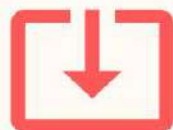


PRACTICE **MOCK**

Simple/Compound Interest

Concept, Tricks & Model
Questions



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Concept of Simple & Compound Interest

If you have a savings account in a bank, you must be familiar with the concept of interest. You deposit money in a bank and the bank after a certain period of holding the money gives you the interest. Similarly, when a person X borrows some money from Y, X has to return the money (with some additional money) to Y. This additional money is called **interest** and the money which is borrowed is called **Principal** or **Sum**. **Amount** is the Principal and Interest together and the period for which X has borrowed the money is called **Time**. The **Rate of Interest** is the amount paid every year on Rs 100 as interest.

When the interest on a sum borrowed for a certain period is reckoned uniformly, the interest is called simple interest. The formula of Simple Interest is below:

$$SI = (P \times R \times T) / 100$$

$$P + SI = A$$

Where SI = Simple Interest, P = Principle, R = Rate of Interest, T = Time & A = Amount

Now that you are aware of the concept of Simple Interest, let's have a look at some quick formulae:

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Simple Interest Tricks

- If the sum becomes S1 in T years and S2 in T + 1 years, the below formulae will apply

$$I = S2 - S1$$

- If Principal is given in 2 parts, 1st part is given for R1 for T1 years and 2nd part is given for R2 for T2 years and their interests are same, the part 1 amount is
Part 1 Amount = $(P * T2 * R2) / [(T1 * R1) + (T2 * R2)]$
- If the rate of interest is R1% per annum for the first T1 years, R2% per annum for the next T2 years and R3% per annum for the next years beyond the first (T1 + T2) years. If the interest obtained in T3 years is Rs I.
 $P = (I * 100) / [(R1 * T1) + (R2 * T2) + (R3 * (T3 - T2 - T1))]$
- If a sum of money becomes X times in T years at simple interest, the rate of interest R will be
 $R = 100(X - 1) / T$
- If P is split into two parts and simple interest is I. 1st part is given for R1 for T1 years and 2nd part is given for R2 for T2 years, the formula for the 1st part amount is
1st part amount = $[(I * 100) - (P * T2 * R2)] / [(T1 * R1) - (T2 * R2)]$
- In case R1 falls to R2 and income is diminished by D, the formula of principal will be
 $P = (D * 100) / (R1 - R2)$
- If the sum becomes S1 in T1 years and S2 in T2 years, the rate of interest will be
Rate of Interest = $[(S2 - S1) * 100] / [(T2 - T1) * S1 - T1 * (S2 - S1)] * T1$

Compound Interest Tricks

Please note the below legends used in the formulae & tricks:

A = future value

P = principal amount (initial investment)

r = annual nominal interest rate

n = number of times the interest is compounded per year

t = number of years for which the money is borrowed

- A sum of money placed at compound interest becomes x times in 'a' years and y times in 'b' years. These two sums can be related by the following formula: $(x)^{(1/a)} = (y)^{(1/b)}$
- If an amount of money grows up to Rs x in t years and up to Rs y in $(t+1)$ years on compound interest, then $R\% = [(y-x)/x]*100$
- A sum at a rate of interest compounded yearly becomes Rs. A_1 in n years and Rs. A_2 in $(n + 1)$ years, then $P = A_1(A_1/A_2)^n$
- If a certain sum becomes x times of itself in t years, the rate of compound interest will be equal to $r = 100[(x)^{(1/t)} - 1]$
- If the compound interest on a certain sum for 2 years is CI and simple interest for two years is SI , then rate of interest per annum is $r\% = 2[(CI-SI)/SI]*100$

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Simple/ Compound Interest Model Questions for Practice

1. A certain sum of money invested at 20% per annum for 2 years compounded annually, but if interest would have been compounded half yearly on the same amount, then Rs. 241 more interest would have been received. Find the sum of money invested.

- a. Rs. 10000
- b. Rs. 8000

c. Rs. 12000

d. Rs. 7500

e. Rs. 10500

Answer: a

Solution:

Let the certain amount of money invested be Rs. 'P'.

When interest is compounded yearly,

$$\text{So, CI} = P(1 + 20/100)^2 - P = P[(1 + 20/100)^2 - 1] = P(1.44 - 1) = 0.44 \times P$$

When interest is compounded half yearly,

$$\text{And, CI} = P(1 + 10/100)^4 - P = P[(1.1)^4 - 1] = P(1.4641 - 1) = 0.4641 \times P$$

According to question, $0.4641 \times P - 0.44 \times P = 241$

$$0.0241 \times P = 241$$

$$P = 241/0.0241 = 10000$$

Therefore, the certain amount of money invested is Rs. 10000.

Hence, option a.

2. The difference between compound interest and simple interest at rate of 8% per annum for 2 years is Rs. 96. Find the simple interest obtained on same amount for a period of 2 years at rate of 10% per annum.

a. Rs. 2000

- b. Rs. 3200
- c. Rs. 3500
- d. Rs. 3000
- e. Rs. 2500

Answer: d

Solution:

Let, the amount be Rs. P.

$$P[(1 + 8/100)^2 - 1] - P \times 8\% \times 2 = 96$$

$$P \times 0.1664 - P \times 0.16 = 96$$

$$P \times 0.0064 = 96$$

$$P = 96 \div 0.0064 = \text{Rs. } 15000$$

Therefore, required interest = $15000 \times 10\% \times 2 = \text{Rs. } 3000$

Hence, option d.

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3. A man deposited Rs. 'x + 600' at 12% per annum simple interest and earned Rs. 528 as interest after 2 years. Find the interest earned by him if he deposited Rs. 2x at 10% per annum for 2 years at compound interest.

- a. Rs. 620

- b. Rs. 636
- c. Rs. 650
- d. Rs. 672
- e. Rs. 612

Answer: d

Solution:

$$\text{So, } \{(x + 600) \times 0.12 \times 2 = 528$$

$$0.24x + 144 = 528$$

$$x = 384/0.24 = 1600$$

$$\text{So, required interest earned} = 2 \times 1600 \times 0.21 = \text{Rs. } 672$$

Hence, option d.

4. A man invested some amount which becomes Rs. 5000 in 5 years and Rs. 5600 in 8 years at certain rate of simple interest. Find the rate of interest (p.a.) at which the amount is invested.

- a. 5% per annum
- b. 15% per annum
- c. 10% per annum
- d. 20% per annum
- e. 12% per annum

Answer: a

Solution:

Let, amount invested be Rs. P.

According to question,

$$P + SI \text{ (for 5 years)} = 5000$$

$$\text{Also, } P + SI \text{ (for 8 years)} = 5600$$

$$\text{Therefore, } SI \text{ for 3 years} = 5600 - 5000 = \text{Rs. } 600$$

$$SI \text{ for 1 years} = 600/3 = \text{Rs. } 200$$

$$\text{So, amount invested} = 5000 - 200 \times 5 = \text{Rs. } 4000$$

$$\text{Therefore, rate of interest} = (200/4000) \times 100 = 5\% \text{ per annum}$$

Hence, option a.

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5. Vishal invested Rs. 960 in two schemes A and B in the respective ratio of 5:3. Scheme A and B are offering simple interest at the rate of 8% per annum and 10% per annum, respectively. Find the interest obtained after 2 years from scheme A.

- a. Rs. 74
- b. Rs. 82
- c. Rs. 96
- d. Rs. 104
- e. Rs. 90

Answer: c

Solution:

Amount invested in scheme A = $(5/8) \times 960 = \text{Rs. } 600$

Interest earned from scheme A = $600 \times 8\% \times 2 = \text{Rs. } 96$

Hence, option c.

6. Sumit earned an interest of Rs. 774 on principal amount of Rs. 2400 at some rate of compound interest in 2 years. How much more/less interest would he have earned on Rs. 2800 at the same rate of simple interest for the same duration?

- a. Rs. 80
- b. Rs. 76
- c. Rs. 62
- d. Rs. 66
- e. Rs. 70

Answer: d

Solution:

Let, rate of interest be 'r'% per annum

$$\text{So, } 774 = 2400 \times \{(1 + r/100)^2 - 1\}$$

$$129/400 = \{(1 + r/100)^2 - 1\}$$

$$529/400 = (1 + r/100)^2$$

$$(23/20)^2 = (1 + r/100)^2$$

$$23/20 = 1 + r/100$$

$$3/20 = r/100, r = 15$$

$$\text{So, simple interest earned} = 2800 \times 0.15 \times 2 = \text{Rs. } 840$$

$$\text{Required amount} = 840 - 774 = \text{Rs. } 66$$

Hence, option d.

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7. In 8 years, a sum of money earns an interest equal to twice the sum invested at simple interest. In how many years the sum of money becomes 800% of itself at the same rate of simple interest?

a. 26 years

- b. 32 years
- c. 30 years
- d. 24 years
- e. 28 years

Answer: e

Solution:

Rate of interest = $200/8 = 25\%$

If the sum of money amount to 800% of itself, this means 700% of interest is earned.

So the time taken to earn 700% interest = $700/25 = 28$ years

Hence, option e.

8. A man deposited 30% of his salary to a bank which offers compound interest at the rate of 10% p.a. If the interest earned by him from the bank after 2 years is Rs. 3780, find the monthly expenditure of the man which is 52% of his monthly salary.

- a. Rs. 31200
- b. Rs. 32400
- c. Rs. 28400
- d. Rs. 26200
- e. Rs. 34400

Answer: a

Solution:

Let the amount of money deposited in the bank be Rs. 'x'.

$$\text{So, } x \times [(1.1)^2 - 1] = 3780$$

$$0.21x = 3780, x = 18000$$

$$\text{So, monthly income of man} = 18000/0.3 = \text{Rs. } 60000$$

$$\text{Required monthly expenditure of man} = 52\% \text{ of } 60000 = \text{Rs. } 31200$$

Hence, option a.

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9. A man deposited Rs. 8000 at 10% compound interest, compounded annually while Rs. 7500 at 13% simple interest per annum. What will be the difference between the compound interest and the simple interest earned by him after 3 years?

- a. Rs. 272
- b. Rs. 282
- c. Rs. 277

d. Rs. 290

e. Rs. 240

Answer: c

Solution:

Compound interest earned by the man in 3 years = $8000 \times \{(1 + 10/100)^3 - 1\}$
= $8000 \times 0.331 = \text{Rs. } 2648$

Simple interest earned by the man in 3 years = $7500 \times 0.13 \times 3 = \text{Rs. } 2925$

Required difference = $2925 - 2648 = \text{Rs. } 277$

Hence, option c.

10. Vinit invested Rs. $(x + 200)$ at 12% simple interest per annum for 4 years and Rs. $(x + 600)$ at 9% simple interest per annum for 3 years. If the difference between the interest obtained by both was Rs. 270, then find the average of the two amounts invested by Vinit?

a. Rs. 3200

b. Rs. 2000

c. Rs. 3000

d. Rs. 2500

e. Rs. 3800

Answer: b

Solution:

According to question,

$$(x + 200) \times 12 \times 4 - (x + 600) \times 9 \times 3 = 270 \times 100$$

$$48x + 9600 - 27x - 16200 = 27000$$

$$21x = 33600$$

$$x = 1600$$

So, amounts invested by Vinit were Rs. 1800 and Rs. 2200.

Therefore, required average = $(1800 + 2200)/2 = \text{Rs. } 2000$

Hence, option b.

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