Section 4.1 – Simple Interest and Compound Interest: Future Value and Present Value

Simple Interest

Interest is the amount of money paid for either borrowing money or earning money on a deposit.

Simple Interest is interest that is compounded on the original principal only.

\[ I = P rt \]

\( I \) = Interest
\( P \) = principal (present value)
\( r \) = interest rate (% to decimal)
\( t \) = time in years

Example 1: Find the simple interest on a $1000 investment made for 3 years at an interest rate of 5% per year.

Future Value with Simple Interest

\[ F = P(1 + rt) \]

\( F \) = Future Value
\( P \) = Principal(present value)
\( r \) = interest rate
\( t \) = time in years

Example 2: Mike borrowed $1,200 at 10% simple interest per year. How much is due when the loan matures in 9 months?
Compounded Interest

Interest that charged or earned on the original principal and also on any previously charged or earned interest.

Future Value with Compound Interest Formula:

\[ F = P (1 + i)^n \]

where \( i = \frac{r}{m} \) and \( n = mt \)

\( F \) = Future Value

\( P \) = present value or principal.

\( r \) = the interest rate per year.

\( m \) = the number of compounding periods per year.

\( t \) = time in years.

Example 3: Find the accumulated amount after 5 years if $1700 is invested at 6.25% per year compounded

a. quarterly.

b. semiannually.

Present Value with Compound Interest Formula:

\[ P = F (1 + i)^{-n} \]

where \( i = \frac{r}{m} \) and \( n = mt \)
Example 4: Kim and Ken find that they will need $15,500 to build an addition to their home in 4 years. How much should they invest now at 3.25% per year compounded quarterly to have the desired funds in 4 years?

Example 5: A newborn child receives a $5000 gift towards a college education from her grandparents. How much will the $5000 be worth in 17 years if it is invested at 9% per year compounded quarterly?

Example 6: Kim invested a sum of money 4 years ago in a savings account that has since paid interest at the rate of 6.5% per year compounded monthly. Her investment is now worth $19,440.31. How much did she originally invest?