**Practice Final**

1) (1.1) Given $g(x) = 3x^2 - 2x + 1$, find

   a) $g(1)$

   b) $g(-2)$

   c) $g(w)$

   d) $g(x + h)$

2) (1.2) The Audubon Society at Enormous State University (ESU) is planning its annual fund-raising "Eat-a-thon". The society will charge students 60¢ per serving of pasta. The only expenses the society will incur are the cost of the pasta, estimated at 10¢ per serving, and the $300 cost of renting the facility.

   a) Write down the associated cost, revenue, and profit functions.

   b) How many servings of pasta must the Audubon Society sell in order to break even?

   c) What profit (or loss) results from the sale of 1,500 servings of pasta?

3) (1.2) The demand for your factory made skateboards, in weekly sales, is $q = -p + 40$ if the selling price is $\$p$. If you are selling them at that price, you can obtain $q = 2p - 26$ per week from the factory. At what price should you sell your skateboards so that there is neither a surplus nor a shortage?

4) (1.2) In 2007, Bank of America was offering 5.2% interest on its online savings account, with interest reinvested monthly. Find the associated exponential model for the value of a $5,000 deposit after $t$ years. Assuming this rate of return continued for six years, how much would a deposit of $5,000 at the beginning of 2007 be worth at the start of 2013? (Answer to the nearest $1.)

5) (1.3) A soft-drink manufacturer can produce 1,000 cases of soda in a week at a total cost of $6,000 and 1,500 cases of soda at a total cost of $8,500. Find the manufacturer's weekly fixed costs and marginal cost per case of soda.

6) (1.3) The demand for your college newspaper is 2,000 copies each week if the paper is given away free of charge, and drops to 1,000 each week if the charge is 10¢/copy. However, the university is prepared to supply only 600 copies per week free of charge, but will supply 1,400 each week at 20¢ per copy.

   a) Write down the associated linear demand and supply functions.

   b) At what price should the college newspapers be sold so that there is neither a surplus nor a shortage of papers?

7) (3.1) Tom is ordering supplies. Yellow paper costs $4.00 per ream while white paper costs $6.00 per ream. He would like to order 150 reams total, and has a budget of $800. How many reams of each color should he order?

8) (9.1) XYZ Lunchbox company predicts that the demand equation for its lunchboxes is $q = -3p + 150$, where $q$ is the number of lunchboxes it can sell in a month if the price is $\$p$ per lunchbox. At what price should it sell the lunchboxes to get the largest revenue? What is the largest monthly revenue?

9) (9.2) A bacteria culture starts with 2,000 bacteria. Two hours later there are 5,500 bacteria. Find an exponential model for the size of the culture as a function of time $t$ in hours, and use the model to predict how many bacteria there will be after 2 days.

10) (9.2) Find the equation of the exponential function that passes through the points $(-2, 3)$ and $(4, 5)$.

11) (9.3) Use logarithms to solve the given equation.

$$4.1(3^x) = 6$$

12) (9.3) The half-life of strontium 89 is 42 years.

a) Obtain an exponential model for strontium 89 in the form $Q(t) = Q_0 e^{-kt}$. (Round coefficients to three significant digits.)

b) Use your model to predict, to the nearest year, the time it takes for one-fourth of the sample of strontium 89 to decay.

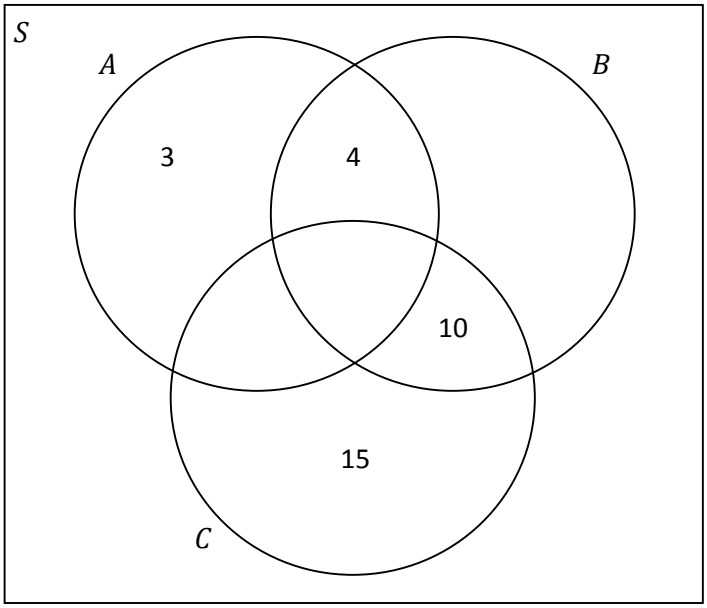
13) (2.1) You take out a 6-month, $5,000 loan at 8% simple interest. How much would you owe at the end of the 6 months?

14) (2.2) Calculate the present value of an investment that will be worth $1,000 at 4.2% per year, compounded weekly (assume 52 weeks/year), in 5 years.

15) (2.3) Beth has just received an inheritance of $200,000 and would like to be able to make monthly withdrawals over the next 10 years. She decides on an annuity that pays 6.2%, compounded monthly. How much will her monthly payments be in order to draw the account down to zero at the end of 10 years?

16) (6.1) List the elements in the set of all outcomes of rolling two distinguishable dice such that the numbers add to 7.

17) (6.2) Use the given information to complete the solution of the partially solved Venn diagram.




$$n(A) = 10, n(B) = 19, n(A \cap B) = 6, n(S) = 140$$

18) (6.3) A test requires that you answer first Part A and then either Part B or Part C. Part A consists of five true-false questions, Part B consists of three multiple-choice questions with one correct answer out of four, and Part C consists of four questions with one correct answer out of five. How many different completed answer sheets are possible?

19) (7.4) Suzy is given a bag containing 4 red marbles, 3 green ones, 2 white ones, and 1 purple one. She grabs five of them. Find the probabilities of the following events, expressing each as a fraction in lowest terms.

a) She has all the red ones.

b) She has at least one white one.

c) She has two red ones and one of each of the other colors.

d) She has at most one green one.