Sections 8.1 and 8.2

**Interest** - fee charged to borrow money

**Prime Rate** - lowest possible rate, available for large financially sound institutions

**Simple Interest** - interest is applied only to the amount borrowed and not to the interest that has accumulated

**Principal** - original amount of money borrowed

**Compound Interest** - interest is applied to the principal and the interest that accumulates
Simple Interest = Principal (Rate) (Time)  

or  

I = PRT

**Time is always in years unless changed by the user.**

**Promissory Note** - a legal document in which one person agrees to pay money at a date in the future to another person

Maker - the person borrowing the money  
Payee - the person who loaned the money and will receive payment  
Term - time period  
Face Value/Principal - amount being borrowed  
Maturity Value - face value plus interest due at maturity of the note  
Maturity Date - the date the loan must be paid off
Jim borrowed $2500 to put in a sprinkler system at 5.75% for 2 years. How much interest will he owe for the system?

\[ I = PRT \]
\[ I = 2500(0.0575)(2) \]
\[ I = 287.50 \]

**Maturity Value** - Principal plus interest, total amount due from the loan

You borrow money from a friend to get new furniture. You borrow $1500 for 8 months at 3.25%. How much do you pay your friend back?

\[ I = 1500(0.0325)(\frac{8}{12}) \]
\[ I = 32.50 \]

\[ M = 15 + 32.50 = 1532.50 \]
What is the maturity value of a loan for remodeling the kitchen that is $3500 for 5 months at 6.7% interest.

\[
I = 3500 \left(0.067 \times \frac{5}{12}\right)
\]

\[I = 97.71\]

\[M = 3597.71\]

Time is always in years unless changed.

Two ways of calculating interest for simple interest

- **Exact interest** -> use 365 days as the denominator (must be specified)
- **Ordinary, or Banker’s, Interest** -> use 360 as the denominator in the time fraction (all situations unless specified)
We take a promissory note out for $13750 on Jan 8. It is to be paid back in 120 days at 7.85%. What day is the note due and what is maturity with ordinary and exact interest?

Ordinary

\[ I = 13750 \times 0.0785 \times \left( \frac{120}{360} \right) = 359.79 \]

\[ M = 14109.79 \]

Exact

\[ I = 13750 \times 0.0785 \times \left( \frac{120}{365} \right) = 354.86 \]

\[ M = 14104.86 \]

Section 8.2

Finding the parts of simple interest formula

\[ I = PRT \]

\[ P = \frac{I}{RT} \]

\[ T = \frac{I}{PR} \]

\[ R = \frac{I}{PT} \]
Find Principal

How much money would I have to loan my friend for 3 years to get a return of $600 if the interest rate was 9.8%?

\[
\frac{600}{0.098 \times 3} = P
\]

$2040.82 = P

I want to make $50 from some extra money I have. So I write a promissory note on March 13 for 45 days at 6.75%. What would the loan have to be for so I can make my goal?

\[
P = \frac{50}{0.0675 \times \frac{45}{360}}
\]

$P = 5925.93
Find rate

I loan $2000 to a friend so he can buy a wedding ring. We decide that $150 will be good for the interest over the 7 months until he said he should pay me back. What interest rate am I charging my friend?

\[
\frac{150}{2000} = R \left( \frac{7}{12} \right) \\
\]

\[
\frac{\frac{12}{7} \cdot 0.075}{\frac{7}{12}} = R \left( \frac{7}{12} \right)
\]

\[
12.86\% = R
\]

In exact interest, we loan out $3500 on Sept 12 until Dec 25 and we get $575 in interest. What is the interest rate?

\[
\frac{575}{3500 \left( \frac{104}{365} \right)} = R \left( \frac{104}{365} \right)
\]

\[
R = \frac{575}{3500 \cdot \frac{104}{365}}
\]

\[
R = 57.7\%
\]
Finding Time

A friend borrows money for a trip. She borrows $1000 and said she would pay us $50 in interest at 5.5%. So how long does she have to pay us back?

\[ 50 = 1000(0.055)(T) \]

\[ T = \frac{50}{1000 \cdot 0.055} \]

\[ T = \frac{.91 \text{ years}}{360 \text{ days}} \]

\[ T = 327.6 \approx 328 \text{ days} \]

Josh put money in an account earning simple interest. He put in $1950 at 3.8% and got $24.50 in interest. How many days did he leave his money in the account?

\[ 24.50 = 1950(0.038)(T) \]

\[ T = \frac{24.50}{(1950 \cdot 0.038)} \times 360 \]

\[ T = 119 \text{ days} \]
If I loan out $15,000 to another business and they agree to pay 7.85% which comes to $1079.38 in interest. How many months was the loan for?