Precalculus D 6.7 and 13.3 Name: Key

Compound Interest and Annuities Worksheet Date: _____

1. James is investing $1500 for 20 years at a 6.25% annual interest rate. How much will be in the account if:
   a. the account is compounded annually
      $5042.78
   b. the account is compounded semiannually
      $5136.29
   c. the account is compounded quarterly
      $5185.16
   d. the account is compounded monthly
      $5218.56
   e. the account is compounded daily
      $5234.95
   f. the account is compounded continuously
      $5235.51
2. How much time is required for an investment to double in value if interest is earned at the rate of 5.75% compounded quarterly?
   ≈ 12.1412 years
3. What annual interest rate compounded monthly is required for an $8500 investment to triple in five years?
   ≈ 22.17%
4. Which investment is more attractive, one that pays 9.75% compounded quarterly or another that pays 9.7% compounded monthly? Why?
   9.7% compounded monthly because over one year it would yield more money (has a higher APY)
5. Find the annual percentage yield (APY) for $8000 at 4.7% compounded monthly.
   4.803%
6. Explain APY and APR.
   APY = Annual Percentage Yield and it is used to compare interest rates compounded at different intervals by determining the interest rate that could be used to compound annually
   APR = Annual Percentage Rate and it is used for the calculations of interest for varying intervals of compounding, but the percentage itself is based on one year
7. Sue contributes money every month into the Lincoln National Bond Fund earning 12.5% annual interest.
   a. Sue decides to contribute $50 per month. What is the value of her investment after 25 years?
      $102,695.83
   b. Sue has decided that contributing $50 a month will not meet her goal of having $500,000 by the time she retires in 25 years. If she keeps her money in the same fund earning the same interest (12.5%), what monthly contribution must she make to reach her goal?
      $243.44
8. What is Eric's monthly payment for a 3-year $12,000 car loan with an APR of 9.65% from County Bank?
   $385.24
9. Curt is has just begun making $150 monthly payments in to an IRA that earns 4.5% annual interest. How long will he have to continue making payments to have $120,000 in his account?
   ≈ 30.86 years
10. What are the required monthly payments on a $120,000 mortgage for 30 years at 7.70% APR?
    $855.52
    a. Suppose you decide to make monthly payments of $1250. When would the mortgage be completely paid?
       ≈ 12.47 years
    b. How much do you save with the greater payments compared with the original plan?
       $120,937.20
11. An investor determines a need for a $1.5 million retirement account at age 65 and has been assured of an 8.5% annual rate of return.

a. Determine the regular monthly payment required if the individual starts at age 25.

$371.41

b. If the individual started at age 25 what is the actual amount of money invested? How much money would have come from interest?

Invested $178,276.80 From Interest $1,321,723.20

c. How does the situation change if the individual waits until age 40 to begin the retirement account?

Monthly investment now becomes $1453.41, resulting in actually investing $436,023 which is about 245% more than it would have been starting at age 25.

12. A potential home buyer is looking to borrow $250,000 at 5.2% interest for a 30 year home loan. What is the regular monthly payment? What is the total cost of the loan? How does the situation change if the loan is changed to a 15 year loan?

30-year: Monthly payment is $1372.77 which results in the total loan cost being $494,197.20
15-year: Monthly payment is $2003.13 which results in the total loan cost being $360,563.40 saving about $133,633.80 on the amount of interest paid