

Math 141 Key Topics: 5.1-5.3

Section 5.1

- **Simple interest** is interest that is computed on the original principal only. If I have a principal of P dollars invested at an interest rate of r per year for t years, then:

$$\text{Interest: } I = Prt$$

$$\text{Accumulated Amount: } A = P + Prt = P(1 + rt)$$

Note: For simple interest formulas, r must be written as a decimal. Also, make sure t is in years.

- **Compound interest** is interest that is computed on the new accumulated amount, not just the original principal, after each compounding period.
- We can solve problems that involve compound interest by using TVM Solver on the calculator.

N = the total number of compounding periods.

$I\%$ = the interest rate *as a percent*.

PV = present value (original principal).

PMT = payment amount per period. (0 if there are no payments.)

FV = future value (accumulated amount).

$P/Y = C/Y$ = number of compounding periods per year.

PMT : **END** BEGIN (For this class, always have END selected.)

To solve for a value, move the cursor to that positions and press *ALPHA*, *ENTER*.

Note: Make a value negative in TVM Solver if money is begin invested or paid. Make a value positive if money is being borrowed or received. This is done to represent the flow of money from the perspective of the investor/borrower. If money is being taken out of your pocket, this is negative flow. If money is being put into your pocket, this is positive flow.

- When interest is **compounded continuously**, we use the following formula to find the accumulated amount:

$$A = Pe^{rt}$$

Note: Again, make sure that r is written as a decimal in this formula and that t is in years.

- The **effective interest rate** is the simple interest rate that would yield the same accumulated amount in one year as the compound interest rate would by compounding m times a year. It is used to compare interest rates. The command *Eff* under the Finance menu computes this for you.

$$Eff(I, m)$$

where I is the interest rate as a percent and m is the number of compounding periods per year.

Sections 5.2 and 5.3

- An **annuity** is a sequence of payments made at regular time intervals. (Ex: Depositing money each month into a savings account.)
- To **amortize** a debt or loan means to pay the debt or loan off with a series of payments. (Ex: Paying off a mortgage or student loans.)
- A **sinking fund** is an account set up for a specific purpose at some future date. (Ex: Retirement account or vacation fund.)
- Some general hints for finance problems:
 1. When taking out a loan, make sure any down payments are subtracted from the original cash price in order to determine the value of the loan.
 2. To find the payment required to pay off a loan, make PV the original value of the loan and set FV equal to 0 (since the loan will be paid off completely.)
 3. To find the outstanding principal (how much you still owe) at a certain point, find the present value (PV) of the remaining payments. (Some instructors teach another method, which is to let N be the number of payments that have already been made and then to solve for FV.)
 4. Equity is how much of an item you actually own (what belongs to you).
Equity = Value of Item - Outstanding Principal