Applied 40S
Personal Financing
Simple Investments

DEFINITIONS

- There are many definitions that need to be known in this unit.
- ***Term:*** The length of an investment or loan
- ***Principle:*** the amount of money you borrow. It is usually the difference between the selling price and your down payment for a loan.
- ***Interest:*** the amount of money earned on an investment or paid on a loan above and beyond the principle amount.
- ***Maturity:*** the end date of an investment or loan at the end of the term.
- ***Future Value:*** The amount that an investment will be worth after a specified period of time.

- ***Compound Periods:*** Corresponds to the number of payments you will make or the number of times the interest will be added. Annual is once a year, semi-annual is twice, quarterly is 4 times, monthly is 12 times, semi-monthly is 24 times and bi-weekly is 26 times a year.
- ***Simple Interest:*** is the amount of interest earned or paid based on the principle and the simple interest rate. In other words, the amount of interest will be the same every year of the loan or investment.
- ***Compound Interest;*** the interest that is earned or paid on both the principle and the accumulated interest. Here, the amount of interest will be different every year/term.
- ***Rule of 72:*** a formula that estimates the doubling time of an investment. It is **72/I%**. Works best with annual compounds.

SIMPLE INTEREST

- As defined earlier, simple interest applies the interest rate only to the principle amount.
- The formula is:

$$i = prt$$

where i = interest earned
p = principle
r = interest rate in decimal
t = time in years

ex: Mary invested $2500 in a guaranteed investment certificate (GIC) at 2.5% simple interest, paid annually, with a term of 10 years. How much interest will she earn and what is her future value?

$i = prt$
$= (2500)(0.025)(10)$
$= \$625$

ex 2: Grant invested $20,000 in a simple interest Canadian Savings Bond (CSB) that paid annual interest.

a) If the future value is $29,375 at the end of 5 years, what was the interest rate?

$i = 29375 - 20000 = 9375$

$i = prt$

$$\frac{9375}{(20000)(5)} = \frac{(20000)(r)(5)}{(20000)(5)}$$

$r = 0.09375 = 9.38\%$

b) Grant cashed in after 4.5 years. How much money did he end up with using the same info?

$i = prt$

$i = (20000)(0.0938)(4)$

$i = \$7504 + 20000 = \$27{,}504$

i = interest earned P = principle r = interest rat t = time (years)

Interest Earned

$i = prt$

$i = FV - P$

Principle

$P = \frac{i}{(rt)}$

Time

$t = \frac{i}{(Pr)}$

Interest Rate

$r = \frac{i}{(Pt)}$

Future Value

$FV = P + i$

Sometimes we are given the future value (ie, not given the interest earned) without the principle so we need a modified formula to solve these problems:

$A = P + Prt$

where A is the future value
P is the principle
r is the rate (decimal)
t is the time (years)

$A = P + I$
$A = P + Prt$
$A = P(1 + rt)$

x: An investment company is offering a simple interest rate of 4.3% for a GIC with a 6 year term. What principle would you need to invest if you want to have $15 000?

$4.3\% = 0.043$

$A = P + Prt$ can also look like $A = P(1+rt)$

$P = \frac{A}{(1+rt)}$

$15000 = P(1 + (0.043)(6))$

$\frac{15000}{1.258} = \frac{P(1.258)}{1.258}$

$P = \$11\,923.69$

$P = \frac{15000}{(1+(0.043)(6))}$

$$A = \frac{P(1+rt)}{(1+rt)}$$

$$P = \frac{A}{(1+rt)}$$

Finding Principle.