These are some of the possible types of problems – keep in mind that you are responsible for material discussed in class. If I forget or do not include a type of problem that was discussed in class or assigned for HW, it is not an indication that it will not be on the exam. Here are some problems.

YOU SHOULD SHOW AS MUCH WORK AS POSSIBLE – ESPECIALLY THE FORMULAS WITH CORRECT VALUES SUBSTITUTED IN.


   a) A loan is given at 8 1/3 % per year compounded daily for 300 days. Find the interest earned. ___________

   b) You lend your cousin Jay $250 for three months. At that time Jay will pay you $300.

      1) What simple interest rate does this equate to ? ___________

      2) What would be the rate if your money would be compounding monthly? Round your answer to the nearest hundred – carry your calculation in their entirety – do not round or estimate until your final answer. ___________

   c) You start thinking about Christmas 12 months in advance. You deposit your $2000 Christmas bonus into an account that earns 4 ½ % per year compounded continuously. How much will be in the account 12 months later ?

      __________

      How about in 340 days – assume year = 365 days. ? __________
2. In order to see which investment is best you need to calculate the effective rate of interest \( r_{\text{eff}} \). Do that for each of the following investments:

Make sure to write down the formulas – so that I know that you are using them instead of a specific amount

a) 13.21 % per year simple interest \( \rightarrow r_{\text{eff}} = \) _____________

b) 13 % per year compounded continuously \( \rightarrow r_{\text{eff}} = \) __________

c) 13.1 % per year compounded semiannually \( \rightarrow r_{\text{eff}} = \) ____________

3. At the end of a 54 month loan period – you owe $2400. No payment or penalties of any kind have been made since the original loan was taken out. If your interest was being charged at the rate of 12 ¾ % per year compounded every three months, then how much did you borrow?

4. You deposit $800 into your “nest egg”. It earns 4 ½ % per year compounded daily (assume 360 days/year). During the next 2 years you will make additional deposits of $800 every half year. This will total five deposits. How much will you have in the account at the end of the 2 years?
5. How long will it take an investment to double if it is earning
   a) 6 % per year simple interest ? _______

   b) 6 % per year compounded monthly ? _______

   c) 6 % per year compounded continuously ? _______

6. You save up for 12 months by depositing $25 into the bank at the end of each month earning 3 ¼ % per year compounded monthly. How much will you have at the end of the 12 month period.

7. You begin saving up for your golden years at age 30. This means that you will be able to save money for 35 years. How much should you save each month (equal deposits) so that at age 65 you will have $1,000,000. Assume that you can find a place that will pay you 8 % per year compounded monthly.

8. Your uncle Joe has left an investments that will pay you $2050 at the end of each quarter for the next 20 years. At the end of the 20 years – the investment will have a zero value. (Annuity) If you know that it was earning 12 ¼ % per year compounded quarterly, then what was the initial amount in the investment.
9. A company wants to have $30,000 at the end of the next three years to buy some equipment. How much should be allocated at the end of each six month period so that at the end of the three years they will have $30,000? Assume that they can earn 14% per year compounded semiannually.

10. A house is selling for $70,000. You will make a 10% down payment. The rest is financed at 6%. Calculate how much you will pay in interest if the loan is for
   a) at 6% per year compounded monthly for 30 years
   
   b) at 6% per year compounded monthly for 20 years?

11. Write an amortization schedule for problem 10b above.

<table>
<thead>
<tr>
<th>Period</th>
<th>Beginning Balance</th>
<th>Monthly Payment</th>
<th>Interest</th>
<th>Actual Payment on P</th>
<th>Ending Balance</th>
</tr>
</thead>
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12. You have $2400 for a down payment on a car and feel that if you are given a 6% loan for 60 months you will be able to afford payments of $325 per month. What is the highest priced car that you should look at?
13. If you retire at age 67 and plan to live another 13 years off of your retirement annuity – how much will you get at the end of each month for the next 13 years if you only have $280,000 at the time of retirement and the money will be earning 8 ½ % per year compounded monthly?

14. Find the solution of the following system of equations by any method.
   a) \[2x + y = 3\]
      \[x - 4y = 12\]
   b) \[x + 2y - z = 4\]
      \[2x - y - z = 0\]
      \[3x + 2y - z = 8\]

15. Write down the 3 x 2 zero matrix. Write down the 3x3 identity matrix.

16. Write the corresponding augmented matrix for the system of equations in problem
   a) 14a
   b) 14b

17. Write the corresponding coefficient matrix for the system of equation found in 10a.
18. Given the following matrices determine if it is possible to perform the given operation – if so do it, otherwise say NOT POSSIBLE.

\[
\begin{align*}
A &= \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix} & B &= \begin{bmatrix} 4 & 1 \end{bmatrix} & C &= \begin{bmatrix} 2 \\ 1 \\ -3 \end{bmatrix} & D &= \begin{bmatrix} 1 & 2 & 3 \\ 0 & -2 & -3 \\ 2 & 4 & 1 \end{bmatrix} & E &= \begin{bmatrix} 3 & -1 \\ -3 & 2 \end{bmatrix} \\
F &= \begin{bmatrix} 1 \\ -2 \end{bmatrix} & G &= \begin{bmatrix} 1 & -2 & 3 \\ 2 & 4 & 1 \end{bmatrix} \\
k &= 2
\end{align*}
\]

a) \(kC = \) 

b) \(B + F = \)

c) \(E - A = \) 

d) \(BC = \)

e) \(AB = \) 

f) \(BF = \)

g) \(FE = \)

h) If \(GD = H\), then find these entries: \(h_{23} = \) \(h_{21} = \)

19. IF \(I\) is the 3 x 3 identity matrix and \(O\) is the 3x1 zero matrix – then find the product of \(I\) and \(O\)

\(IO = \)
20. Solve by using matrices. - SHOW ALL WORK

\[ x + 2y = 4 \]
\[ 2x + 5y = 1 \]

\[ 3x + 4y = 6 \]
\[ 2x - 5y = 4 \]