

EE-287 Engineering Economics

Lecture Title:

Simple and Compound Interest

Instructor:

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Simple Interest?

Simple interest is calculated using the “Principal Amount” only ignoring any interest accrued in preceding interest periods

Principal Amount means the amount which is “Borrowed or Lent”.

Simple Interest = (Principal Amount)x(Number of Periods)x(Interest Rate).....(1)

Explanation Example

A company borrows \$1 million (i.e. \$10,00,000/-) for 3 years at 5% per year
(Simple Interest)

Determine:

- (1) How much money will the company repay at the end of 3 years?
- (2) Tabulate the results in \$1000 units

Point to Remember: \$1 million (i.e. \$10,00,000/-) has 1000 units of \$1000/-
So the calculation can be done using a single unit of \$1000 and can be enhanced later



Solution (Part 1)

How much money will the company repay at the end of 3 years?

Taking a \$1000/- unit out of \$1 million and using relation (1)

Total Interest (3 years) = (Principal Amount)x(Number of Periods)x(Interest Rate)

Total Interest (3 years) = (1000)x(3)x(0.05)

Total Interest (3 years) = \$150

Meaning \$50/- per year

The amount to be repaid after 3 years per \$1000/- unit = \$1000 + \$150 = \$1150

Total Interest (3 years) on \$1 million = \$150 x 1000 = \$150,000/- (Enhanced)

Meaning \$50,000/- per year

**The amount to be repaid after 3 years on \$1 million = \$1150 x 1000 = \$11,50,000/-
(Enhanced)**



Solution (Part 2)

Tabulate the results in \$1000 units

End of Year	Amount Borrowed	Interest	Amount Owed	Amount Paid
t = 0	\$1000	-	-	-
1	-	\$50	\$1050	-
2	-	\$50	\$1100	-
3	-	\$50	\$1150	\$1150

$\$1150 \times 1000 = \$11,50,000/-$ (Enhanced)



Compound Interest?

In Compound interest plan, interest for each interest period is calculated on the Principal plus the total amount of interest accumulated in all previous periods

Thus, Compound Interest means “Interest on top of Interest”

Compound Interest = (Principal Amount + All accrued interest)x(Interest Rate)...(2)

Hint: Do not use directly, use stepwise approach as shown in example

Explanation Example

A company borrows \$1 million (i.e. \$10,00,000/-) from another source for 3 years at 5% per year (Compound Interest)

Determine:

- (1) How much money will the company repay at the end of 3 years?
- (2) Compare the results with previous example (Simple Interest)

Point to Remember: \$1 million (i.e. \$10,00,000/-) has 1000 units of \$1000/-
So the calculation can be done using a single unit of \$1000 and can be enhanced later



Solution (Part 1)

How much money will the company repay at the end of 3 years?

Here,

Interest and Total Amount Due (TAD) are computed separately using relation (2)

In \$1000 Units:

Year 1 Interest: $\$1000 \times (0.05) = \50

TAD after Year 1 = $\$1000 + \$50 = \$1050$

Year 2 Interest: $\$1050 \times (0.05) = \52.50

TAD after Year 2 = $\$1050 + \$52.50 = \$1102.50$

Year 3 Interest: $\$1102.50 \times (0.05) = \55.13

TAD after Year 3 = $\$1102.50 + \$55.13 = \$1157.63$

The amount to be repaid after 3 years on \$1 million = $\$1157.63 \times 1000$

= $\$11,57,630/-$ (Enhanced)



Solution (Part 2)

Compare the result with previous example (Simple Interest)

Comparison:

Repayment on Simple Interest Plan = \$11,50,000/-


Repayment on Compound Interest Plan = \$11,57,630/-

Difference = Compound Interest Repayment – Simple Interest Repayment

= \$11,57,630 - \$11,50,000

= \$7630/- more on Compound Interest Plan





Thank You for listening

