

**Final Exam Review**

Date: \_\_\_\_\_ Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

Solve the following problems.

Use a calculator with a  $[y^x]$  key or a  $[^]$  key to solve the problem.

- 1) Research suggests that the probability of a certain fuse malfunctioning increases exponentially as the concentration of an impurity in the fuse increases. The probability is modeled by the function  $y = 7(257,998)^x$ , where  $x$  is the impurity concentration, and  $y$ , given as a percent, is the probability of the fuse malfunctioning. Find the probability of the fuse malfunctioning for an impurity concentration of 0.13. Round to the nearest percent. 1) \_\_\_\_\_

Write the decimal as a percent.

- 2) 0.686 2) \_\_\_\_\_

Solve the problem.

- 3) What percent of 120 is 45.6? 3) \_\_\_\_\_

Use the table to calculate the tax owed. Round to the nearest cent.

| Table 8.1 2012 Marginal Tax Rates, Standard Deductions, and Exemptions |                        |                           |                        |                        |
|--|------------------------|---------------------------|------------------------|------------------------|
| Tax Rate   | Single                 | Married Filing Separately | Married Filing Jointly | Head of Household      |
| 10%  | up to \$8700           | up to \$8700              | up to \$17,400         | up to \$12,400         |
| 15%  | \$8701 to \$35,350     | \$8701 to \$35,350        | \$17,401 to \$70,700   | \$12,401 to \$47,350   |
| 25%  | \$35,351 to \$85,650   | \$35,351 to \$71,350      | \$70,701 to \$142,700  | \$47,351 to \$122,300  |
| 28%  | \$85,651 to \$178,650  | \$71,351 to \$108,725     | \$142,701 to \$217,450 | \$122,301 to \$198,050 |
| 33%  | \$178,651 to \$388,350 | \$108,726 to \$194,175    | \$217,451 to \$388,350 | \$198,051 to \$388,350 |
| 35%  | more than \$388,350    | more than \$194,175       | more than \$388,350    | more than \$388,350    |
| Standard Deduction   | \$5950                 | \$5950                    | \$11,900               | \$8700                 |
| Exemptions (per person)  | \$3800                 | \$3800                    | \$3800                 | \$3800                 |

- 4) a married woman filing separately with a taxable income of \$113,000 4) \_\_\_\_\_

- 5) Single female, no dependents 5) \_\_\_\_\_  
 Gross income: \$35,000  
 Adjustments: \$3000  
 Deductions:  
     \$2000 charitable contributions  
     \$2500 student loan interest  
 Tax credit: none

The principal  $P$  is borrowed at simple interest rate  $r$  for a period of time  $t$ . Find the simple interest owed for the use of the money. Assume 360 days in a year and round answer to the nearest cent.

- 6)  $P = \$900.00$  6) \_\_\_\_\_  
 $r = 7\%$   
 $t = 3$  months

The principal  $P$  is borrowed at simple interest rate  $r$  for a period of time  $t$ . Find the loan's future value,  $A$ , or the total amount due at time  $t$ . Round answer to the nearest cent.

7)  $P = \$190$ ,  $r = 6\%$ ,  $t = 4$  years 7) \_\_\_\_\_

The principal represents an amount of money deposited in a savings account subject to compound interest at the given rate. Find how much money will be in the account after the given number of years (Assume 360 days in a year.), and how much interest was earned.

8) Principal: \$5000 8) \_\_\_\_\_  
Rate: 7%  
Compounded: semiannually  
Time: 5 years

**Solve the problem.**

9) A mother invests \$6000 in a bank account at the time of her daughter's birth. The interest is compounded quarterly at a rate of 8%. What will be the value of the daughter's account on her twentieth birthday, assuming no other deposits or withdrawals are made during this period? 9) \_\_\_\_\_

**Solve the problem.**

10) How much money should be deposited today in an account that earns 10% compounded quarterly so that it will accumulate to \$3200 in 3 years? 10) \_\_\_\_\_

**Solve the problem. Round to the nearest tenth of a percent.**

11) A passbook savings account has a rate of 6.3%. Find the effective annual yield if the interest is compounded semiannually. 11) \_\_\_\_\_

**Find the value of the annuity and the interest. Round to the nearest dollar.**

12) Periodic Deposit: \$900 at the end of every six months 12) \_\_\_\_\_  
Rate: 4.5% compounded semiannually  
Time: 8 years

**Solve the problem. Round to the nearest dollar.**

13) Suppose that you earned a bachelor's degree and now you're teaching middle school. The school district offers teachers the opportunity to take a year off to earn a master's degree. To achieve this goal, you deposit \$1500 at the end of every three months in an annuity that pays 5.5% compounded quarterly. How much will you have saved at the end of 6 years? Find the interest. 13) \_\_\_\_\_

**Solve the problem. Round up to the nearest dollar.**

14) You would like to have \$61,000 in 5 years for the down payment on a new house following college graduation by making deposits at the end of every three months in an annuity that pays 4.25% compounded quarterly. How much should you deposit at the end of every three months? How much of the \$61,000 comes from deposits and how much comes from interest? 14) \_\_\_\_\_

**Round to the nearest dollar.**

- 15) Suppose that you borrow \$20,000 for four years at 8% toward the purchase of a car. Find the monthly payments and the total interest for the loan. 15) \_\_\_\_\_

**Round all computations to the nearest dollar.**

- 16) Suppose that you drive 40,000 miles per year and gas averages \$4 per gallon. 16) \_\_\_\_\_  
(i) What will you save in annual fuel expenses by owning a hybrid car averaging 40 miles per gallon rather than an SUV averaging 16 miles per gallon?  
(ii) If you deposit your monthly fuel savings at the end of each month into an annuity that pays 5.4% compounded monthly, how much will you have saved at the end of seven years?

**Determine the regular payment amount, rounded to the nearest dollar.**

- 17) The price of a home is \$220,000. The bank requires a 20% down payment. After the down payment, the balance is financed with a 20-year fixed-rate mortgage at 8%. Determine the monthly mortgage payment (excluding escrowed taxes and insurance) to the nearest dollar. 17) \_\_\_\_\_

**Use the following advice from most financial advisors to solve the problem.**

- Spend no more than 28% of your gross monthly income for your mortgage payment.
- Spend no more than 36% of your gross monthly income for your total monthly debt.

**Round all calculations to the nearest dollar, if necessary.**

- 18) Suppose that your gross annual income is \$108,000. 18) \_\_\_\_\_  
(a) What is the maximum amount you should spend each month on a mortgage payment?  
(b) What is the maximum amount you should spend each month for total credit obligations?  
(c) If your monthly mortgage payment is 70% of the maximum amount you can afford, what is the maximum amount you should spend each month for all other debt?

**Determine whether the statement is true or false.**

- 19) Renting a home is generally less costly than buying when staying in it for more than three years. 19) \_\_\_\_\_

**Solve the problem.**

- 20) A credit card has a monthly rate of 1.74% and uses the average daily balance method for calculating interest. Here are some of the details in the June 1–June 30 itemized billing: 20) \_\_\_\_\_
- June 1 Unpaid Balance: \$451.91
  - Payment Received June 8: \$135
  - Purchases Charged to the Account: \$257.52
  - Average Daily Balance: \$348.41
  - Last Day of the Billing Period: June 30
  - Payment Due Date: July 9

- a. Find the interest due on the payment due date.
- b. Find the total balance owed on the last day of the billing period.
- c. Minimum payment terms are shown below. What is the minimum payment due by July 9?

| New Balance          | Minimum Payment     |
|----------------------|---------------------|
| \$0.01 to \$10.00    | No payment due      |
| \$10.01 to \$200.00  | \$10.00             |
| \$200.01 to \$250.00 | \$15.00             |
| \$250.01 to \$300.00 | \$20.00             |
| \$300.01 to \$350.00 | \$25.00             |
| \$350.01 to \$400.00 | \$30.00             |
| \$400.01 to \$450.00 | \$35.00             |
| \$450.01 to \$500.00 | \$40.00             |
| Over \$500.00        | 1/10 of New Balance |

**Solve the problem by applying the Fundamental Counting Principle with two groups of items.**

- 21) License plates in a particular state display 3 letters followed by 3 numbers. How many different license plates can be manufactured? (Repetitions are allowed.) 21) \_\_\_\_\_

**Use the formula for  ${}_nP_r$  to evaluate the expression.**

- 22)  $8P_3$  22) \_\_\_\_\_

**Use the formula for  ${}_nP_r$  to solve.**

- 23) In a contest in which 7 contestants are entered, in how many ways can the 4 distinct prizes be awarded? 23) \_\_\_\_\_

**Use the formula for  ${}_nC_r$  to evaluate the expression.**

- 24)  $10C_1$  24) \_\_\_\_\_

**Solve the problem.**

- 25) To win at LOTTO in a certain state, one must correctly select 6 numbers from a collection of 51 numbers (one through 51). The order in which the selections is made does not matter. How many different selections are possible? 25) \_\_\_\_\_

**Use the theoretical probability formula to solve the problem. Express the probability as a fraction reduced to lowest terms.**

- 26) A die is rolled. The set of equally likely outcomes is {1, 2, 3, 4, 5, 6}. Find the probability of getting a 9. 26) \_\_\_\_\_

**Use the empirical probability formula to solve the exercise. Express the answer as a fraction. Then express the probability as a decimal, rounded to the nearest thousandth, if necessary.**

- 27) In 1999 the stock market took big swings up and down. A survey of 997 adult investors asked how often they tracked their portfolio. The table shows the investor responses. What is the probability that an adult investor tracks his or her portfolio daily? 27) \_\_\_\_\_

| How frequently?     | Response |
|---------------------|----------|
| Daily               | 228      |
| Weekly              | 290      |
| Monthly             | 280      |
| Couple times a year | 136      |
| Don't track         | 63       |

**Solve the problem.**

- 28) Amy, Jean, Keith, Tom, Susan, and Dave have all been invited to a birthday party. They arrive randomly and each person arrives at a different time. In how many ways can they arrive? In how many ways can Jean arrive first and Keith last? Find the probability that Jean will arrive first and Keith will arrive last. 28) \_\_\_\_\_

- 29) A group consists of 6 men and 5 women. Three people are selected to attend a conference. In how many ways can 3 people be selected from this group of 11? In how many ways can 3 men be selected from the 6 men? Find the probability that the selected group will consist of all men. 29) \_\_\_\_\_

**You are dealt one card from a 52-card deck. Find the probability that you are not dealt:**

- 30) a spade. 30) \_\_\_\_\_

**You randomly select one card from a 52-card deck. Find the probability of selecting:**

- 31) an ace or a 6? 31) \_\_\_\_\_

**You are dealt one card from a 52-card deck. Find the probability that you are dealt:**

- 32) a numbered card or a diamond 32) \_\_\_\_\_

**A single die is rolled. Find the odds:**

- 33) in favor of getting a number less than 3. 33) \_\_\_\_\_

**Solve the problem involving probabilities with independent events.**

- 34) A single die is rolled twice. Find the probability of getting a 6 the first time and a 6 the second time. 34) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Solve the problem.**

35) Numbered disks are placed in a box and one disk is selected at random. If there are 7 red disks numbered 1 through 7, and 4 yellow disks numbered 8 through 11, find the probability of selecting a disk numbered 3, given that a red disk is selected. 35) \_\_\_\_\_

- A)  $\frac{1}{11}$                       B)  $\frac{4}{11}$                       C)  $\frac{1}{7}$                       D)  $\frac{7}{11}$

36) The table shows the number of minority officers in the U.S. military. 36) \_\_\_\_\_

|                    | Army | Navy | Marines | Air Force |
|--------------------|------|------|---------|-----------|
| African Americans  | 9162 | 3524 | 1341    | 4282      |
| Hispanic Americans | 2105 | 2732 | 914     | 1518      |
| Other Minorities   | 4075 | 2653 | 599     | 3823      |

Assume that one person will be randomly selected from the group described in the table. Find the probability of selecting an officer who is in the Navy, given that the officer is African American.

- A)  $\frac{3524}{8909}$                       B)  $\frac{8909}{18,309}$                       C)  $\frac{3542}{14785}$                       D)  $\frac{3524}{18,309}$

**Solve the following problems.**

**A spinner has a pointer which can land on one of three regions labelled 1, 2, and 3 respectively.**

37) Compute the expected value for the number on which the pointer lands if the probabilities for the three regions are  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{4}$  respectively. 37) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Solve the problem that involves computing expected values in a game of chance.**

38) A game is played using one die. If the die is rolled and shows a 6, the player wins \$8. If the die shows any number other than 6, the player wins nothing. If there is a charge of \$1 to play the game, what is the game's expected value? 38) \_\_\_\_\_

- A) -\$0.33                      B) \$0.33                      C) \$7.00                      D) -\$1

39) One option in a roulette game is to bet on red. (There are 18 red compartments, 18 black compartments, and two compartments that are neither red nor black.) If the ball lands on red, you get to keep the \$1 that you paid to play the game and you are awarded \$1. If the ball lands elsewhere, you are awarded nothing and the \$1 that you bet is collected. Find the expected value for playing roulette if you bet \$1 on red. 39) \_\_\_\_\_

- A) -\$0.03                      B) -\$0.05                      C) \$0.03                      D) \$0.05

**Solve the problem.**

- 40) The government of a town needs to determine if the city's residents will support the construction of a new town hall. The government decides to conduct a survey of a sample of the city's residents. Which one of the following procedures would be most appropriate for obtaining a sample of the town's residents? 40) \_\_\_\_\_
- A) Survey a random sample of persons within each geographic region of the city.
  - B) Survey the first 500 people listed in the town's telephone directory.
  - C) Survey a random sample of employees at the old city hall.
  - D) Survey every 14th person who walks into city hall on a given day.

**Solve the following problems.**

- 41) The ages of 30 swimmers who participated in a swim meet are as follows: 41) \_\_\_\_\_
- 24, 42, 36, 39, 46, 24, 56, 65, 25, 49, 57, 25, 32, 34, 47, 26, 35, 26, 64, 55, 30, 43, 52, 59, 39, 28, 28, 47, 36, 55
- Construct a grouped frequency distribution for the data. Use the classes 24 - 33, 34 - 43, 44 - 53, 54 - 63, 64 - 73.

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Find the mean for the group of data items. Round to the nearest hundredth, if necessary.**

- 42) 2, 8.3, 1.1, 4, 2, 7.6, 2, 3.2, 3.2, 1.7 42) \_\_\_\_\_
- A) 3.11                      B) 3.51                      C) 3.9                      D) 3.19

**Find the median for the group of data items.**

- 43) 97, 97, 91, 40, 80, 97 43) \_\_\_\_\_
- A) 40                      B) 97                      C) 94                      D) 91

**Compute the mean, range, and standard deviation for the data items in each of the three samples. Then name one way in which the samples are alike and one way in which they are different.**

- 44) Sample A: 11, 13, 15, 17, 19, 21, 23 44) \_\_\_\_\_  
Sample B: 11, 14, 14, 17, 20, 20, 23  
Sample C: 11, 11, 11, 17, 23, 23, 23
- A) Mean (for A, B and C): 17 Range (for A, B, and C): 12 Standard deviation: (A) 4.32 (B) 4.24 (C) 6. Samples have the same mean but different standard deviations.
  - B) Mean (A) 16 (B) 17 (C) 18. Range (for A, B, and C): 12 Standard deviation: (A) 6 (B) 6 (C) 6. Samples have the same standard deviation but different means.
  - C) Mean (for A, B and C): 17 Range (for A, B, and C): 12 Standard deviation: (A) 7 (B) 4.24 (C) 6. Samples have the same mean but different standard deviations.
  - D) Mean (A) 13 (B) 14 (C) 15. Range (for A, B, and C): 12 Standard deviation: (A) 6 (B) 6 (C) 6. Samples have the same standard deviation but different means.

**Provide an appropriate response.**

- 45) If an adult male is told that his height is within 2 standard deviations of the mean of the normal distribution of heights of adult males, what can he assume? 45) \_\_\_\_\_
- A) His height measurement is in the same range as about 95% of the other adult males whose heights were measured.
  - B) His height measurement is in the same range as about 99.7% of the other adult males whose heights were measured.
  - C) He is taller than about 95% of the other men whose heights were measured.
  - D) He is taller than about 99.7% of the other men whose heights were measured.

**A set of data items is normally distributed with a mean of 60. Convert the data item to a z -score, if the standard deviation is as given.**

- 46) data item: 100; standard deviation: 10 46) \_\_\_\_\_
- A)  $\frac{3}{2}$
  - B) 40
  - C) 4
  - D) 10

**Solve the problem.**

- 47) A survey was conducted of 383 teenagers. Thirty-five percent of the teenagers said they occasionally smoked cigarettes. a. Find the margin of error for this survey. b. Write a statement about the percentage of teenagers who occasionally smoke cigarettes. 47) \_\_\_\_\_
- A) a.  $\pm 5.1\%$  b. There is a 95% probability that the true population percentage lies between 24.9% and 35.1%.
  - B) a.  $\pm 5.1\%$  b. There is a 95% probability that the true population percentage lies between 29.9% and 40.1%.
  - C) a.  $\pm 19.57\%$  b. There is a 95% probability that the true population percentage lies between 29.9% and 40.1%.
  - D) a.  $\pm 5.1\%$  b. There is a 99% probability that the true population percentage lies between 29.9% and 40.1%.

**Use a table of z-scores and percentiles to find the percentage of data items in a normal distribution that lie between:**

- 48)  $z = 0.1$  and  $z = 1.4$  48) \_\_\_\_\_
- A) 53.98%
  - B) 46.02%
  - C) 37.94%
  - D) 91.92%

**Test scores are normally distributed with a mean of 500. Convert the given score to a z -score, using the given standard deviation. Then find the percentage of students who score:**

- 49) below 620 if the standard deviation is 80. 49) \_\_\_\_\_
- A) 56.68%
  - B) 80%
  - C) 6.68%
  - D) 93.32%

**Solve the problem.**

- 50) Use the following data to a. determine the coefficient of correlation, rounded to the nearest thousandth, b. find the equation of the regression line for time watching TV and time on the Internet, c. approximate how much time on the Internet can we predict for a person who spends 10 hours weekly watching TV. 50) \_\_\_\_\_

| Subject          | A  | B | C | D  | E  | F | G  |
|------------------|----|---|---|----|----|---|----|
| Time watching TV | 7  | 3 | 1 | 6  | 6  | 4 | 5  |
| Time on Internet | 11 | 9 | 5 | 14 | 15 | 6 | 15 |

- A) a.  $r = 0.752$  b.  $y = 1.52x + 3.77$  c. 19 hours
- B) a.  $r = -0.752$  b.  $y = -1.52x + 3.77$  c. 11.4 hours
- C) a.  $r = 0.752$  b.  $y = 1.52x - 3.77$  c. 11.4 hours
- D) a.  $r = -0.752$  b.  $y = 3.77x + 1.52$  c. 39.2 hours



51) The data show the number of felony convictions, in hundreds, and the crime rate, in crimes per 100,000, for seven randomly selected states. For the given data, (a) determine the correlation coefficient between the number of felony convictions and the crime rate, (b) find the equation of the regression line, (c) approximate what crime rate can we anticipate in a state that has 12 hundred felony convictions.

51) \_\_\_\_\_

|                     |      |      |      |      |     |     |     |
|---------------------|------|------|------|------|-----|-----|-----|
| Felony convictions  | 14.6 | 11.3 | 9.9  | 6.6  | 5.6 | 5.5 | 3.6 |
| Crime rate /100,000 | 14.8 | 12.3 | 13.2 | 11.8 | 7   | 8.3 | 6.1 |

A) a.  $r = -0.906$  b.  $y = -0.777x + 4.16$  c. 5.2

B) a.  $r = -0.906$  b.  $y = 0.777x - 4.16$  c. 5.2

C) a.  $r = 0.906$  b.  $y = 0.777x + 4.16$  c. 13.5

D) a.  $r = 0.906$  b.  $y = 4.16x + 0.777$  c. 50.7

## Answer Key

Testname: MAT142FINALEXAMREVIEW

- 1) 35%
- 2) 68.6%
- 3) 38%
- 4) \$25,743.25
- 5) \$2902.50
- 6) \$15.75
- 7) \$235.60
- 8) amount in account: \$7052.99; interest earned: \$2052.99
- 9) \$29,252.63
- 10) \$2379.38
- 11) 6.4%
- 12) \$17,105; \$2705
- 13) \$42,310; \$6310
- 14) \$2754; \$55,080 from deposits and \$5920 from interest
- 15) \$488; \$3424
- 16) (i) \$6000;  
(ii) \$50,903
- 17) \$1472
- 18) (a) \$2520; (b) \$3240; (c) \$1476
- 19) False
- 20) a. \$6.06  
b. \$580.49  
c. \$58.05
- 21) 17,576,000
- 22) 336
- 23) 840
- 24) 10
- 25) 18,009,460
- 26) 0
- 27)  $\frac{228}{997}$ ; 0.229
- 28) 720; 24;  $\frac{1}{30}$
- 29) 165; 20;  $\frac{4}{33}$
- 30)  $\frac{3}{4}$
- 31)  $\frac{2}{13}$
- 32)  $\frac{10}{13}$
- 33) 1:2
- 34)  $\frac{1}{36}$
- 35) C
- 36) D
- 37)  $\frac{7}{4}$

## Answer Key

Testname: MAT142FINALEXAMREVIEW

38) B

39) B

40) A

|     | Age     | Number of Swimmers |
|-----|---------|--------------------|
|     | 24 - 33 | 10                 |
| 41) | 34 - 43 | 8                  |
|     | 44 - 53 | 5                  |
|     | 54 - 63 | 5                  |
|     | 64 - 73 | 2                  |

42) B

43) C

44) A

45) A

46) C

47) B

48) C

49) D

50) A

51) C