

Simple and Compound Interest

Simple and Compound Interest



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This Video Completely covers Simple and Compound Interest which is more than sufficient for all kind of placement Exams eg: TCS/WIPRO/AMCAT/ELITMUS/CoCubes and all other placement Exams.

SI & CI by : Pratik Shrivastava(10 years of industry experience and awarded as best Aptitude trainer)

Simple and Compound Interest

Q1. What would be the simple interest obtained on an amount of Rs. 1200 at the rate of 10% per annum after 6 yrs.?

- a) Rs.840 b) ☒ Rs.720 c) Rs.950 d) Rs.1089 e) None of these

Solution:

$$\begin{array}{l} P = 1200 \\ R = 10\% \\ t = 6 \end{array}$$

$$S.I = \frac{P \times R \times t}{100} \quad \checkmark$$

$$\begin{array}{l} S.I: \frac{1200 \times 10 \times 6}{100} \\ = 720 \end{array}$$

P: Principal
R: rate of interest
t: time

Simple and Compound Interest

Q2. What would be the simple interest obtained on an amount of Rs. 6535 at the rate of 10% per annum after 6 yrs.?

- a) Rs.3414 b) ☒ Rs.3921 c) Rs.3807 d) Rs.3149 e) None of these

Solution:

$$S.I = \frac{P \times R \times t}{100}$$

$$\begin{array}{r} 1307 \\ 6535 \times 10 \times 6 \\ \hline 51060 \\ = 3921 \end{array}$$

Simple and Compound Interest

Q3 What would be the simple interest obtained on an amount of Rs. 5760 at the rate of 6% per annum after 3 yrs.?

- a) Rs.1036.80 b) Rs.1063.80 c) Rs.1336.80 d) Rs.1666.80 e) None of these

Solution:

$$\begin{aligned} SI &= \frac{P \times R \times T}{100} \\ &= \frac{5760 \times 6 \times 3}{100} \\ &= \frac{18 \times 576}{10} \\ &= \frac{18 \times (500 + 70 + 6)}{10} \\ &= \frac{18 \times 576}{10} \\ &= 1036.8 \end{aligned}$$

Simple and Compound Interest

Suppose you deposit 100rs to the Bank on SI at rate of 10% for 3 years.

100 -----10%-----=> 10

100-----10%-----=> 10

100-----10%-----=> 10

=====

Total 30rs interest bank will give you after 3years.

Simple interest is always calculated on principal.

Suppose you deposit 100rs to the Bank on CI at rate of 10% for 3 years.

100 -----10%-----=> 10 ----> Now Amount= 100+10 = 110

110-----10%-----=> 11 ----> Now Amount= 110+11= 121

121-----10%-----=> 12.1 --> Now Amount = 121 +12.1 =133.1

=====

Total 33.1rs Interest bank will give you after 3years.

Compound interest is always calculated on Amount

Difference
between
Simple and
Compound
Interest

SI = CI
1 year

Simple and Compound Interest

Simple Interest Formula:

$$SI = (P * R * T) / 100$$

Compound Interest Formula:

$$CI = P (1 + r/100)^n - P$$

$$A = CI + P$$

$$CI = A - P \Rightarrow A = (1 + r/100)^n$$

Now, In the Questions it might have told, Mr X invested an amount/Sum/money

Any kind of Investment --> That means Principal

Now What is Amount: Suppose u invest 1000rs and you get a interest of 100rs,

then at the end of 1 year you get: $P(1000) + I(100) = A(1100)$

So Amount will be always

Amount = Principal + SI/CI

Where
P =Principal
R= Rate
n/T = Time

Simple and Compound Interest

Q4. How much time will take for an amount of Rs. 450 to yield Rs. 81 as interest at 4.5% per annum of simple interest ?

- a) 4 years b) 2.5 years c) 3.5 years d) 2 years e) None of these

Solution:

S.I ✓

$$P = 450$$

$$I = 81$$

$$R = 4.5\%$$

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

$$81 = \frac{450 \times 4.5 \times t}{100}$$

$$t = 4 \text{ years}$$

Simple and Compound Interest

Q5. A sum of money doubles itself in 8 years. In how many years it will be 6 times?]

- a. 10 years b. 20 years c. 30 years d. 40 years]

(S.I)

Solution:

Trick

$\frac{P}{100}$	<u>8 years</u>	$A = 200 \left(\frac{P}{100} + \frac{I}{100} \right)$
$\frac{P}{100}$	<u>40 years</u>	$A = 600 \left(\frac{P}{100} + \frac{I}{100} \times 5 \right)$

$$8 \times 5 = 40 \text{ years}$$

Simple and Compound Interest

Q6. A sum of money triples itself in 5 years. In how many years it will be 9 times?]

- a. 10 years b. 20 years c. 30 years d. 40 years]

Solution:

$\frac{P}{100}$	<u>5 years</u>	$A = 300 \left(\frac{P}{100} + \frac{I}{100} \right)$
$\frac{P}{100}$	<u>20 years</u>	$A = 900 \left(\frac{P}{100} + \frac{I}{100} \times 4 \right)$

$$5 \times 4 = 20 \text{ years}$$

Simple and Compound Interest

Q7. Mr. Dinesh invested a sum of money 15440 at simple interest for 6 years at the rate of 10%. After 6 years Mr. Dinesh got an amount of 24704. What is the Simple interest he got after 6 years?

Solution:

Any kind of investment = Principal

$$P = 15440$$

$$t = 6 \text{ years}$$

$$r = 10\%$$

$$\begin{aligned} A &= P + I \checkmark \\ \Rightarrow 24704 &= P + I \\ &= 24704 = 15440 + SI \\ &= 24704 - 15440 = SI \\ &= 9264 \checkmark \end{aligned}$$

Simple and Compound Interest

Q8. Mr. Deepak invested an amount of Rs. 21,250/- for 6 yrs. At what rate of simple interest will he obtain the total amount of Rs. 26,350/- at the end of 6 yrs?

- a) 6p.c.p.a b) 5p.c.p.a c) 8p.c.p.a d) 12p.c.p.a e) ~~None of these~~

Solution:

$$P = 21250$$

$$t = 6 \text{ years}$$

$$A = 26350 \checkmark$$

$$SI = \frac{P \times r \times t}{100}$$

$$A = 26350 = P + I$$

$$26350 = 21250 + SI \checkmark$$

$$SI = 5100 \checkmark$$

$$5100 = \frac{21250 \times r \times 6}{100}$$

$$r = 4\%$$

Simple and Compound Interest

Q9. A sum of money at Simple Interest amounts to Rs. 650 in 3 years and Rs. 750 in 5 years. What is the principal?

Solution:

Diagram illustrating the problem:

```

    P = 500
    |
    +--- 3 years ---> 650
    |
    +--- 5 years ---> 750
    
```

Calculation:

$$\begin{aligned} 3 \times 50 &= 150 \\ 650 - 150 &= 500 \\ \text{2 year} &= 750 - 650 = 100 \\ \text{1 year} &= \frac{100}{2} = 50 \end{aligned}$$

Simple and Compound Interest

Q10. Reena took a loan of Rs. 1200 with simple interest for as many years as the rate of interest. If she paid Rs. 432 as interest at the end of the loan period, what was the rate of interest?

A.3.6 B.6 C.18 D.Cannot be determined E.None of these

$$\begin{aligned}
 P &= 1200 \\
 SI &= 432 \\
 t &= r = x \\
 SI &= \frac{P \times r \times t}{100} \\
 432 &= \frac{1200 \times x \times x}{100} \\
 x^2 &= 36 \\
 x &= 6
 \end{aligned}$$

Simple and Compound Interest

Q11. Find out the compound Interest obtained on an amount of Rs.12000 at the rate of 5% Per annum for 2years?

a.1130rs b.1320rs c.1230rs d.1330rs

Solution:

Basic (Formula Free)

$$1 \quad 12000 \quad \frac{5\%}{100} = 600 \Rightarrow 12000 + 600 = 12600$$

$$2. \quad 12600 \quad \frac{5\%}{100} = 630 \Rightarrow \underline{1230}$$

$$C.I = P(1 + \frac{r}{100})^t$$

$$\frac{12000 \times 5}{100}$$

Simple and Compound Interest

Q12. Find out the compound Interest obtained on an amount of Rs.10000 at the rate of 7% Per annum for 2years?

a.1130rs b.1320rs c.1230rs d.1449rs

Solution:

Basic
C.I \Rightarrow Amount

$$P = 10,000, r = 7\%, t = 2 \text{ year}$$

Formula Free

$$1 \text{ year } 10,000 \quad \frac{7\%}{100} = 700 \quad [10,000 + 700] = 10700$$

$$2 \text{ year } 10700 \quad \frac{7\%}{100} = 749 \quad \underline{1449} \checkmark$$

Simple and Compound Interest

Q12. Find out the compound Interest obtained on an amount of Rs.10000 at the rate of 7% Per annum for 2years?

a.1130rs b.1320rs c.1230rs d.1449rs

Solution:

$$P = 10,000, r = 7\%$$

$$C.I. = 2 \times \frac{10,000 \times 7}{100} + \frac{10,000 \times 7}{100} \times \frac{7}{100}$$

$$\begin{aligned} C.I. &= 2a + b \\ a &= \frac{P \times r}{100} \\ b &= \frac{a \times r}{100} \end{aligned}$$

$$1400 + 49 = 1449$$

Simple and Compound Interest

Q13. What would be the compound interest obtained on an amount of Rs. 4000/- at the rate of 5% per annum after 3 yrs.? a) Rs.612/- b) Rs.578/- c) Rs.525.5 d) Rs.630.5 e) None of these

Solution:

$$\begin{aligned} \text{1 year } & 4000 \xrightarrow{5\%} 200 [A = 4000 + 200 = 4200] \\ \text{2 year } & 4200 \xrightarrow{5\%} 210 [A = 4200 + 210 = 4410] \\ \text{3 year } & 4410 \xrightarrow{5\%} 220.5 \\ & \underline{630.5} \end{aligned}$$

Simple and Compound Interest

Q13. What would be the compound interest obtained on an amount of Rs. 4000/- at the rate of 5% per annum after 3 yrs.? a) Rs.612/- b) Rs.578/- c) Rs.525.5 d) Rs.630.5 e) None of these

Solution:

$$\begin{aligned} 3 \times \frac{4000 \times 5}{100} + 3 \times \frac{4000 \times 5}{100} \times \frac{5}{100} &= 600 + 30 + 0.5 \\ 630.5 + \frac{4000 \times 5}{100} \times \frac{5}{100} \times \frac{5}{100} &= 630.5 + 0.5 \\ C.I. &= 3a + 3b + c \\ C.I. &= 4a + 6b + 4c + d \\ a &= \frac{P \times r}{100} \\ b &= \frac{a \times r}{100} \\ c &= \frac{b \times r}{100} \end{aligned}$$

Simple and Compound Interest

Q14. What would be the compound interest obtained on an amount of Rs. 5000/- at the rate of 6% per annum after 3 yrs.?

- a) Rs.612/- b) Rs.578/- c) Rs.525.5 d) Rs.630.5

e) None of these

Solution:

Formula free

1 year	5000	6%	300	[5000 + 300]
2nd	5300	6%	318	[5300 + 318 = 5618]
3rd	5618	6%	337.08	
			955.08	

337.08

$$C.I = P \left(1 + \frac{r}{100}\right)^n - P$$

$$5000 \left(1 + \frac{6}{100}\right)^3 - 5000$$

$$5000 \times \left(\frac{53}{50}\right)^3 - 5000$$

3-4 min

Simple and Compound Interest

Q15. The difference between simple and compound interests compounded annually on a certain sum of money for 2 years at 4% per annum is Re. 1. The sum is:

- A. Rs.600 B. Rs.645
C. Rs.525 D. Rs.625

Solution:

$$\checkmark [(S.I) - (C.I)]_2 = \frac{Pr^2}{100}$$

$$1 = \frac{P \times 4 \times 4}{100 \times 100}$$

$$P = 625$$

r: 4%

Simple and Compound Interest

Q16. The difference between simple interest and compound interest on a certain sum of money for three years at 10% per annum is Rs. 15 and paise 50. The sum is:

- (a) Rs. 5,000 (b) Rs. 550 (c) Rs. 5,500 (d) Rs. 500 (e) Rs. 1,500

Solution:

$$[S.I - C.I]_3 = \frac{Pr^2(300 + r)}{100^3}$$

$$\frac{31}{2} = \frac{P \times 10 \times 10 \times 310}{100 \times 100 \times 100}$$

$$P = 500$$

15 x 50 / 100 = 7.5 = 15 1/2 = 31 1/2

Simple and Compound Interest

Q17. The compound interest on Rs. 30,000 at 7% per annum is Rs. 4347. The period (in years) is:

A. 2 B. 2.5 C. 3 D. 4

Solution:

$$S.I. = \frac{P \times R \times T}{100}$$

$$C.I. > S.I.$$

[Option Attack]

$$\frac{30000 \times 7 \times 2}{100} = 4200$$

$$P = 30,000, R = 7\%, C.I. = 4347$$

$$\begin{array}{r} 2100 \\ 1050 \\ \hline 4200 \\ 1050 \\ \hline 5250 \end{array}$$

Simple and Compound Interest

Q18. Find out the compound interest on Rs. 5000 at 4% per annum for $1\frac{1}{2}$ years at 4% per annum compounded yearly?

a. 300 b. 305 c. 306.24 c. 350

Very Basic (e) 304

yearly

$$P = 5000$$

$$R = 4\%$$

$$t = 1\frac{1}{2} \text{ years}$$

$$1 \text{ year: } 5000 \times \frac{4}{100} = 200$$

$$\frac{6 \text{ month}}{6} = \frac{1}{2}$$

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

$$\frac{5200 \times 4 \times \frac{1}{2}}{100} = 104$$

$$\begin{array}{r} 200 + 104 \\ \hline 304 \end{array}$$

Simple and Compound Interest

Q18. Find out the compound interest on Rs. 5000 at 4% per annum for $1\frac{1}{2}$ years at 4% per annum compounded half yearly?

a. 300 b. 305 c. 306.24 c. 350

Quarterly

$$R/4$$

$$t \times 4$$

$$R = 4\% = \frac{4}{2} = 2\%$$

$$t = \frac{3}{2} \text{ years} = \frac{3}{2} \times 2 = 3 \text{ years}$$

$$R = \frac{4}{4} = 1\%$$



30

18

$$\begin{array}{r} 5000 \times \frac{2}{100} = 100 \quad [5000 + 100 = 5100] \\ 5100 \times \frac{2}{100} = 102 \quad [5100 + 102 = 5202] \\ 5202 \times \frac{2}{100} = 104.04 \\ \hline 306.04 \end{array}$$

$$\begin{array}{r} 104.04 \\ \hline 100 \end{array}$$

Simple and Compound Interest

Q19) If the compound interest on a certain sum for two years at 10% p.a. is Rs. 2,100 the simple interest on it at the same rate for two years will be

- (a) Rs. 1,980 (b) Rs. 1,760 (c) Rs. 2,000 (d) Rs. 1,800 (e) Rs. 1,805

$$C.I. \text{ 2 years } = 10\%, 2100$$

S.I.

$$\frac{10,000 \times 10 \times 2}{100} = 2000$$

$$C.I. = P \left(1 + \frac{r}{100} \right)^n - P$$

$$2100 = P \left[\left(1 + \frac{10}{100} \right)^2 - 1 \right]$$

$$2100 = P \left[\frac{121 - 100}{100} \right] \quad 2100 = P \left(\frac{11}{10} \right)^2 - 1$$

$$2100 = P \times \frac{21}{100} \quad 2100 = P \left[\frac{121}{100} - 1 \right]$$

$$P = 10000$$

Simple and Compound Interest

Q20) A sum is being lent at 20% per annum compound interest. what is the ratio of increase in amount of 4th year to 5th year?

- A) 4:5 B) 5:4
C) 5:6 D) can't be determined

$$(A) = P + I$$

$$C.I. = P \left(1 + \frac{r}{100} \right)^n - P$$

$$C.I. + P = P \left(1 + \frac{r}{100} \right)^n$$

↓
A

$$\frac{C_4}{C_5} = \frac{P \left(1 + \frac{20}{100} \right)^4}{P \left(1 + \frac{20}{100} \right)^5 \left(1 + \frac{20}{100} \right)}$$

$$\frac{C_4}{C_5} = \frac{100^4}{120^6} \quad 5:6$$

Simple and Compound Interest

Q21) A T.V set is available for Rs. 19650 cash payment or for Rs. 3100 cash down payment and three equal annual installments. If the shopkeeper charges interest at the rate of 10% per annum compounded annually, calculate the amount of each installment.

Solutions:

Total cost = 19650 $\frac{6655}{\text{Installment} = (P + I)}$ ✓

down payment = 3100

$19650 - 3100 = 16550$ ✓

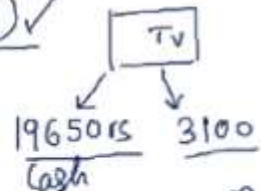
$r = 10\%$

let x is the value of each installment.

$$x + \frac{x}{\left(1 + \frac{10}{100} \right)^1} + \frac{x}{\left(1 + \frac{10}{100} \right)^2} + \frac{x}{\left(1 + \frac{10}{100} \right)^3} = 16550$$

$$\Rightarrow \frac{10x}{11} + \frac{100x}{121} + \frac{1000x}{1331} = 16550$$

$$3310x = 16550 \times 1331 = 6655 \times \frac{1210x + 1100x + 1000x}{1331} = 16550$$



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

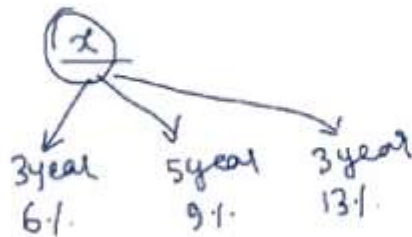
$$P = \frac{A}{\left(1 + \frac{r}{100} \right)^n}$$

Simple and Compound Interest

Q22 Pratik borrowed some money at the rate 6% pa. for the first 3 years, 9% pa for the next 5 years and 13% pa beyond 8 years. The above are all simple interest rates. If Pratik pays a total of Rs.8,160 after 11 years, how much money did he borrow.

- a. Rs.8000 b. Rs.11000 c. Rs.12000 d. Rs.14000

Solutions:



$$\begin{aligned}
 \text{Simple} &= 8160 \\
 \frac{P \times R \times T}{100} &= 18x + 45x + 39x \\
 \frac{x \times 3 \times 6}{100} + \frac{x \times 5 \times 9}{100} + \frac{x \times 3 \times 13}{100} &= 8160 \\
 \frac{102x}{100} &= \frac{8160}{1} \\
 x &= 8000
 \end{aligned}$$

Simple and Compound Interest

Q23 How long will it take to pay off a debt of Rs. 8800 if Rs. 250 is paid in the first month, Rs. 270 in second month, Rs. 290 in the third month and so on?

1. 20 months 2. 24 month 3. 18 month 4. 36 months

Solutions:



8800

250, 270, 290, 310, ...

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

d: Common

$$8800 = 240n + 10n^2$$

$$28800 = \frac{n}{2} [2 \times 250 + (n-1)20]$$

$$8800 = \frac{n}{2} [500 + 20n - 20]$$

$$8800 = \frac{n}{2} \times 480 + \frac{n}{2} \times 20n$$

8800