

MATH 1030-006

Quiz 5

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page. **Show all your work.**

Name: Key ID: U 00

1. (20 points) Using the Loan Payment formula:

$$PMT = \frac{P \times \left(\frac{APR}{n}\right)}{\left[1 - \left(1 + \frac{APR}{n}\right)^{-nY}\right]}$$

solve the following problem:

Suppose you take out a 30-year \$200,000 mortgage with an APR of 6%. You make payment for 5 years (60 monthly payments) and then consider refinancing the original loan. The new loan would have a term of 20 years, an APR of 5.5%, and be in the amount of the unpaid balance on the original loan. (The amount you borrow on the new loan would be used to pay off the balance on the original loan.) The administrative cost of taking out the second loan would be \$2000.

- What are the monthly payments on the original loan?
- A short calculation shows that the unpaid balance on the original loan after 5 years is \$186,046, which would become the amount of the second loan. What would the monthly payments be on the second loan?
- What would the total payment be if you continued with the original 30-year loan without refinancing?
- What would the total payment be with the refinancing plan?
- Compare the two options and decide which one you would choose. What other factors should be considered in making the decision?

(a)  $PMT = \frac{\$200,000 \times \left(\frac{0.06}{12}\right)}{\left[1 - \left(1 + \frac{0.06}{12}\right)^{-(12 \times 30)}\right]} = \$1199.10$

(b)  $PMT = \frac{\$186,046 \times \left(\frac{0.055}{12}\right)}{\left[1 - \left(1 + \frac{0.055}{12}\right)^{-(12 \times 20)}\right]} = \$1279.79$

(c) The total payment on the original loan would be  $\$1199.10 \times 12 \times 30 = \$431,676$

(d) The total payment in refinancing plan would be  $\$1199.10 \times 12 \times 5 + \$1279.79 \times 12 \times 20 + \$2000 = \$381,095.60$

(e) Decide it by yourself. ☺