

TUTORIAL 5

BUSINESS MATHEMATICS

Simple interest is computed with the formula:

$$I = Pin,$$

Where, I = simple interest, P = principal, i = interest rate per time period, n = number of time periods of loan

$$\text{Amount at end of period, } A = P + Pin = P(1 + in)$$

Example 1:

You have taken a loan of \$10,000, for which simple interest is charged at 5% per year. If you repay the entire loan at the end of 2 years, how much did you repay?

Answer:

$$I = ?, P = 10,000, i = 5\%, n = 2$$

$$I = 10,000 \times 0.05 \times 2 = 1000; \text{ repaid } 10,000 + 1,000 = 11,000$$

OR

$$A = P + Pin = 10,000 + 10000 \times 0.05 \times 2 = 11,000$$

1.) Find n :

- a.) $1.125^n = 5,000$
- b.) $1.04^n = 20,000$

2.) \$2,000 is invested at an interest rate of 6.5% for:

- a.) Two years
- b.) Four years

Find the simple interest earned.

3.) A businessman invests \$10,000, and earns simple interest of \$432 in the first half of the year. Find his annual rate of interest

4.) A firm obtains a loan of \$150,000 for 8 months, at a simple interest rate of 10.5%. How much should the firm repay?

5.) Find the total amount due on a loan of RM1800 at 15% simple interest at the end of 3 months.

6.) A student purchases a computer priced at RM1,500. He pays RM1620 six months later, in full payment of the initial amount plus interest. Find the interest rate.

Compound interest rate is given by:

$$S = P(1+i)^n$$

where,

S = compound amount

P = principal

i = interest rate per compounding period

n = number of compounding periods

Example:

You invest RM2000 in a savings account which earns interest at a rate of 4% per year compounded annually.

Find the compound amount after 8 years.

Answer:

$$S = P(1+i)^n$$

where $S = ?$, $P = 2000$, $i = 4\%$, $n = 8$

$$S = 2,000 (1+0.04)^8 = \$2737.14$$

- 7.) How long will it take RM5000 to grow to RM6000 when it is invested at 9% compounded monthly?
- 8.) If RM 2000 is invested at 4% compounded (i) annually (ii) semi-annually (iii) quarterly and (iv.) monthly, find the amount after 5 years (to the nearest sen)
- 9.) How many years will it take for RM10,000, compounded annually at 7%, to reach RM15,000?
- 10.) Find the rate of interest compounded semi-annually at which RM15,000 will grow to \$20,000 in 10 years
- 11.) How many years will it take for a sum of money to triple at 8% compounded annually?
- 12.) What nominal interest rate compounded quarterly gives an effective rate of 8.5%?
- 13.) Which is a better investment and why: 9% compounded monthly or 9.3% compounded annually?
- 14.) A debtor can discharge his liabilities by paying RM19,000 now or RM20,000 in two years. If money is only worth 10% compounded semiannually, which is better?

Independent study: BUD Chapter 8