Math 122 Review 1

1. Complete the table of values for the *linear* function.

x	3	6	9	12	15
$f(x)$	2	7			

Write the equation of this linear function.

2. Complete the table of values for the *exponential* function.

x	3	6	9	12	15
$f(x)$	2	5			

Write the equation of this exponential function.

3. Find the equation of the *linear* function that passes through the points $(2, 7)$ and $(4, 15.75)$.

4. Find the equation of the *exponential* function that passes through the points $(2, 7)$ and $(4, 15.75)$.

5. Jason leaves Detroit at 2:00PM and drives at a constant speed west along I-96. He passes Ann Arbor, 40 miles from Detroit at 2:50PM. Express the distance traveled in terms of the time elapsed. What speed (in mph) was he traveling?

6. The manager of a furniture factory finds that it costs \$2200 to manufacture 100 chairs in one day and \$4800 to produce 300 chairs in one day.
a. Express the cost as a function of the number of chairs produced, assuming it is linear.

b. What is the vertical intercept of the graph and what does it represent?

7. A company that manufactures small canoes has a fixed cost of \$18,000. It costs \$20 to produce each canoe. The selling price is \$80 per canoe.
a. Write the cost function, $C(x)$.

b. Write the revenue function, $R(x)$.

c. Determine the break-even point. Describe what this means.

8. I am choosing between two long-distance telephone plans. Plan A has a monthly fee of \$20 with a charge of \$0.05 per minute. Plan B has a monthly fee of \$5 with a charge of \$0.10 per minute. How should I determine which plan is best for me? Be specific with your answer.

9. The population models for several towns with time t in years are given below:

Town	Population Model
A	$P = 1200(1.03)^t$
B	$P = 900(1.14)^t$
C	$P = 1000(.95)^t$

a. Which town's population is growing the fastest? What is the percent growth rate?

b. Are any of the towns decreasing in size?

c. Which town has the largest initial population?

10. What interest rate, compounded continuously, is equivalent to an 8% rate compounded annually?

11. Traces of burned wood along with ancient stone tools in an archeological dig in Chile were found to contain approximately 1.67% of the original amount of carbon 14. If the half-life of carbon 14 is 5600 years, approximately when was the tree cut and burned?

12. Find the average rate of change of $f(x) = 3x^2$ from 1 to 7.

13. A clean up of a polluted lake will remove 3% of the remaining contaminants every year, beginning in 1996. The goal is to reduce the quantity of contaminants to $\frac{1}{10}$ its present level. When will this be achieved?

14. The height of an object in feet above the ground is given in the following table:

t(sec)	0	1	2	3	4	5	6
y(feet)	10	45	70	85	90	85	70

Compute the average velocity over the interval $0 \leq t \leq 3$. Give units.

15. The speed that a car can achieve in 10 seconds is inversely proportional to its weight. (That is, the more the car weighs, the slower it will be going.) After 10 seconds, a car that weighs 2400 pounds can achieve a speed of 44 miles per hour. If the car weighed 1600 pounds, how fast would it be going?

16. The demand function for a certain brand of microwave is given by

$$d(q) = 300 - 0.03q^2$$

and the corresponding supply function is given by

$$s(q) = 0.09q^2$$

where the price is measured in dollars. Find the equilibrium quantity and price. Give units and explain your answer.