CHE 477 **Problem Set #1** **Due: Tue, Sept. 5, 11:59pm**

Submit on Brightspace as a single MS Word, Excel or PDF file. Highlight or box your numerical answers, but show the work and explain your reasoning. MathCAD files are NOT acceptable to submit. (3pts)

1. (15 pts) The Ford F-150 is said to be the best-selling vehicle of 2023. Suppose you took out a loan to purchase an F-150 XL at the starting MSRP of $33,835 at the rate of 3.9% APR for A) 60 months, B) 36 months or C) 12 months, what would the monthly payment be in each scenario, and what would the sum of the interest paid over the loan be in each case?

2. (12pts) Convert the following APY values to APR values:
    a. A savings account earning the typical rate of 0.5% APY
    b. A high yield savings account with 4.5% APY
    c. For each account in parts (a) and (b), find the value you would have if you deposited a $10,000 signing bonus and let it grow for 10 years.

3. (15 pts) Suppose you had instead saved up and had $60,000 in a bank account at the time of purchasing the Ford F-150 and you want to decide between purchasing the vehicle outright and taking out a 5-year loan. In purchasing outright, the MSRP is deducted from the bank account at time 0 and the bank account earns interest on the balance over the next 60 months. For the loan scenario, your bank account begins with $60,000 at time 0 and deducts the monthly payment at the beginning of each month (starting at month 1) then earns the savings interest rate on the new balance. How does your ending bank balance compare in these two scenarios (purchase vs. loan) if A) Your savings account is earning the typical 0.5% APY interest rate or B) Your savings account sits in a high yield 4.5% APY account.

3. (15pts) Investing in stocks has the potential to make higher return on investment than a less risky savings account, but also has potential to lose large amounts of money. Analyze the effective annual interest rates of the following two stocks if I sold them today:

A.) NVIDIA (NVDA): Purchased 4 shares at $542 each, thirty months ago. Currently this stock would sell for $460 per share. Stocks will sometimes 'split' if they reach a high share price to avoid deterring investors. If a stock were to split 2-1, the shareholder would then have twice as many shares but each share would be worth half as much. The NVIDIA stock split 4-1 about twenty-five months ago. This stock also pays quarterly dividends, which could be deposited into savings, but these were reinvested in buying additional shares of stock which resulted in now owning an additional 0.3 shares of stock.

B.) Paypal Holdings Inc (PYPL): Purchased 11 shares at $271 per share, twenty-five months ago. Purchased an additional 24 shares at $124 per share, nineteen months ago. Paypal is not a dividend paying stock, so the total number of shares remains the same. Today it would sell for $61 per share.

5. Suppose you have two job offers to consider for similar positions. Company A will pay a salary of $85,000 per year and offers the most common retirement plan 401(k) match, which is 50 cents for each dollar you contribute on up to 6% of your pay. Company B will pay a salary of $75,000 per year and offers a dollar-for-dollar match on up to 10% of your pay. Assume you spend 10 years working at the company, that salary and retirement contributions all occur monthly, and the average APR is 7%.
    a. (10pts) What are the balances on these two account options? Include both your contribution and the employers.
    b. (5pts) Explain which option you would take.