Unit 2: The Mathematics of Loans and Credit

Goal: To understand various types of loans and credit cards and to use mathematics to determine the effect of principal, interest rate, and time on the repayment of loans and credit cards.

Expectations

1. analyze the characteristics of various types of loans, such as credit cards, personal loans, student loans, auto financing, and mortgages.

   Example:

   You wish to put a deck on your house. Design a deck and determine the cost to build it. Determine which of the following would be the best way to finance the deck: personal loan, credit card, or home equity loan.

   Example:

   What factors impact your credit score? How does your credit score affect the rates that you pay on loans?

2. apply appropriate models to determine the impact of the relationship among loan rates, the term of a loan, the principal amount of a loan, and payments.

   Example:

   How long will it take to pay off a credit card with a balance of $1000 if the interest rate is 14% compounded daily and the minimum payment of 2% of the balance is made at the beginning of the billing cycle?

   Example:

   You have an adjustable rate mortgage (ARM) with $250,000 remaining on the mortgage. The rate will increase from 4.5% to 6%. How much more will you pay per month?

   Example:

   You are financing a home with a $300,000 mortgage at 5% interest, compounded monthly over 30 years. What will your monthly payment be? If you were to add $50 to the monthly payment determined in the first part of this question, how much sooner would the mortgage be paid off? How much interest would you save?

   Example:

   You have purchased a new car for $30,000, financed for 72 months at 4.9% interest, compounded monthly. What is the total amount you will pay for the car? The rate of depreciation on this car is 15% per year, compounded monthly. When will the amount you owe on the car be more than the value of the car?