***Pre Calculus Lesson***

***Finance***

***Compound Interest: Suppose a principal, P, is invested at an annual interest rate, r, compounded k times a year for t years. The amount A in the account after t years is***

 ***A = P(1 + )***

***Ex 1) John invested $12,000 at an annual interest rate of 9%. Find the balance after 5 years if the interest is compounded a) quarterly b) monthly***

***Ex 2) Lisa has $1500 to invest at a rate of 9.375% interest compounded monthly. How long will it take to double her investment?***

***Continuous Change Model: If interest is compounded continuously,***

 ***A = Pe***

***Ex 3) Tyler wants to invest $5000 at 7.75% compounded continuously so that he can take care of Mr. Zappia when he retires.***

1. ***How much will he have for Zap in 6 years?***
2. ***How long will it take for his investment to double (Because Zap isn’t getting any younger!)***

***Comparing Investments: A common basis for comparing investments is the annual percentage yield (APY). This is the percentage rate that, when compounded annually, would yield the same return as the given interest rate with the given compounding period.***

***Ex 4) A $2000 investment is made at a bank paying 5.15% annual interest compounded quarterly. What is the equivalent APY? Explain the meaning of your answer.***

$2000\left(1+r\right)=2000(1+\frac{.0515}{4})^{4(1)}$ ***set up both for a 1 year time period***

$$1+r=1.0525$$

$r=.0525 or 5.25\%$ ***meaning you would have to invest at a 5.25% annual interest rate to get the same return as the 5.15% quarterly investment.***

***Ex 5) Which is a better investment?***

 ***Option A: . one that pays 8.75% compounded quarterly or***

 ***Option B: one that pays 8.7% compounded monthly***

***Calculate 2 APYs, 1 for each option. Higher % is better investment***

$$1+r= (1+\frac{.0875}{4})^{4} 1+r= (1+\frac{.087}{12})^{12}$$

$r≈.090413 r≈.09055$

 ***9.04% 9.06%***

***Option B is the better investment because it has a higher APY***

***THE FORMULAS ON THIS PAGE ONLY WILL BE GIVEN TO YOU FOR THE TEST, BUT YOU MUST KNOW WHAT ALL LETTERS STAND FOR AND HOW TO FIND THEM!***

***Annuity: A series of equal periodic payments.***

***Future Value of an Annuity: FV = R,***

 ***where R= amount of investment***

 ***i= rate per compounding period***

 ***n = # of equal periodic payments***

***Ex 6) At the end of each quarter, Emily makes a $500 payment into a mutual fund. If her investment earns 7.88% compounded quarterly, what will the value be in 20 years?***

$$FV=500(\frac{\left(1+\frac{.0788}{12}\right)^{12}}{\left(\frac{.0788}{12}\right)})$$

 ***FV= $95, 483.39***

***Present Value: The net amount of money put into an annuity.***

 ***PV = R()***

***Ex 7) Joe purchases a car for $18,500. What are the monthly payments for a***

***4-year loan with $2,000 down if the APR is 2.9%?***

 $16,500=R(\frac{1-\left(1+\frac{.029}{12}\right)^{-48}}{\left(\frac{.029}{12}\right)})$

 R= $364.49