

# Question on Compound Interest and Simple Interest

① If the compound interest on a certain sum for 2 years at 10% per annum is Rs. 525. The simple interest on the same sum for double the time at half the percent per annum is:

- A) 400 rupees      B) 500 rupees      C) 600 rupees  
 D) 800 rupees

Given,

Compound interest = ₹ 525

Time = 2 years

Rate of interest = 10%

Let the principal be  $x$ .

Principal = Amount - Compound Interest

A/Q,

$$\Rightarrow x = P \left[ 1 + \frac{r}{100} \right]^n - 525$$

$$\Rightarrow x = x \left[ 1 + \frac{10}{100} \right]^2 - 525$$

$$= x \left[ \frac{110}{100} \times \frac{110}{100} \right] - 525$$

$$= \frac{121x}{100} - 525$$

$$\Rightarrow x = \frac{121x - 52500}{100}$$

$$\Rightarrow 100x = 121x - 52500$$

$$\Rightarrow 52500 = 121x - 100x$$

$$\Rightarrow 52500 = 21x$$

$$\Rightarrow \frac{52500}{21} = x$$

$$\Rightarrow 2500 = x$$

For Simple Interest,

Principal = ₹ 2500

Rate of interest =  $\frac{10\%}{2} = 5\%$

Time =  $2 \times 2 = 4$  years

Simple Interest =  $\frac{P \times r \times t}{100} = \frac{2500 \times 5 \times 4}{100}$

= ₹ 500

∴ Hence, the simple interest is ₹ 500

2. The simple interest on a certain sum of money for three years at 8% per annum is half the compound interest on Rs 4000 for 2 years at 10% per annum. The sum placed on simple interest is:

- A) 1550 rupees    B) 1650 rupees    C) 1750 rupees  
 D) 2000 rupees.

Given,

For Compound Interest,

$$\text{Principal} = ₹ 4000$$

$$\text{Time} = 2 \text{ years}$$

$$\text{Rate of interest} = 10\%$$

$$\text{Amount} = P \left( 1 + \frac{r}{100} \right)^n$$

$$= 4000 \times \left[ 1 + \frac{10}{100} \right]^2$$

$$= 4000 \times \frac{110}{100} \times \frac{110}{100}$$

$$= ₹ 4840$$

$$\begin{aligned} \text{Compound Interest} &= \text{Amount} - \text{Principal} \\ &= ₹ (4840 - 4000) \\ &= ₹ 840 \end{aligned}$$

$$\begin{aligned} \text{Simple Interest} &= \frac{1}{2} \text{ of Compound Interest} \\ &= \frac{1}{2} \times 840 \\ &= ₹ 420 \end{aligned}$$

$$\text{Time} = 3 \text{ years}$$

$$\text{Rate of interest} = 10\%$$

$$\text{Simple Interest} = \frac{P \times r \times T}{100} = 420$$

$$\begin{aligned} \text{Principal} &= \frac{\text{SI} \times 100}{T \times R} = \frac{420 \times 100}{3 \times 10} = \frac{420 \times 100}{3 \times 8} \\ &= ₹ 1400 = ₹ 1750 \end{aligned}$$

∴ Hence, the sum of money placed on simple interest is ~~₹ 1400~~ ₹ 1750.

3. There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Rs. 12000 after 3 years at the same rate?

- A) 2160 rupees    B) 3120 rupees    C) 3972 rupees    D) 6240 rupees  
 E) None of these.

For Simple Interest,

Time = 6 years

Increase in simple interest = 60%

Let the principal be ₹ 100

Simple Interest = 60% of 100

$$= \frac{60}{100} \times 100 = ₹ 60$$

$$\text{Rate of interest} = \frac{\text{SI} \times 100}{\text{PT}} = \frac{60 \times 100}{100 \times 6} = 10\%$$

For Compound Interest,

Time = 3 years

Principal = ₹ 12000

Rate of interest = 10% p.a.

$$\text{Amount} = P \left[ 1 + \frac{r}{100} \right]^n$$

$$= 12000 \times \left[ 1 + \frac{10}{100} \right]^3$$

$$= 12000 \times \frac{110}{100} \times \frac{110}{100} \times \frac{110}{100}$$

$$= ₹ 15,972$$

Compound interest = Amount - Interest

$$= ₹ (15972 - 12000)$$

$$= ₹ 3972$$

∴ Hence, the compound interest is ₹ 3972

Q. The difference between compound interest and simple interest on an amount of ~~Rs. 15000~~ Rs. 15000 for 2 years is Rs 96. What is the rate of interest per annum?

A) 8      B) 10      C) 12      D) Cannot be determined

E) None of these

Given,

Principal = ₹ 15,000

Time = 2 years

CI - SI = ₹ 96

Let the rate of interest be  $r\%$ .

$$\text{Simple interest} = \frac{PTR}{100} = \frac{15000 \times 2 \times r}{100}$$

$$\text{Compound interest} = P \left[ \left( 1 + \frac{r}{100} \right)^n - 1 \right]$$

$$= 15000 \times \left[ \left( 1 + \frac{r}{100} \right)^2 - 1 \right]$$

$$= 15000 \times \left[ 1 + \frac{r^2}{10000} + \frac{2r}{100} - 1 \right] = 15000 \times \left[ \frac{r^2 + 200r}{10000} \right]$$

$$A/Q, \Rightarrow 96 = 15000 \times \left[ \frac{x^2 + 20000x}{10000} \right] - \frac{15000 \times 2 \times x}{100}$$

$$\Rightarrow 96 = 15000 \times \left[ \frac{x^2 + 20000x}{10000} - \frac{2x}{100} \right]$$

$$\Rightarrow 96 = 15000 \times \frac{x^2}{10000}$$

$$\Rightarrow 96 = \frac{15x^2}{10}$$

$$\Rightarrow \frac{96 \times 10}{15} = x^2$$

$$\Rightarrow \cancel{64x^2} \Rightarrow 64 = x^2 \Rightarrow \sqrt{64} = x \Rightarrow 8 = x$$

Rate of ~~percent~~ interest = 8%

∴ Hence, the rate of ~~percent~~ interest per annum is 8%