MATH 134 – Calculus with Fundamentals 2
Final Group Discussion: Constructing "Amortization Tables"; Other Types of Loans
May 1, 2018

Background

Suppose you take out a loan for $50000 at an interest rate of 6% per year, to be repaid in equal monthly payments over 3 years.

Questions

(A) Determine the monthly payment by the method we discussed in class. (*Note:* The monthly payment is $1521.10 so you can check your work, but you must show all the calculations leading to this for credit.)

(B) Construct an *amortization table* showing, for each month the loan is outstanding,

- The balance outstanding (the amount still owed) at the beginning of that month,
- The amount of that month's payment that goes to interest on the loan
- The amount of that month's payment that goes to pay down the principal

Note: This will slightly tedious by hand but it should be manageable if you split things up among the group members. Alternatively, if you are a Excel spreadsheet whiz, you can also do the computation that way, but *DON'T USE ANY BUILT-IN FINANCIAL FUNCTIONS* – the point of this exercise is to understand how the formulas work, not just to generate numbers.

(C) In an attempt to make big-ticket loans seem more affordable to customers, lenders sometimes structure them so that a different amount (smaller than the monthly balance for the fully-amortized loan) is set as the monthly payment, but then the balance of the loan becomes due as a "balloon payment" at the end of the term. (Sometimes several larger amounts become due after certain numbers of months). If a lender structured a $50000 loan at 6% per year for three years that

way, charging a monthly payment of $800 per month rather than the answer from part (A), but then charged a single balloon payment at the end of the 36 months, what would the balloon payment be?

(D) Another possible variation on the loans we have been describing (which have all been *fixed rate* loans). There are also *variable interest rate* loans. For a simple example of this, suppose the lender we have been thinking of set the interest rate at 6% for the first two years of the $50000 loan, then increased the interest rate to 8% for the final year. Suppose this was done so that the monthly payment was the same for every month in the first two years based on our formulas, but then the third year was essentially treated as a new loan at an 8% interest rate with principal equal to the remaining balance at the end of the second year. The monthly payment would be recalculated at that time with the new interest rate. What would the monthly payments be for the first two and the last years? What would the total amount paid by the customer be?