

Camden County College
MTH-111 Final Exam Sample Questions

1. The collection, organization, summarization, and presentation of data is called:

- a. Inferential statistics
- b. A Population
- c. Sampling
- d. Descriptive statistics

For problem #2 and #3 Identify as a) Discrete or b)Continuous

2. Outdoor temperature at a randomly selected time of the day

3. The number of correct answers in a quiz consisting of 10 questions

4. Every seventh customer entering a shopping mall is asked to select his or her favorite store. The sampling technique this researcher is using is:

- a. Random
- b. Systematic
- c. Stratified
- d. Cluster
- e. Convenience

5. News coverage includes exit polls of everyone from each of 80 randomly selected election precincts. The sampling technique used is:

- a. Random
- b. Systematic sampling
- c. Stratified
- d. Cluster
- e. Convenience

6. Classifying each child in a day care center as infant, toddler, or preschool is an example of:

- a. A quantitative variable
- b. A qualitative variable
- c. A discrete variable
- d. A continuous variable

7. For the class 110 – 117 of a given frequency distribution, what is the upper class boundary?

- a. 110
- b. 109.5
- c. 117
- d. 117.5

8. For the classes 27 – 32, 33 – 38, 39 – 44, what is the class width?

- a. 26.5
- b. 44.5
- c. 5
- d. 6

9. A motorist recorded the number of gallons of gasoline he used for 8 weeks. The results are as follows: 11, 11, 11, 10, 9, 11, 9, and 10. The mean number of gallons used would be:

- a. 9.5
- b. 10.25
- c. 11
- d. 10.8

Use the following sample to answer questions 10 and 11:

102, 88, 102, 98, 41, 120

10. The sample mean is

- a. 91.8
- b. 24.6
- c. 102
- d. 100

- 11.** The sample variance is
- a. 27 b. 727.4 c. 24.6 d. none
- 12.** P_{75} is the same as
- a. Q_3 b. D_7 c. The first quartile d. the median
- 13.** If a statement is made that more people are buying red cars than any other color, which measure of central tendency is being used?
- a. Mode b. Population mean c. Median d. Sample mean
- 14.** Generally, if a distribution is negatively skewed (skewed to the left), the mean is:
- a. to the left of the median
b. to the right of the median
c. equal to the median
d. to the right of the mode

Use the following frequency distribution for problems 15 – 17.

Class Boundaries	Midpoint	Frequency	Cum-Freq
16.5 – 23.5	20	8	8
23.5 – 30.5	27	3	11
30.5 – 37.5	34	9	20
37.5 – 44.5	41	7	27
44.5 – 51.5	48	3	30

- 15.** The mean is:
- a. 5.667 b. 32.6 c. 34 d. 33.6
- 16.** The Variance is
- a. 9.45 b. 99.54 c. 89.21 d. 31.27
- 17.** The Standard deviation is
- a. 34.5 b. 9.45 c. 89.21 d. 99.54
- 18.** A sample has a mean of 95 and a standard deviation of 20. According to the empirical rule, about 68% of the data will fall between what values?
- a. 35 and 155 b. 94 and 96 c. 75 and 115 d. 55 and 135
- 19.** In a survey, 42% of Americans said they own an answering machine. If 10 Americans are selected at random, find the probability that exactly 8 own an answering machine.
- a. 0.153 b. 0.015 c. 0.008 d. 0.021

USE THE PROBABILITY DISTRIBUTION BELOW TO ANSWER QUESTIONS 20-23

X	0	1	2	3	4	5
P(X)	0.1	0.2	0.2	0.1	0.3	0.1

- 20.** The probability of exactly 4 is, $P(4)=$
- a. 0.2 b. 0.3 c. 0.4 d. 0.1
- 21.** The probability of at least 3 is, $P(x \geq 3) =$
- a. 0.3 b. 0.4 c. 0.5 d. 1.0
- 22.** The mean μ is
- a. 5.2 b. 1.0 c. 2.0 d. 2.6
- 23.** The standard deviation σ is
- a. 1.56 b. 2.6 c. 1.2 d. 5.2

USE THE FOLLOWING INFORMATION TO ANSWER QUESTIONS 24 – 28

Suppose x is a binomial random variable such that $n = 5$ and $p = 0.4$ then

- 24.** Find $P(x = 4)$
- a. 0.680 b. 0.077 c. 0.770 d. 0.608
- 25.** Find $P(x$ at least 4)
- a. 0.087 b. 0.690 c. 0.618 d. 0.780
- 26.** Find $P(x$ at most 4)
- a. 0.8989 b. 0.7701 c. 0.9726 d. 0.9898
- 27.** Find μ
- a. 2.0 b. 3.0 c. 1.2 d. 0.24
- 28.** Find σ
- a. 1.73 b. 1.10 c. 1.41 d. 0.49

For questions 29 through 36, find the probabilities using the standard normal distribution.

- 29.** $P(z < 1.97)$
- a. 0.9756 b. 0.9292 c. 0.9418 d. 0.8997
- 30.** $P(z > 1.02)$
- a. 0.1539 b. 0.3461 c. 0.1628 d. 0.3508

31. $P(z < -1.43)$

- a. 0.0987 b. 0.0764 c. 0.4236 d. 0.4251

32. $P(-0.87 < z < -0.21)$

- a. 0.2247 b. 0.3078 c. 0.0832 d. 0.2566

33. $P(-0.05 < z < 1.10)$

- a. 0.0199 b. 0.3232 c. 0.3643 d. 0.3843

34. $P(1.32 < z < 1.51)$

- a. 0.0279 b. 0.0296 c. 0.4066 d. 0.4236

35. $P(z > -1.39)$

- a. 0.4177 b. 0.0823 c. 0.4345 d. 0.9177

36. What is the z-score that corresponds to the 85th percentile?

- a. 1.04 b. -1.04 c. 0.1368 d. 0.39

Questions 37 and 38 refer to the following paragraph.

The mean time it takes college freshmen to complete the Mason Basic Reasoning Test is 38.3 minutes. The standard deviation is 3.2 minutes. Assume that the times are normally distributed.

37. Find the probability that it will take a student between 35 and 42 minutes to complete the test.

- a. 0.3485 b. 0.3770 c. 0.285 d. 0.7250

38. Find the probability that it will take a student less than 35 minutes or more than 42 minutes to complete the test.

- a. 0.3485 b. 0.3770 c. 0.7255 d. 0.2750

39. A small publisher wishes to publish self-improvement books. After a survey of the market, the publisher finds that the mean cost of the type of book that she wishes to publish is \$15.00. If she wants to price her books to sell in the middle 34% range, what should the maximum and minimum prices of the books be? The standard deviation is \$0.25 and the self-improvement books are normally distributed.

- a. \$13.80 and \$16.20 b. \$14.05 and \$15.95
c. \$13.91 and \$16.09 d. \$14.89 and \$15.11

40. In order to qualify for letter sorting, applicants are given a speed-reading test. The scores are normally distributed, with a mean of 70 and a standard deviation of 5. If only the top 10% are selected, find the cutoff score.

- a. 70.1 b. 76.4 c. 79.2 d. 79.8

Questions 41 and 42 refer to the following paragraph.

The mean annual salary of a certain group of wage earners in Pennsylvania was \$25,000 in 1992. Assume that salaries were normally distributed and the standard deviation of this group was \$3,000. Assume that the sample was taken from a large population and the correction factor can be ignored.

41. Find the probability that a randomly selected individual earned less than \$27,000.

- a. 0.2514 b. 0.2486 c. 0.7475 d. 0.7888

42. Find the probability that for a randomly selected sample of 10 individuals, the mean salary was less than \$27,000.

- a. 0.0174 b. 0.4826 c. 0.9825 d. 0.9266

43. *Prevention* magazine reports that 20 % of drivers use a car phone while driving. Find the probability that in a random sample of 80 drivers, exactly 16 will use a car phone while driving.

- a. 10.34 % b. 11.09 % c. 13 % d. 5.57 %

Use the following information for problems 44 and 45.

The mean waiting time for a drive-in window at a local bank is 9.2 minutes, with a standard deviation of 2.6 minutes. Assume the waiting times are normally distributed.

44. Find the probability that a customer will have to wait between 5 and 10 minutes.

- a. 0.4474 b. 0.5677 c.) 0.1217 d. 0.3257

45. Find the probability that a customer will have to wait less than 6 minutes or more than 9 minutes.

- a. 0.4226 b. 0.6399 c. -0.3907 d. 0.0319

46. What statistic best estimates the population mean (μ)?

- a. The population standard deviation (σ).
- b. The population variance (s^2).
- c. The sample standard deviation (s).
- d. The sample mean (\bar{x}).

**Use the following information to answer questions 47- 50:
IQs are normally distributed with a mean of 100 and a standard deviation of 15**

- 47.** What is the probability of randomly selecting an IQ of at least 85?
a. 0.1587 b. 85% c. 0.3413 d. 0.8413
- 48.** A job requires an IQ in the top 25%, find the lowest acceptable IQ.
a. 90.75 b. 110.12 c. 125.75 d. 118.02
- 49.** If 10 subjects are randomly selected, what is the probability that their mean IQ is between 110 and 130?
a. 0.5 b. 0.0800 c. 0.2297 d. 0.0175
- 50.** In the above question, the standard error of the mean $\sigma_{\bar{x}}$ is
a. 4.7434 b. 15 c. 0.9487 d. 0.06
- 51.** A study found that the mean time it took a person to find a new job was 2.5 months. If a sample of 50 job seekers was surveyed, find the 80% confidence interval of the mean. σ is known to be 0.3 month.
a. $2.45 < \mu < 2.55$ b. $2.15 < \mu < 2.97$
c. $1.83 < \mu < 3.22$ d. $1.74 < \mu < 3.38$
- 52.** A sample of 25 adult elephants had a mean weight of 9,500 pounds, with a sample standard deviation of 150 pounds. Find the 99% confidence interval of the true population mean. Assume that the weights are normally distributed.
a. $1576.61 < \mu < 1609.39$ b. $9416.09 < \mu < 9583.91$
c. $9314.06 < \mu < 9685.94$ d. $9214.03 < \mu < 9785.97$
- 53.** A survey of 100 recent fatal traffic accidents showed that 60 were alcohol-related. Find the 98% confidence interval of the true proportion of people who die in alcohol-related accidents.
a. $0.434 < p < 0.766$ b. $0.410 < p < 0.790$
c. $0.486 < p < 0.714$ d. $0.505 < p < 0.695$
- 54.** A trial is repeated 2000 times with 300 successes. Use a 95 % degree of confidence and find the margin of error E of the proportion p of successes.
a. 0.156 b. 1.56 c. 0.0156 d. none of the above
- 55.** Evaluate t_c for $\alpha = 0.01$ and a sample of 25 scores.
a. 2.797 b. 2.492 c. 1.711 d. 2.787

56. A travel agent claims that the mean cost of a three-day trip to Atlantic City is \$480. σ is known to be \$30. Fifty people who scheduled the trip paid an average of \$490 for the trip. Test the agent's claim using $\alpha = 0.01$ level of significance.

H_0 :

H_1 :

Critical Value(s):

Test Statistic:

P-value:

Decision:

57. A real estate agent claims that the average price of a condominium in Naples, Florida, is at most \$50,000. The standard deviation is $s = \$8,500$. A sample of 81 condominiums has an average selling price of \$51,500. Use a $\alpha = 0.10$ level of significance to test the claim.

H_0 :

H_1 :

Critical Value(s):

Test Statistic:

P-value:

Decision:

58. A personnel researcher has designed a questionnaire that she believes will take an average time of 35 minutes to complete. Suppose she samples 20 employees and finds that the mean time to take the test is 27 minutes with a standard deviation of 4 minutes. Determine if there is sufficient evidence to conclude that the completion time of the newly designed test differs from its intended duration. Conduct the test at $\alpha = 0.05$ level of significance. Assume that the population from which the sample is drawn is normally distributed.

H_0 :

H_1 :

Critical Value(s):

Test Statistic:

P-value:

Decision:

59. A government watchdog association claims that 70 % of Americans agree that the government is inefficient and wasteful. You work for a government agency and are asked to test this claim. You find that in a random sample of 1165 Americans, 785 agreed with this view. At $\alpha = 0.05$, do you have enough evidence to reject the association's claim?

H_0 :

H_1 :

Critical Value(s):

Test Statistic:

P-value:

Decision:

60. A team of eye surgeons has developed a new technique for a risky eye operation to restore the sight of people blinded from certain disease. Under the old method, it is known that only 30 % of the patients who undergo this operation recover their eyesight. Suppose that surgeons in various hospitals have performed a total of 225 operations using the new method and that 88 have been successful (the patients fully recovered their sight). Can we justify the claim that the new method is better than the old one? (Use a 1% level of significance).

H_0 :

H_1 :

Critical Value(s):

Test Statistic:

P-value:

Decision:

61. The Hill of Tara in Ireland is a place of great archaeological importance. This region has been occupied by people for over 4,000 years. Geomagnetic surveys detect subsurface anomalies in the earth's magnetic field. These surveys have led to many significant archeological discoveries. The following data measure magnetic susceptibility (centimeter-gram-second $\times 10^{-6}$) on two of the main grids on the Hill of Tara

Grid E: X variable

13.20	5.60	19.80	15.05	21.40	17.25	27.45	16.95
23.90	32.40	40.75	5.10	17.75	28.35		

Grid H: Y variable

11.85	15.25	21.30	17.30	27.50	10.35	14.90	48.70	25.40
25.95	57.60	34.35	38.80	41.00	31.25			

Compute a 75% Chebyshev interval around the mean for x-values and also for y-values. Higher numbers indicate higher magnetic susceptibility. However, extreme values could mean an anomaly and possible archeological treasure. Use the intervals to compare the magnetic susceptibility on the two grids.

62. Compute the sample coefficient of variation for each grid in question 61 above. Use the CV's to compare the two grids. The coefficient of variation can be thought of as a measure of the variability per unit of expected signal. A considerable variability in the signal (above or below average) might indicate buried artifacts. Why, in this case, would a large CV be better, or at least more exciting?

63. According to the U.S. Census Bureau, the mean commute time to work for a resident of Boston, MA is 27.3 minutes with a standard deviation of 8.1 minutes. Use Chebychev's Inequality to find the percentage of commuters in Boston having a commute time within 1.5 standard deviations of the mean. What are these commute times?

64. Given the supply of a commodity, x, and the price of a commodity, y, would you expect a positive correlation, a negative correlation, or no correlation?
 a. positive correlation b. negative correlation c. no correlation

65. An agricultural business wants to determine if the rainfall in inches can be used to predict the yield per acre on a wheat farm. What are the explanatory and response variables in this scenario?

66. The data below are the gestation periods, in months, of randomly selected animals and their corresponding life spans, in years. Construct a scatter plot for the data. Determine whether there is a positive linear correlation, a negative linear correlation, or no linear correlation.

Gestation, x	8	2.1	1.3	1	11.5	5.3	3.8	24.3
Life span, y	30	12	6	3	25	12	10	40

67. In order for applicants to work for the foreign-service department, they must take a test in the language of the country where they plan to work. The data below show the relationship between the number of years that applicants have studied a particular language and the grades they received on the proficiency exam. Construct a scatter plot for the data.

Number of years, x	3	4	4	5	3	6	2	7	3
Grades on test, y	61	68	75	82	73	90	58	93	72

68. The data below are the temperatures on randomly chosen days during a summer class and the number of absences on those days. Calculate the correlation coefficient, r.

Temperature, x	77	90	96	95	93	103	80	105	85
Number of absences, y	10	14	17	17	15	22	11	22	12

- a. 0.890 b. 0.980 c. 0.881 d. 0.819

69. In an area of the Midwest, records were kept on the relationship between the rainfall (in inches) and the yield of wheat (bushels per acre). Calculate the correlation coefficient, r.

Rain fall (in inches), x	11.5	9.8	14.4	13.5	19.8	11.3	8	16.6	17
Yield (bushels per acre), y	46.5	42.2	54.8	55	78.4	45.2	27.9	72	74.8

- a. 0.981 b. 0.900 c. 0.899 d. 0.998

70. Which of the following values could not represent a correlation coefficient?

- a. 0 b. 0.927 c. -1 d. 1.032

71. The data below are the gestation periods, in months, of randomly selected animals and their corresponding life spans, in years. Find the equation of the regression line for the given data.

Gestation, x	8	2.1	1.3	1	11.5	5.3	3.8	24.3
Life span, y	30	12	6	3	25	12	10	40

72. The data below are the temperatures on randomly chosen days during a summer class and the number of absences on those days. Find the equation of the regression line for the given data.

Temperature, x	72	85	91	90	88	98	75	100	80
Number of absences, y	3	7	10	10	8	15	4	15	5

- a. $\hat{y} = 0.449x + 30.27$ b. $\hat{y} = 30.27x + 0.449$
c. $\hat{y} = 30.27x - 0.449$ d. $\hat{y} = 0.449x - 30.27$

73. Given the equation of a regression line is $\hat{y} = 2x - 5$, what is the best predicted value for y given $x = 10$? Assume that the variables x and y have a significant correlation.

- a. 15 b. 7 c. 25 d. 48

74. Given the equation of a regression line is $\hat{y} = -1.04x + 50.3$, determine whether there is a positive linear correlation or a negative linear correlation.

- a. positive linear correlation b. negative linear correlation

75. The data below are the number of absences and the final grades of 9 randomly selected students from a statistics class. Construct a scatter plot for the data.

Number of absences, x	0	3	6	4	9	2	15	8	5
Final grade, y	98	86	80	82	71	92	55	76	82

76. A sample of employees of a large pharmaceutical company has been obtained. The length of time (in months) they have worked for the company was recorded for each employee. A stemplot of these data is shown below. Stem: Tens digit, Leaf: Ones digit.

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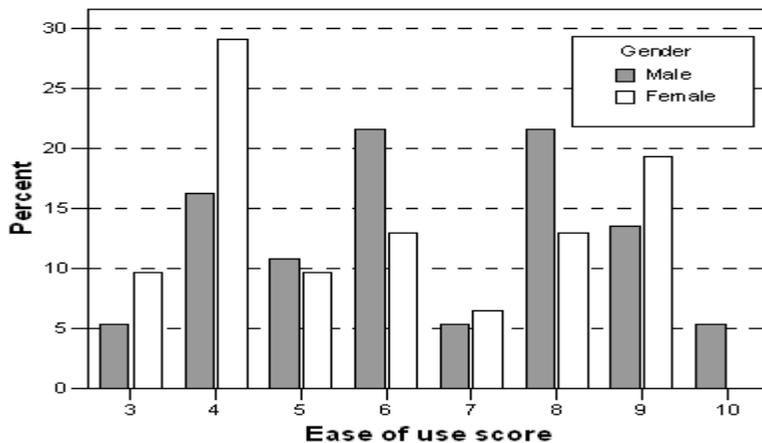
6 | 2 2 3 3 4 5 7 8 9
7 | 0 0 0 2 3 4 4 4 5 6 7 8 8 8 9
8 | 0 0 1 1 2 3 4 4 4 5 7 9 9 9
9 | 0 0 0 1 1 1 2 3 5 8

```

What would be a better way to represent this data set?

- a) Display the data in a time plot.
 b) Display the data in a boxplot.
 c) Split the stems.
 d) Use a histogram with class widths equal to 10.

77. A distributor of appliances is doing a customer satisfaction survey for a manufacturer of DVD players. A sample of 68 clients is asked to rate a particular DVD player on appearance, functionality, ease of use, and price on a 1 to 10 scale, where 1 corresponds to the worst rating and 10 to the best possible rating. A bar graph of the ease of use ratings classified by gender is given below:



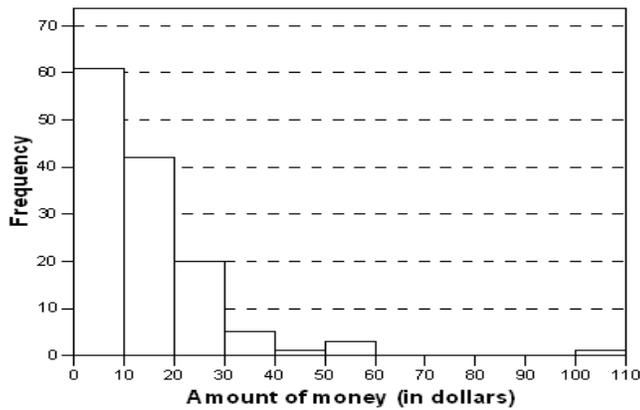
What percentage of the sampled female clients rated the DVD player as not so easy to use (a

rating of 4 or lower)?

- a) 28% b) 29% c) 38% d) 62%

Use the following information to answer questions 78-80.

In a statistics class with 136 students, the professor records how much money each student has in their possession during the first class of the semester. The histogram shown below represents the data he collected:



- 78.** What is approximately the percentage of students with under \$10.00 in their possession?
a) 35% b) 40% c) 45% d) 50%
- 79.** Which of the following description(s) is/are correct regarding the shape of the histogram?
a) Skewed right b) Skewed left c) Symmetric d) An outlier is present
e) Unimodal f) Bimodal
- 80.** What is approximately the number of students with \$30.00 or more in their possession?
a) Less than 5 b) About 10 c) About 30 d) More than 100

Use the following information to answer questions 81-82.

During the early part of the 1994 baseball season, many sports fans and baseball players noticed that the number of home runs being hit seemed to be unusually large. Below are separate stemplots for the number of home runs by American League and National League teams based on the team-by-team statistics on home runs hit through Friday, June 3, 1994 (from the *Columbus Dispatch* sports section, Sunday, June 5, 1994)

<u>American League</u>	<u>National League</u>
2	2 9
3 5	3 1
4 0 3 9	4 2 6 7 8 8
5 1 4 7 8 8	5 3 5 5 5
6 4 8 8	6 3 3 7
7 5 7	7

- 81.** What is the median for the number of home runs for the American League teams?

a) 45

b) 50

c) 50.5

d) 57.5

82. Determine whether each of the following statements is true or false.

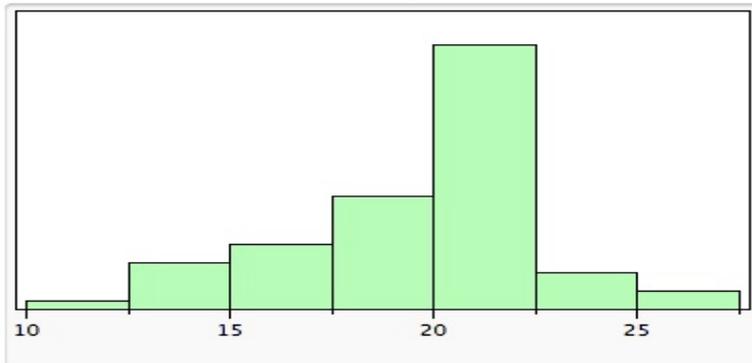
a) The American league plot is reasonably symmetric.

b) The National League plot is bimodal.

c) The median number of home runs hit by National League teams for this time period was higher than the median for the American League teams.

d) The lowest number of home runs hit by *any* team for this time period is 29.

83. In the fuel efficiency study of 2007 compact model automobiles the following histogram of the distribution of the miles per gallon fuel efficiency rating in city driving (MPG-City) for automobiles manufactured in Europe was obtained:



From the histogram above, showing the distribution of MPG-City, we can see that

a) the shape of the distribution is roughly symmetric with one peak.

b) the distribution is skewed left.

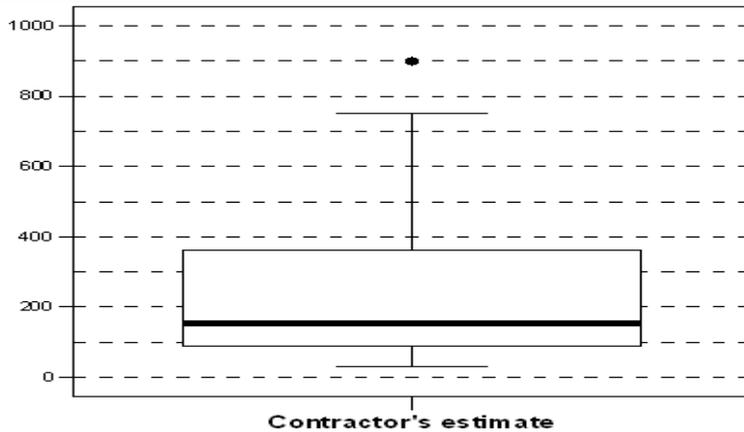
c) the distribution is skewed right.

d) the shape of the distribution is roughly symmetric with outlier values to the left.

e) the shape of the distribution would be easier to see if a stem-and-leaf plot had been constructed instead of the histogram.

Use the following information to answer questions 84-85.

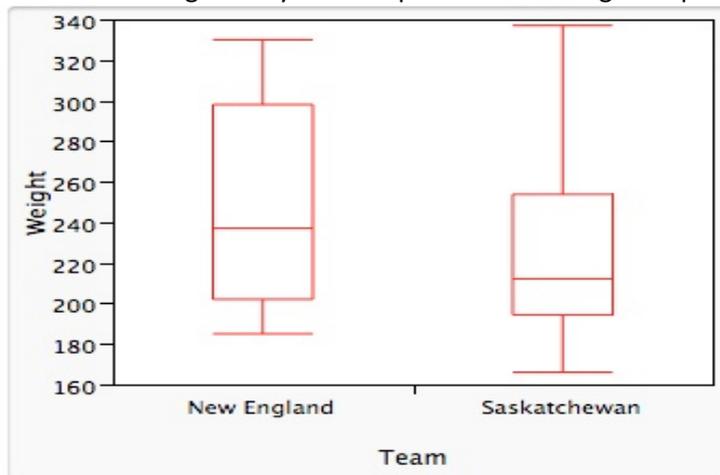
The Michigan Department of Transportation (M-DOT) is working on a major project: 80% of the highways in Michigan need to be repaved. To speed completion of this project, many contractors will be working for M-DOT. Contractors are currently bidding on the next part of the project. To help make a decision about which contractor to hire, M-DOT collects many variables besides just the estimated cost. One of those variables is the contractor's estimate of the number of workdays required to finish the job. Twenty contractors have bid on the next job. The boxplot below represents their estimates of the number of work days required:



84. What is (approximately) the interquartile range, based on the boxplot?
 a) 140 days b) 270 days c) 360 days d) 760 days

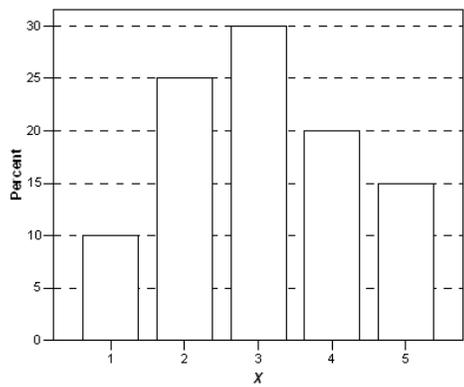
85. Determine whether each of the following statements is true or false.
 a) The median number of days is approximately 180.
 b) The minimum number of days is approximately 40.
 c) The maximum number of days is approximately 750.
 d) Twenty-five percent of contractors estimated the number of days to be more than 100.

86. The New England Patriots are a top ranked team in the National Football League (NFL) and the Saskatchewan Roughriders are the 2007 champions of the Canadian Football League (CFL). From the 2007 rosters of these two teams the weight of the players was determined and the following side-by-side boxplots of their weights is provided below:



Which of the following statements about these side-by-side boxplots is (are) TRUE?
 a) The weights of the New England team exhibited less overall variation than the Saskatchewan team.
 b) The median weight for the New England team is higher than the median weight for the Saskatchewan team..
 c) The *IQR* for the Saskatchewan team is greater than the *IQR* of the New England team.
 d) a and b
 e) b and c

87. Consider the following probability histogram for a discrete random variable X :



This probability histogram corresponds to which of the following distributions for X ?

a)

Value of X	1	2	3	4	5
Probability	0.06	0.25	0.38	0.25	0.06

b)

Value of X	1	2	3	4	5
Probability	0.10	0.25	0.30	0.20	0.15

c)

Value of X	1	2	3	4	5
Probability	0.10	0.25	0.30	0.25	0.10

d) None of the above.

88. It is estimated that chemotherapy is successful 70% of the time in curing a particular type of cancer. Suppose that 4 patients with the given type of cancer are treated and let X be the number of them that are successfully cured.

X	0	1	2	3	4
$P(X = x)$	0.01	0.08	0.27	0.40	0.24

What is the expected value $E(x)$ of the number of patients that will be cured?

- a) 3 b) 2 c) 0.2 d) 2.78 e) 2.5

89. The proportion of students who own a cell phone on college campuses across the country has increased tremendously over the past few years. It is estimated that approximately 93.33% of students now own a cell phone. Fifteen students are to be selected at random from a large university. Assume that the proportion of students who own a cell phone at this university is the same as nationwide. Let X = the number of students in the sample of 15 who own a cell phone.

In simple random samples of 15 students, how many students would you **expect** to own a cell phone?

- a) 9 b) 13 c) 13.5 d) 14

Use the following to answer questions 90–92:

The scores of individual students on the American College Testing (ACT) Program Composite College Entrance Examination have a Normal distribution with mean 18.6 and standard deviation 6.0. At Northside High, 36 seniors take the test. Assume the scores at this school have the same distribution as national scores.

- 90.** What is the mean of the sampling distribution of the sample mean score for a random sample of 36 students?
 a) 1.0 b) 3.1 c) 18.6 d) 6.0
- 91.** What is the standard deviation of the sampling distribution of the sample mean score for a random sample of 36 students?
 a) 1.0 b) 3.1 c) 18.6 d) 6.0
- 92.** What is the sampling distribution of the sample mean score for a random sample of 36 students?
 a) Approximately Normal, but the approximation is poor.
 b) Approximately Normal, and the approximation is good.
 c) Exactly Normal.
 d) Neither Normal nor non-Normal. Its depends on the particular 36 students selected.
- 93.** Chocolate bars produced by a certain machine are labeled 8.0 oz. The distribution of the actual weights of these chocolate bars is claimed to be Normal with a mean of 8.1 oz and a standard deviation of 0.1 oz. A quality control manager initially plans to take a simple random sample of size n from the production line. If he were to double his sample size (to $2n$), by what factor would the standard deviation of the sampling distribution of \bar{X} change?
 a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{2}}$ c) $\sqrt{2}$ d) 2
- 94.** The Information Technology Department at a large university wishes to estimate p = the proportion of students living in the dormitories who own a computer with a 95% confidence interval. What is the minimum required sample size the IT Department should use to estimate the proportion p with a margin of error no larger than 3 percentage points?
 a) 1068 b) 752 c) 1100 d) 33
- 95.** How large a sample n would you need to estimate p with a margin of error 0.01, with 95% confidence? Assume 0.20 is a trusted preliminary estimate of \hat{p} .
 a) $n = 32$ b) $n = 1537$ c) $n = 6147$ d) $n = 9604$

MTH-111 Final Review Answer Key

- 1. d 2. b 3. a 4. b 5. d 6. b 7. d 8. d 9. b 10. a 11. b 12. a**
13. a 14. a 15. b 16. c 17. b 18. c 19. b 20. b 21. c 22. d 23. a
24. b binompdf (5, 0.4, 4) 25. a 1-binomcdf (5, 0.4, 3) 26. d binomcdf (5, 0.4, 4)
27. a 28. b 29. a normalcdf(-E99, 1.97) 30. a normalcdf (1.02, E99)
31. b normalcdf (-E99, -1.43) 32. a normalcdf (-0.87, -0.21)
33. d normalcdf (-0.05, 1.10) 34. a normalcdf (1.32, 1.51)

35. d normalcdf (-1.39, E99) 36. a invnorm (0.85) 37. d normalcdf (35, 42, 38.3, 3.2)
 38. d 1-normalcdf (35, 42, 38.3, 3.2) 39. d 40. b invnorm (0.90, 70, 5)
 41. c normalcdf (-E99, 27000, 25000, 3000) 42. c normalcdf (-E99, 27000, 25000, $\frac{3000}{\sqrt{10}}$)
 43. b binompdf (80, 0.20, 16) 44. b normalcdf (5, 10, 9.2, 2.6)
 45. b 1-normalcdf (6, 9, 9.2, 2.6) 46. d 47. d normalcdf (85, E99, 100, 15)
 48. b invnorm (0.75, 100, 15) 49. d normalcdf (110, 130, 100, $\frac{15}{\sqrt{10}}$) 50. a 51. a
 52. b **STAT > > TESTS 8** 53. c **STAT > > TESTS A** 54. c 55. a

56. **STAT > > TESTS 1**

$H_0 : \mu = 480$ claim

$H_1 : \mu \neq 480$

CV : $z = \pm 2.575$

TS : $z = 2.36$

p -value : 0.0184

Fail to Reject H_0

At the 1% level of significance, there is insufficient evidence to warrant rejection of the travel agent's claim that the mean cost of a three day trip to Atlantic City is \$480.

57. **STAT > > TESTS 1 OR 2** (Large sample, use a z-test or since σ is unknown, use a t-test)

$H_0 : \mu \leq 50,000$ claim

$H_1 : \mu > 50,000$

CV : $z = 1.28$ ($t = 1.292$)

TS : $z = 1.59$ ($t = 1.59$)

p -value : 0.0561 (t -test gives $p = 0.0581$)

Reject H_0

At the 10% level of significance, there is sufficient evidence to warrant rejection of the real estate agent's claim that the average price of a condo in Naples, FL is at most \$50,000.

58. STAT >> TESTS 2

$$H_0 : \mu = 35 \text{ claim}$$

$$H_1 : \mu \neq 35$$

$$CV : t = \pm 2.093$$

$$TS : t = -8.94$$

$$p\text{-value} : 0.0$$

Reject H_0

At the 5% level of significance, there is sufficient evidence to conclude that the average completion time of the newly designed test differs from its intended duration.

59. STAT >> TESTS 5

$$H_0 : p = 0.70 \text{ claim}$$

$$H_1 : p \neq 0.70$$

$$CV : z = \pm 1.96$$

$$TS : z = -1.9499$$

$$p\text{-value} : 0.0512$$

Fail to Reject H_0

At the 5% level of significance, there is insufficient evidence to warrant rejection of the association's claim that 70% of Americans believe that the government is inefficient and wasteful.

60. STAT >> TESTS 5

$$H_0 : p \leq 0.30$$

$$H_1 : p > 0.30 \text{ claim}$$

$$CV : z = 2.33$$

$$TS : z = 2.98$$

$$p\text{-value} : 0.0014$$

Reject H_0

At the 1% level of significance, there is sufficient evidence to support the claim that the new method is better than the old one.

61. $\bar{x} - 2s = 20.35 - 2(9.80) = 0.75$

$$\bar{x} + 2s = 20.35 + 2(9.80) = 39.95$$

For Grid E, at least 75 % of the data fall in the interval 0.75–39.95.

$$\bar{y} - 2s = 28.1 - 2(13.93) = 0.24$$

$$\bar{y} + 2s = 28.1 + 2(13.93) = 55.96$$

For Grid H, at least 75% of the data fall in the interval 0.24–55.96. Grid H shows a wider 75% range of values.

62. Grid E: $CV = \frac{s}{\bar{x}} \cdot 100 = \frac{9.80}{20.35} \cdot 100 \approx 48\%$

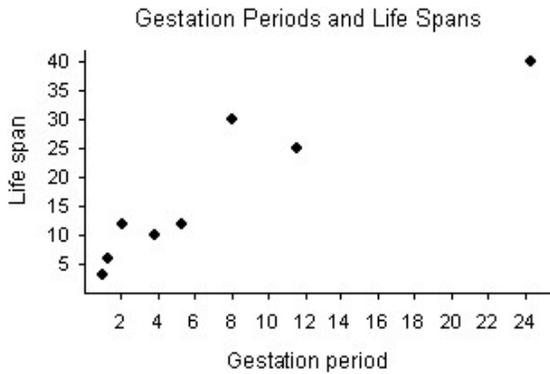
Grid H: $CV = \frac{s}{\bar{y}} \cdot 100 = \frac{13.93}{28.1} \cdot 100 \approx 50\%$

Grid H demonstrates slightly greater variability per expected signal. The CV, together with the Chebychev interval, indicates that Grid H might have more buried artifacts.

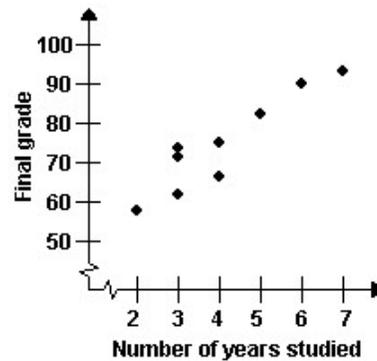
63. Approximately 55.6 % of commuters in Boston have a commute time between 15.15 minutes and 39.45 minutes.

64. b 65. explanatory variable: rainfall in inches; response variable: yield per acre

66.



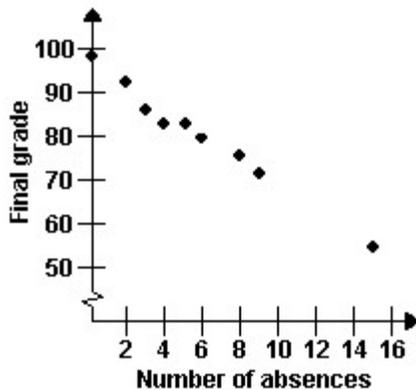
67.



There appears to be a positive linear correlation.

68. b 69. a 70. d 71. $\hat{y} = 1.523x + 6.343$ 72. d 73. a 74. b

75.



76. c

77. c

78. c

79. a, d, & e

80. b

81. d

82. TRUE, FALSE, FALSE, TRUE **83.** b **84.** b **85.** TRUE, TRUE, FALSE, FALSE
86. d **87.** b **88.** d **89.** d **90.** c **91.** a
92. c **93.** b **94.** a **95.** c