Mathematics of Personal Finance II
Credit Cards and Using a Recursive Formula

According to a report on consumer buying, the average credit card user carries an average balance of $2500 from one month to the next. Of course, the consumer must pay interest on this amount. The next set of questions will show how easy it is for people to get in “over their head” financially.

The new balance is affected by the previous balance, new purchases, the number of days in the billing cycle and the interest rate offered by the credit card company. Since the number of days in the billing cycle will vary from one month to the next, the credit card company computes an average daily balance and a daily periodic rate. The daily periodic rate is equal to the annual percentage rate divided by 365.

Suppose MasterCard's annual percentage rate (APR) is 19.8%. Compute the daily periodic rate to five decimal places.

\[ \text{\%} \]

Since the monthly balance has many factors contributing to its amount, the circumstances will be simplified so that some final conclusions can easily be made. This will allow the use of a recursive formula to approximate the use and pitfalls of a credit card.

1) Suppose you owe $614.57 on purchases for the month. And the credit card company computes your minimum payment to be $13. You decide to just pay the $13 every month until the balance is paid. If you make no new purchases, and the APR is 19.8% complete the following:

\[ i = \frac{\text{\%}}{12} = \text{\%} \]

Write the recursive formula:

\[ U_n = \text{ } u(n\text{Min}) = \text{ } \]

For the 1st payment, how much of the $13 was interest and how much went to reducing the balance?

Enter the recursive formula into the calculator and find the amount remaining on the balance after making this first payment.

What is the balance after 1 year? 
after 2 years? 
after 5 years? 

For the 60th payment, how much of the $13 was interest and how much went to reducing the balance?
What is the amount of the last payment?

What was the total amount repaid? And how much was interest?

2) Earlier in this supplement it was noted that the average consumer carries a balance of $2500 every month. Again assume no new purchases and you are just going to pay the minimum payment of $52.88 each month. The annual percentage rate is 18.9%

\[ i = ____________ \]

Write the recursive formula:

____________________________________________________________

What is the balance after 1 year? __________________
3 years? __________________
6 years? __________________

For the 50th payment, how much is interest and how much went to reducing the balance?

What is the amount of the last payment?

What was the total amount repaid and how much of it was interest?