

# Loans as an Annuity

---

## Warm-up

Mr. Elliott wins 1 million dollars in the lottery. He quits teaching. He puts the money into an annuity that pays 6%/a compounded monthly. He will make equal monthly withdrawals for the next 50 years. How much will each withdrawal be worth?

**LOAN – an agreement by a person or business to borrows money from the bank and pay it back with interest.**

Suppose Sammy borrows \$25,000 to purchase a new vehicle. He will be 7%/a compounded monthly and make monthly payments for the next 5 years to pay off the loan. How much is each payment?



Erika will also borrow money at 7%/a compounded monthly. The loan is amortized over 5 years. If she can only afford \$250 monthly payments, how much can she afford to borrow?

How much interest did Erika pay in total?

A mortgage is a special type of loan used to purchase a house. Find the monthly payments on a mortgage for \$280,000 amortized over 25 years at an interest rate of 3%/a. (compounded monthly).



When purchasing a home a person usually saves up money to make a **down payment**. Suppose you want to purchase a home in 5 years. You save \$150 per month to go towards the down payment. The money collects interest at 2.5%/a compounded monthly. How much money will you have saved for a down payment?

## Types of Loans

**Credit Card** – If you do not pay your credit card bill, it is transferred into a loan. The interest rate is often very high on a credit card (anywhere from 15% to as much as 30%)

**Short Term Loan** – A loan over a short period of time (1 – 6 years). Interest rates start at around 5% - 8%.

**Auto Loan** – A loan used to purchase a vehicle. Interest rates usually around 5 – 8%, but might be lower for a brand new vehicle. In this case, your vehicle is collateral for the loan.

**Line of Credit** – This type of loan is a bank account that has a negative balance. You borrow money as you need it. Very common for students, or people who need money in an emergency. Similar interest rate to a short-term loan.

**OSAP – (Ontario Student Assistance Plan)** – A special type of student loan offered by the government of Ontario. While you are a student there is no interest on the loan. You also do not need to start paying off the loan until 6 months after graduation from college/university. Interest rate is similar to a short-term loan.

**Mortgage** – A loan used to purchase a home. Mortgages are typically 15 – 25 years in length. (**Amortization period** is 15-25 years). Interest rates are much lower than other loan (as low as 2%). A down payment (at least 5% in Canada) is required to obtain the mortgage.

*Interest rates above are just simple guidelines..*

**What affects the interest rate on a loan?**

- the type of loan
- your credit history
- your income
- prime interest rates (which go up and down as the Bank of Canada)
- the financial institution (you can “shop” around).

**We will learn more about Automotive Loans and Mortgages next week!**