MA 110 TEST 1 REVIEW WORKSHEET

Name _____

1. The weekly demand for mouthwash in a chain of drug stores is 1,160 bottles at a price of $3.79 per bottle. If the price is lowered to $3.59, the weekly demand increases to 1,320. Assume that the relationship between demand D and price per p is linear.

A. Write a linear equation that expresses D in terms of p.

B. What should the price of a bottle of mouthwash be so that the demand is 2000 bottles?

C. How many bottles would the stores sell each week if the price were lowered to $3.29?

D. Suppose that the Supply function for the mouthwash is S = 500p. Is there a surplus or shortage when the price is $3.29? Explain.

E. Find the equilibrium price.

F. For what prices is there a shortage? Explain.

2. A charter company buys a new machine for $4500 and assumes that it will have a trade in value of $500 after 8 years. Supposing the machine depreciates linearly,

A. Find a linear model V for the depreciated value of the machine t years after is was purchased. **Clearly show your ordered pairs and a few other steps!!**

B. INTERPRET the slope of your linear function. Write your answer in sentence form.

C. What is the depreciated value of the machine after 3 years?

D. When will the depreciated value be $2000? **Answer to nearest whole year.**

3. The research department in a company that manufactures dish washers established the following functions: Revenue: $R(x) = -3x^2 + 120x$ and Cost: $C(x) = 500 + 25x$, $0 \leq x \leq 40$, is in hundreds, p(x) is in dollars, and R(x) and C(x) are in hundreds of dollars.

   A. Find the production level(s) of dishwashers (to the nearest hundred) at which the company has break-even point(s). You should find this answer graphically. **Give units with your answer!!**

   B. If the company sells 30 hundred dish washers will they make a profit or experience a loss? Explain.

4. The research department in a company that manufactures cell phone established the following price-demand function: $p(x) = 300 - 15x$ where x, $0 \leq x \leq 20$, is in hundreds and p(x) is in dollars.

A. Write the revenue function R(x) where x is the number of cell phones sold (in hundreds) and R(x) is the revenue in hundreds of dollars.

B. Determine the number of cell phones that must be sold to maximize the revenue. **Give units with your answer!!** You may find this answer algebraically or graphically. Show your steps or a simple sketch of your graph to support your answer.

C. What is the price per cell phone when revenue is maximized? Show which equation you use and your substitution.

D. What is the maximum revenue? **Give units with your answer!!** Show your substitution or a simple sketch of your supporting graph.

5. What will the pay-off amount be for a 16 month loan of $2,500 at an annual simple interest rate of 9.5%?

6. What interest rate compounded quarterly is needed to have a $1,000 investment grow to $5,000 in five years?

N =
I% =
PV =
PMT =
FV =
P/Y =

Answer: _____

7. If you deposit $450 a month into your child's college fund for 18 years at 4.7% compounded monthly, how much will you accumulate?

N =
I% =
PV =
PMT =
FV =
P/Y =

Answer: _____

How much interest does this account earn in the 18th (last) year? Hint: You have to use the TVM solver and then simple arithmetic. Show arithmetic here:

N =
I% =
PV =
PMT =
FV =
P/Y =

Answer: _____

8. You purchase a home set up a 30-year mortgage $320,000 with a loan company that charges 7.5% compounded monthly. What will your monthly mortgage payments be?

N =
I% =
PV =
PMT =
FV =
P/Y =

Answer: _____

How much interest will you pay over the entire length of the loan? Show steps!!

9. How much should you deposit now to accumulate $45,000 in 10 years in an account that earns 4.3% compounded **quarterly**? If you use the TVM solver fill in the table, otherwise, you can list the formula and show your substitutions.

N =
I% =
PV =
PMT =
FV =
P/Y =

Answer: _____

10. How many **years** will it take for $8,000 to grow to $15,000 in an account that earns 3.5% compounded **quarterly**?

N =
I% =
PV =
PMT =
FV =
P/Y =

Answer: _____

11. How much will you need to save each month for 35 years to accumulate $2,300,000 in your retirement account if you can earn 6.8% compounded monthly.

N =
I% =
PV =
PMT =
FV =
P/Y =

Answer: _____