1. (5pts) Sharon borrowed $300 from a local lender. If she repays the loan with $347 after 3 months, what annual simple interest rate is she being charged?

$$F = P(1 + rt)$$

$$347 = 300\left(1 + r \cdot \frac{3}{12}\right)$$

$$347 = 300 + 300 \cdot \frac{r}{4} \quad | -300$$

$$47 = 75r$$

$$r = \frac{47}{75} = 0.62666\ldots$$

interest rate is

$$62.67\%$$

2. (6pts) What is a better deal on a certificate of deposit:
a) an account earning 4.77%, compounded monthly, or
b) an account earning 4.81%, compounded quarterly?

$$APY = \left(1 + \frac{r}{n}\right)^n - 1$$

a) $APY = \left(1 + \frac{0.0477}{12}\right)^{12} - 1 = 0.0487568$ ← (4.88%)

b) $APY = \left(1 + \frac{0.0481}{4}\right)^4 - 1 = 0.0489746$ ← better interest rate (4.90%)

3. (6pts) A family can afford to save $300 every month toward the purchase of new furniture. If the family is depositing money into an account bearing 5.4%, compounded monthly, how long will it be until they have $9,000?

$$F = D \frac{\left(1 + \frac{r}{u}\right)^{ut} - 1}{\frac{r}{n}}$$

$$9000 = 300 \frac{\left(1 + \frac{0.054}{12}\right)^{12t} - 1}{\frac{0.054}{12}} \quad | \div 300$$

$$30 = \frac{1.0045^{12t} - 1}{0.0045} \quad | \cdot 0.0045$$

$$0.135 = 1.0045^{12t} - 1$$

$$1.135 = 1.0045^{12t} \quad | \log$$

$$\log 1.135 = \log 1.0045^{12t}$$

$$\log 1.135 = 12t \log 1.0045$$

$$t = \frac{\log 1.135}{12 \log 1.0045} = 2.35 \text{ years}$$

4. (6pts) In January of 1991 the stock of LSI Logic company was trading at $1.88 per share. In January of 2007 it is trading at $9.50 per share. Find the annual compound interest rate that this growth corresponds to.

$$F = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$n = 1, \quad t = 16$$

$$9.50 = 1.88(1 + r)^{16} \quad | \div 1.88$$

$$5.053\ldots = (1+r)^{16} \quad |^{\wedge \frac{1}{16}}$$

$$1.106\ldots = \left((1+r)^{16}\right)^{\frac{1}{16}}$$

$$1.106\ldots = 1 + r \quad |-1$$

$$0.106554 = r$$

Approx. 10.66%

---

5. (7pts) You would like to buy a car for $17,540. Suppose you are putting 10% down and getting a loan for the remainder. If you can get an interest rate of 3.75%, compounded monthly, what will your monthly payment be?

$$P = R \frac{1 - \left(1 + \frac{r}{n}\right)^{-nt}}{\frac{r}{n}}$$

$$P = 90\% \text{ of } 17,540$$

$$= 0.9 \cdot 17,540$$

$$= 15,786$$

$$15,786 = R \frac{1 - \left(1 + \frac{0.0375}{12}\right)^{-12 \cdot 4}}{\frac{0.0375}{12}}$$

$$15,786 = R \frac{1 - (1.003125)^{-48}}{0.003125}$$

$$15,786 = R \cdot 44.5090\ldots \quad | \div 44.5090\ldots$$

$$\frac{15,786}{44,5090\ldots} = R$$

$$R = \$354.67$$