

**Mathematics 106**

Turn-in Homework #3

Name ANSWER KEY

Due Thursday, February 12, 2009

You may show work on this or a separate sheet of paper, but please record your answers on this sheet. Be sure to indicate very clearly what formulas you are using and what numbers you are plugging into each. Note: if I can't read it, I can't grade it!

1. Ian and Sylvia know they want to buy a beach house in 6 years and that they will need \$35,000 for a down payment.

*Present Value Question*

a) What amount of money should they invest now in long-term CD's paying 3.8% interest, compounded monthly, in order to have \$35,000 for a beach house in 6 years? \$27,874.39

$$P = \frac{A}{(1 + \frac{r}{n})^{nt}} = \frac{35,000}{(1 + \frac{0.038}{12})^{12 \cdot 6}} = 27,874.388 \uparrow$$

b) What amount would they have to invest at the end of each month to have \$35,000 in 6 years, if the bank also offers a rate of 3.8% compounded monthly for automatic withdrawals into savings? \$433.57

$$PMT = \frac{A(\frac{r}{n})}{(1 + \frac{r}{n})^{nt} - 1} = \frac{35,000(\frac{0.038}{12})}{((1 + \frac{0.038}{12})^{12 \cdot 6} - 1)} = 433.564 \uparrow$$

c) How much interest would Ian and Sylvia earn with each of the above investment strategies?

i) Strategy a, one deposit now into CD's \$7,125.61

$$I = 35,000 - 27,874.39 = 7,125.61$$

ii) Strategy b, deposits at the end of every month for 6 years \$3,782.96

$$433.57 \times 12 \times 6 = 31,217.04$$

$$\begin{array}{r} 35,000 \\ - 31,217.04 \\ \hline 3,782.96 \end{array}$$

2. Paul has run up his credit card and wonders how bad his situation is. He owed \$3650 on April 1, and he was only able to make a small payment of \$75.00 on April 10. The annual interest rate on his card is 17.5%. How much interest would he owe for the month of April, assuming that he has no other transactions on his card? For this problem, use a monthly interest rate. \$52.46

Date	# of days	Balance
Apr. 1 - Apr. 9	9	3650
Apr. 10 - Apr. 30	21	3650 - 75 = 3575
May 1	30	

$$ADB = \frac{9(3650) + 21(3575)}{30} = \frac{107,925}{30} = 3597.5$$

$$I = 3597.50 \times .175 \times \frac{1}{12} = 52.463 \uparrow$$

3. John has given up driving his Hummer and now drives a Prius. He estimates that he saves \$150 per month in gasoline and insurance, which he is planning to put in an investment account. If he puts \$150 at the end of each month into an account paying 4.25% per year, compounded monthly, how much will he have in the bank in 5 years?

$$A = \frac{PMT \left[ \left(1 + \frac{r}{n}\right)^{nt} - 1 \right]}{\frac{r}{n}} = \frac{150 \left[ \left(1 + \frac{0.0425}{12}\right)^{12 \cdot 5} - 1 \right]}{\frac{0.0425}{12}} = 10,008.08$$