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Time Value of Money

Calculator Tricks

Simple Interest:

SI = Principle $\times \frac{\text{Rate}}{100} \times \text{Time}$

OR
 $P \times \frac{R}{100} \times T$

SI = Principle $\times \text{Rate} \% \times \text{Time}$

OR
 $P \times R \% \times T$

Question

SI on Rs. 3500 for 3 years at 12% P.a is

- a) Rs. 1200
- b) 1260
- c) 2260
- d) None of these

SI = $P \times \frac{R}{100} \times T$

= $3500 \times \frac{12}{100} \times 3$

SI = 1260

SI = $P \times R \% \times T$

SI = $3500 \times 12 \% \times 3$

SI = 1260

∴ SI = 1260 which is option (b)

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→ Important
to press
% key
on
calculator

→ Press
% key
on
calculator
is
Important

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IF Question Gives SI and asks Principle (P)
or Rate (R) or Time (T) or any two of three

OR

Advance Question on SI (Simple Interest)

Formula To Calculate Rate

$$\text{Rate} = \frac{\text{SI} \times 100}{\text{Principle} \times \text{Time}}$$

OR

$$R = \frac{\text{SI} \times 100}{P \times T}$$

Sometimes SI is more than Principle that means SI is added to Principle which is called as Total amount

$$\underline{\underline{\text{Amount} = \text{SI} + \text{Principle}}}$$

To find out SI

$$\text{SI} = \text{Amount} - \text{Principle}$$

OR

$$\text{SI} = A - P$$

Formula To Calculate Time

$$\text{Time} = \frac{\text{SI} \times 100}{\text{Principle} \times \text{Rate}}$$

OR

$$T = \frac{\text{SI} \times 100}{P \times R}$$

When Amount is given (i.e. $\text{SI} > P$)

$$\text{SI} = A - P$$

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Formula to Calculate Principle

$$\text{Principle} = \frac{SI \times 100}{\text{Rate} \times \text{Time}}$$

OR

$$P = \frac{SI \times 100}{R \times T}$$

When Amount is given instead of SI (i.e. SI > P)

$$SI = \text{Amount} - P$$

All formulas at one place

$$P = \frac{SI \times 100}{R \times T}$$

$$R = \frac{SI \times 100}{P \times T}$$

$$T = \frac{SI \times 100}{P \times R}$$

Here Formulas are similar for Principle (P), Rate (R) and Time (T) but just interchange of position of P, R & T

Question

To find out principle

Find Principle when Time is 5 years, SI is 500 and Rate = 5% P.A. ?

- a) 1000 b) 2000
- c) 3000 d) 4000 ✓

$$P = \frac{SI \times 100}{R \times T} = \frac{500 \times 100}{5 \times 5} = \frac{50000}{25} = 2000$$

∴ Principle = 2000 which is option (b)

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To find out Rate (R)

Find Rate (R), when Principal = ₹3000
SI = ₹400 ; Time = 3 years?

- a) 10.9% b) 8.88% c) 4.44% d) 2.24%

$$\text{Rate} = \frac{\text{SI} \times 100}{P \times T} = \frac{400 \times 100}{3000 \times 3} = \frac{40000}{9000} = 4.44$$

∴ Rate = 4.44% = (C) → option

To find out Time (T)

Find Time when, Principle P = ₹1500, interest
is ₹450, Rate = 5% p.a.?

- a) 9 years b) 6 years
c) 10 years d) 7 years

$$T = \frac{\text{SI} \times 100}{P \times R} = \frac{450 \times 100}{1500 \times 5} = \frac{45000}{7500} = 6$$

∴ Time = 6 years = option (b)

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To find out Rate, Principle and Time when Amount is given instead of SI (simple interest) or $SI > P$

To find out SI
formula is $SI = A - P$

Example or Question

Find Rate, when Principle ₹10000 amounts to 12000 in 2 years?

- a) 20% b) 10% c) 5% d) 15%

As ~~here~~ here Amount is given = 12000

or
here SI is greater than Principle
 $12000 > 10000$

$SI = \text{Amount} - \text{Principle}$

$= 12000 - 10000$

$SI = 2000$

$\therefore SI = 2000$

Now Apply Rate formula

$\text{Rate} = \frac{SI \times 100}{P \times T} = \frac{2000 \times 100}{10000 \times 2} = \frac{200000}{20000} = 10$

\therefore Rate = 10% which is equal to option (b)

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Further Advance Question → Pf Question Gives Two Items and asks for Remaining Two Items

Use Reverse Approach

means option to Question

Example of Question

The simple Interest for 2 years on a certain Principle (P) amounts to 2000 (SI). Then find out Principle and Rate?

- Principle is ₹10000 and Rate is 10%.
- Principle is ₹90000 and Rate is 10%.
- Principle is ₹5000 and Rate is 5%.
- Principle is ₹9000 and Rate is 20%.

Here we have to use reverse approach
means option to Question

Use option a) $P = 10000$ and $R = 10\%$.

then → $SI = P \times R\% \times T$

$= 10000 \times 10\% \times 2$ → Given in Question

$= 2000$ → which is given in Question also

∴ Option (a) is correct.

SIMPLE INTREST

1. S.I on Rs. 3500 for 3 years at 12% per annum is
(a) Rs. 1200 (b) 1260
(c) 2260 (d) none of these
2. A certain sum of money trebles itself in 10 years at a certain rate of S.I. p.a. then the rate of interest is
(a) 20% (b) 10%
(c) 5% (d) None
3. A sum of money amount to Rs. 6200 is 2 years and Rs. 7400 in 3 years. The principal and rate of interest are
(a) Rs. 3800 31.57%
(b) Rs. 3000, 20%
(c) Rs. 3500, 15%
(d) none of these
4. A sum of Rs. 46,875 was lent out at simple interest and at the end of 1 year 8 months the total amount was Rs. 50,000. Find the rate of interest per cent per annum.
(a) 4% (b) 5%
(c) 7% (d) None
5. It the simple interest on Rs. 20,000 increases by Rs. 4,000 with the increase of time by 4 Yrs. Find the rate per cent per annum.
(a) 0.15% (b) 0.5%
(c) 5% (d) None

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