Test 2 - Math 1010 - NAME $\qquad$
Partial credit will be granted so do continue on with a problem even if you know that one part is wrong. If part b) depends on part a), full credit can still be obtained for b) by showing the correct process for $b$ ).
"Set up a formula with numbers substituted in for the variables" means that you should set up something similar to $100(1+.049){ }^{100}$ (using the appropriate formula and numbers)
"Show work" means that you should show what numbers you plugged in to get an answer (ie $3 * 2+1=7$ ) but there is no need to explain in words.

PROBLEM 1): Yosef is taking out a loan to buy a condo. The interest rate was $\mathbf{6 . 7 5}$ \% compounded for 30 years ( 360 months). The loan amount was $\$ 84212.00$.
a) Set up a formula with numbers substituted in for the variables in order to determine the required monthly loan payment
b) Solve for an answer for the required monthly payment
c) How much interest (\$) does he pay in total over the life of the loan? Show work.
d) Does your answer in c) make sense? Why or why not?
e) What is the interest (\$) for the first month? Show work.
f) Why isn't the answer in part d) equal to the answer in part c) divided by 360 , i.e. the average interest (where I obtained 360 by the number of months)?

Instead of paying the required monthly payment amount listed in part b), beginning with the first payment, he decides to pay $\$ 600$ each month. On Excel, we see the following:

| Month \# | Monthly Payment | Monthly Interest(\$) | Principle Paid | Loan Balance |
| ---: | ---: | ---: | ---: | ---: |
| 277 | $\$ 600.00$ | $\$ 6.01$ | $\$ 593.99$ | $\$ 473.73$ |

278 \$600.00 \$2.66 \$597.34 (\$123.61)
f) Use this Excel to determine how much he pays in total now. Show work.
g) How much total interest (\$) does he pay over the life of the loan now? Show work.
h) How much total interest (\$) did he save or lose by paying $\$ 600$ a month instead of the required monthly payment from part b)? Show work.
i) Does your answer in part h) make sense? Why or why not?
j) Set up an equation with numbers that would have solved for how long it would take to pay off the loan this way (by paying $\$ 600$ each month over the entire life of the loan) if I didn't have the Excel chart to give me the answer, but DO NOT SOLVE.

## PROBLEM 2):

a) If there are 500 different lottery tickets total, and you have purchased 2 of them, what is the probability you will win?
b) Discuss how the reward/risk ratio and probability relate in comparing real-life Powerball lotteries to the stock market.
c) How do chance and probability relate to financial forecasts?
d) Discuss how the debt-to-income ratio precipitated the 2008 recession?
e) What is a positive consequence of taking a periodic payout in the lottery?
f) Give enough information about the philosophy of derivation so that that someone could understand where the -1 came from in the periodic payment formula?

