

**UMUC**  
**Math 103**  
**Final Exam – Practice**

- You have two and a half hours to complete this exam.
- The examination has 20 questions. (There are 5 more here for extra practice.)
- This is a closed book, closed notes examination.
- You may use a calculator on the examination.
- A formula sheet and a statistical table are available from your instructor should you not have your copy with you.

- 1) Solve:  $2(2x - 4) = 9 - 2(x + 1)$
- 2) A 30-year-old worker plans to retire at age 65. He believes that \$500,000 is needed to retire comfortably. How much should be deposited now at 3.5% compounded monthly to meet the \$500,000 retirement goal?
- 3) A muffin recipe calls for  $\frac{3}{4}$  cups sugar for 3 dozen muffins. How much sugar will you use to make 8 dozen?
- 4) Weights of the Pacific yellowfin tuna follow a normal distribution with mean 68 pounds and standard deviation 12 pounds.
  - a. What percent of the tuna have a weight of more than 89 pounds?
  - b. What percent of the tuna have a weight of between 53 and 74 pounds?
- 5) The function  $C(x) = .76x + 171.4$  models the cholesterol level of a person, as a function of his age  $x$ , in years.
  - a) Compute  $C(20)$
  - b) Interpret the answer.
- 6) Given the equation of a line  $4x - 2y = 8$ 
  - a) Find the x-intercept.
  - b) Find the y-intercept.
  - c) Find the slope.
  - d) Graph the line.
- 7) A car can be rented from Continental Rental for \$80 per week plus 25 cents for each mile driven. How many miles can you travel if you can spend at most \$400 for the week?

- 8) You are taking a multiple choice test that has 5 questions. Each of the questions has three answer choices, with one correct answer per question. If you select one of these three choices for each question and leave nothing blank, in how many ways can you answer the questions?
- 9) A farmer wants to find out about the relationship between the amount of rain in March and crop yield in June.

March Rainfall in inches $x$	3	7	2	6	5
Crop yield in bushels per acre $y$	5	12	4	10	6

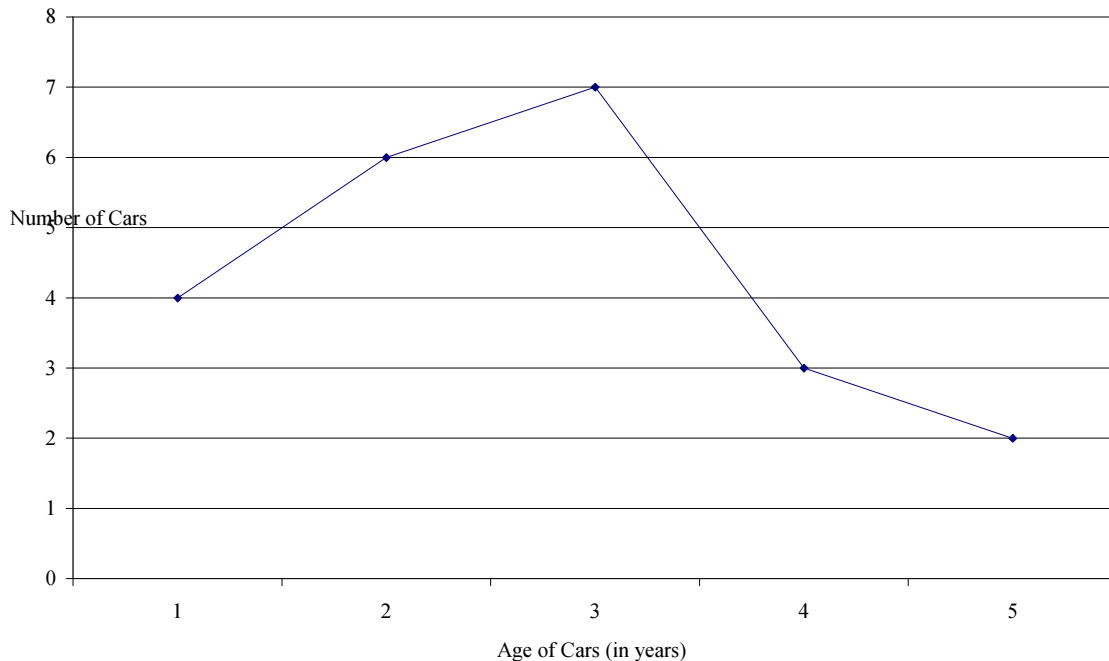
- a) Set up a scatter diagram for the data.
- b) Does there appear to be a positive linear correlation, negative linear correlation, or no linear correlation?
- 10) Solve:  $3x^2 + 5x - 7 = 0$
- 11) A baseball franchise is owned by three people. The first owns  $\frac{5}{12}$  of the franchise. The second owns  $\frac{1}{3}$ . What fraction of the franchise is owned by the third person?
- 12) Given the function  $f(x) = x^2 + 2x - 3$
- a) Find the vertex.
- b) Find the  $x$ -intercepts.
- c) Find the  $y$ -intercept.
- d) Graph the function.
- 13) A class is collecting data on eye color and gender. They organize the data they collected into the table below. Numbers in the table represent the number of students from the class that belong to each of the categories.

	Brown	Blue	Green
Male	22	18	10
Female	18	20	12

Find the probability that a randomly selected student from this class

- a) Does not have brown eyes.
- b) Has brown eyes or blue eyes.
- c) Is female or has green eyes.
- d) Is male, given the student has blue eyes.
- e) Is female and has green eyes.

- 14) The population  $P$  of bass in a lake is predicted by the function  $P(t) = \frac{3600}{1 + 7e^{-0.05t}}$  where  $t$  is time in months since the lake was initially stocked. Evaluate  $P(12)$  and explain what this means.
- 15) At age 25 you decide to put aside \$80 each month into a retirement annuity that pays 2.5% compounded monthly.
- How much will you have saved after 40 years?
  - Find the interest.
- 16) The price of a home is \$180,000. The bank requires a 20% down payment for a 15-year mortgage at 4%.
- Find the monthly payment.
  - Find the total interest paid.
- 17) Two McDonald's Quarter Pounders and three Burger King Whoppers with cheese contain 520 milligrams of cholesterol. Three Quarter Pounders and one Whopper with cheese contain 353 milligrams of cholesterol. Determine the cholesterol content in each item.
- 18) There are 22 cars in the parking lot. Robert wants to find some statistical data concerning these cars and finds out how old these cars are. The results can be read from the following frequency polygon.



- Find the modal car age
- Find the median car age
- Find the mean age of the cars
- Find the standard deviation of the ages of the cars

- 19) The names of 10 men and 7 women are entered in a sweepstakes drawing. Two names are drawn at random in succession. What is the probability that
- the first name is a man's and the second is a woman's?
  - both names are women's?
- 20) The function  $f(x) = 110.5 \cdot (1.13)^x$  can be used to model the number of cell phone subscribers in the United States from 2000 through 2007, where  $f(x)$  represents the number of cell phone subscribers in millions,  $x$  years after 2000. Evaluate and interpret  $f(4)$ .
- 21) Solve:  $5x^2 + 3x - 2 = 0$
- 22) If \$10,500 is borrowed and \$12,000 must be paid back after three years, what is the simple interest rate?
- 23) A telephone manufacturer believes that the profit in dollars,  $P$ , the company makes is related to the number of telephones produced and sold,  $x$ , by the function  $P(x) = -0.025x^2 + 500x - 120,000$ . According to the function, what is the maximum profit that the manufacturer can expect?
- 24) From a class of 20 students:
- How many ways are there to select 5 students to work on a committee?
  - How many ways are there to select a president, vice president, and treasurer?
- 25) Consider the lifetime of 8 television sets: 7, 9, 5, 7, 8, 7, 12, 10
- Find the mode
  - Find the median
  - Find the mean
  - Find the standard deviation