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.

$$I = Prt$$

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?

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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:

$$F = P(1+i)^n \qquad \text{where } i = \frac{r}{m} \text{ and } n = mt$$

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:

$$P = F(1+i)^{-n} \qquad \text{where } i = \frac{r}{m} \text{ and } n = mt$$

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?