MATH 1030-004, Quiz 3 Solution **Spring 2014**

1. **(4 pts)** Find the annual percentage yield (APY) if a bank offers an APR of 4.25% compounded quarterly.

$$APY = \left(1 + \frac{APR}{n}\right)^n - 1 = \left(1 + \frac{0.0425}{4}\right)^4 - 1 = 0.0432 = 4.32\%.$$

2. **(4 pts)** How much money will you have after 40 years if you deposit $\$5,000$ in an account with an annual interest rate of 5%, assuming that you earn simple interest?

$$A = P + APR \cdot P \cdot Y = \$5,000 + 0.05 \cdot \$5,000 \cdot 40 = \$15,000.$$

3. **(4 pts)** How much money will you have after 30 years if you deposit $10,000 today at an APR of 4.5% compouned monthly?

$$A = P \cdot \left(1 + \frac{APR}{n}\right)^{nY} = \$10,000 \cdot \left(1 + \frac{0.045}{12}\right)^{12 \cdot 30} = 38,477.$$

4. Suppose you want to have $200,000 in 40 years. Your bank offers an APR of 4%.

   (a) **(4 pts)** What should your monthly deposits be in order to achieve this goal?

$$\begin{aligned} A &= PMT \cdot \frac{\left(1 + \frac{APR}{n}\right)^{nY} - 1}{\left(\frac{APR}{n}\right)} \\ \$200,000 &= PMT \cdot \frac{\left(1 + \frac{0.04}{12}\right)^{12 \cdot 40} - 1}{\left(\frac{0.04}{12}\right)} \\ \$200,000 &= PMT \cdot 1,181.96 \\ PMT &= \frac{\$200,000}{1,181.96} = \$169.21 \end{aligned}$$

   (b) **(Extra Credit: 2 pts)** How much did you earn in interest?

$$\$200,000 - \$169.21 \cdot 12 \cdot 40 = \$118,779.20.$$