Math 17: Quiz 5 Solutions Name:

For full credit you must show your work. Partial credit may be given for incorrect solutions if sufficient work is shown.

1. Suppose you borrow $\$9,000$ for a term of three years with simple interest and 3.75% APR. How much is the total (principal plus interest) you must pay back on the loan? (4 pt)

   We are given $P = 9000,\ t = 3,\ r = 0.0375$. We want to find F.

   $$F = P(1 + rt) = 9000(1 + 0.0375 \cdot 3) = \boxed{\$10,012.50}$$

2. Between 1970 and 1979 the average annual inflation rate was 7.25%. Find the salary in 1970 that would be equivalent to a $\$18,000$ salary in 1979. (3 pt)

   We are given $F = 18000,\ t = 9,\ r = 0.0725$. We want to find P. Recall that inflation means **compound interest**.

   $$F = P(1 + r)^t \implies P = \frac{F}{(1 + r)^t} = \frac{18000}{(1 + 0.0725)^9} = \boxed{\$9,587.31}$$

3. Consider a CD paying a 2.4% APR compounded quarterly (four times a year). Find the periodic interest rate and then use it to calculate the future value of the CD assuming you invest $\$5,000$ for three years. (3 pt)

   We are given $P = 5000,\ t = 3,\ r = 0.024$. The total number of times compounded is $T = 3 \cdot 4 = 12$. We want the periodic interest rate p and the future value F.

   $$p = \frac{r}{\#\text{ times compounded per year}} = \frac{0.024}{4} = \boxed{0.006}$$

   $$F = P(1 + p)^T = 5000(1 + 0.006)^{12} = \boxed{\$5,372.12}$$