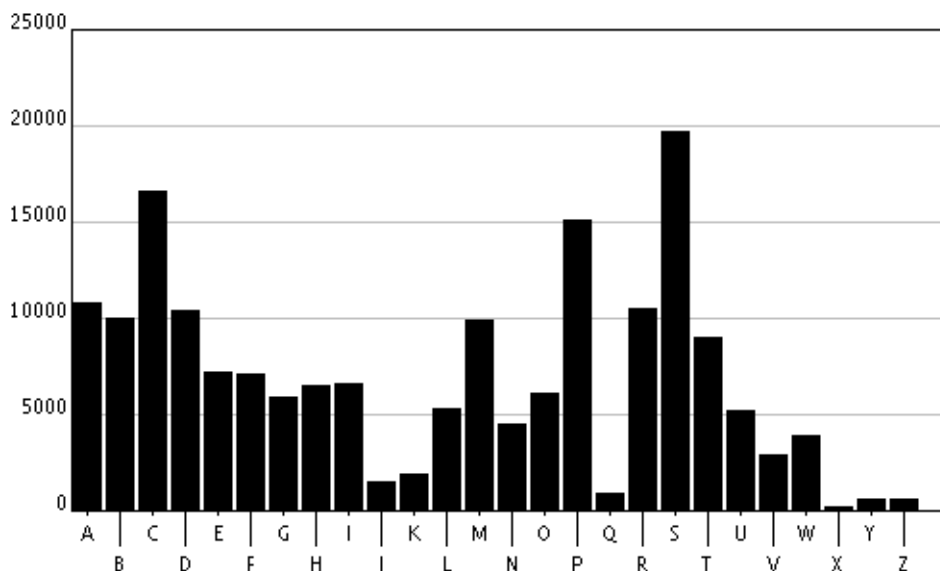
- (A) 17
- (B) 136
- (C) 650
- (D) 680
- (E) None of these

**6.5** Calculate  ${}_{17}C_2$  from Pascal's triangle.

- (A) 16
- (B) 91
- (C) 105
- (D) 455
- (E) None of these



First letter frequency in TWL06



- 7 Interpret this histogram. It counts the number of words that start with the indicated letter in a popular Scrabble dictionary. If you picked a word at random from this dictionary, what letter is it likely to start with?
- 8 Explain why a histogram, when compared with a frequency distribution, is better-suited to identify the distribution of data.
- 9 Would you say that the first letters of words in this dictionary are normally distributed? Why or why not?
- 10 Draw a normal distribution.

# Answer Sheet

1.1.1\_\_\_\_\_ 1.1.2\_\_\_\_\_ 1.1.3\_\_\_\_\_ 1.1.4\_\_\_\_\_ 1.1.5\_\_\_\_\_

1.2.1\_\_\_\_\_ 1.2.2\_\_\_\_\_ 1.2.3\_\_\_\_\_ 1.2.4\_\_\_\_\_ 1.2.5\_\_\_\_\_

2.1\_\_\_\_\_ 2.2\_\_\_\_\_ 2.3\_\_\_\_\_ 2.4\_\_\_\_\_ 2.5\_\_\_\_\_

3.1\_\_\_\_\_ 3.2\_\_\_\_\_ 3.3\_\_\_\_\_ 3.4\_\_\_\_\_ 3.5\_\_\_\_\_

4.1\_\_\_\_\_ 4.2\_\_\_\_\_ 5.1\_\_\_\_\_ 5.2\_\_\_\_\_

6.1\_\_\_\_\_ 6.2\_\_\_\_\_ 6.3\_\_\_\_\_ 6.4\_\_\_\_\_ 6.5\_\_\_\_\_

7\_\_\_\_\_

8 \_\_\_\_\_  
\_\_\_\_\_

9 \_\_\_\_\_  
\_\_\_\_\_

10

