Simple Interest Concepts and Formulas

Points to remember:

1. Interest: It is the money paid by the borrower to the lender for using the borrowed money.

2. Principal: The total amount of money borrowed by the borrower is called principal.

3. Amount: It is the sum of the interest and principal i.e. the total money paid back to the lender which includes principal and interest.

4. Simple Interest: It is the interest which is payable only on the principal e.g. Simple interest on Rs. 100 at the rate of 5% per annum will be Rs. 5 each year; after one year the amount will be 105, and after two year the amount will be Rs. 110 and so on.

Simple Interest is given by:

$$I = \frac{P*r*t}{100}$$

Where, I = simple interest

P = principal

R = rate of interest

T = number of years

5. Therefore, **Principal** = $\frac{I * 100}{r * t}$

6. Similarly, **Rate of Interest** = $\frac{I * 100}{P * t}$

7. And, **Number of years or time** = $\frac{I * 100}{P * r}$

8. Amount = Principal + Simple Interest

$$= \text{Principal} + \frac{\text{Principal} * \text{rate} * \text{time}}{100}$$

$$= \text{Principal}\left(1 + \frac{\text{rate} * \text{time}}{100}\right)$$

$$\text{Or, } A = P\left(1 + \frac{r * t}{100}\right)$$

Some Quicker Methods:

1.) The payment that can clear a debt of Rs. A for t years at the rate of interest r% per annum is given by:

$$= \frac{100A}{100t+\frac{rt(t-1)}{2}}$$

2) If a sum of money becomes X times in t years at simple rate of interest then the rate of interest is given by:

$$R = \frac{100(X-1)}{t}$$

When different amounts of money mature to the same amount at simple rate of interest, then the ratio of the amounts invested is given by:

$$\frac{1}{100+r1t1} : \frac{1}{100+r2t2} : \frac{1}{100+r3t3} \cdots\cdots \frac{1}{100+rmtn}$$

3) There are two equal amounts of money for t1 and t2 years at r1% and r2% respectively. If the difference between their interests is Id then the sum is given by:

$$\frac{Id*100}{r1t1-r2t2}$$

Similarly, if the difference between interests on certain sum for t1 years at the rate of interest r1 and for t2 years at the rate of interest r2% is X then, the sum is given by:

$$\frac{X*100}{r1t1-r2t2}$$

4) If a sum amounts to Rs. P1 in T1 years and Rs. P2 in T2 years at simple rate of interest, then the rate of interest is given by:

$$\text{Rate of interest per annum} = \frac{100(P2-P1)}{(P1t2-P2t1)}$$

Simple Interest Aptitude Problems

1) If Suresh borrows Rs. 36000 from Mahesh at rate of interest 6% S.I, at the end of four years how much interest Suresh has to pay along with principal amount?

A. Rs. 12560

B. Rs. 12960

C. Rs. 13500

D. Rs. 14500

The Correct answer is (B)

Answer with explanation:

Principal amount = Rs. 36000

Rate of interest = 6

Number of years or time = 6 years

$$\text{Apply formula: } S.I = \frac{P*r*t}{100}$$

$$\text{Simple interest} = \frac{36000*6*6}{100} = 12960$$

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2) If A lends Rs. 4500 to B at 8% per annum and B lends the same sum to C at 10% per annum, find the gain of B in a period of 3 years.

A. Rs. 220

B. Rs.240

C. Rs. 250

D. Rs.270

The Correct answer is (D)

Answer with explanation:

The gain of B will be equal to the difference between the interest which C pays to D and the interest which B pays to A for the amount borrowed.

Therefore, **apply formula;** $S.I = \frac{P*r*t}{100}$

B's gain $= \frac{P*r*t}{100} - \frac{P*r*t}{100}$ (only r is different, P and r is same in both the cases)

$= \frac{4500*10*3}{100} - \frac{4500*8*3}{100}$

$= \frac{135000}{100} - \frac{108000}{100}$

= 1350 - 1080 = Rs. 270

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3) In how many years the simple interest on Rs. 6000 at 10% rate of interest S.I will become Rs. 1800?

A. 3 months

B. 3.5 months

C. 4 months

D. 4.5 months

The Correct answer is (A)

Answer with explanation:

Principal = Rs. 6000

Simple Interest = Rs. 1800

Rate of interest = 10%

Number of years or time =?

Apply formula: Number of years $= \frac{I*100}{P*r}$

$= \frac{1800*100}{6000*10}$

$= \frac{180000}{60000} = \frac{180}{60} = 3$ months

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4) Sohan has borrowed Rs. 5000 at the rate of 6% S.I. what amount he needs to pay after 3 years to clear the debt?

A. Rs. 5500

B. Rs. 5900

C. Rs. 6100

D. Rs. 6300

The Correct answer is (B)

Answer with explanation:

Principal = Rs. 5000

Rate of interest= 6%

Time period = 3 years

Apply formula: $\text{Amount} = P\left(1+\frac{r*t}{100}\right)$

$\text{Therefore, Required Amount} = 5000\left(1+\frac{6*3}{100}\right)$

$= 5000\left(1+\frac{18}{100}\right)$

$= 5000 * \frac{118}{100} = \text{Rs. } 5900$

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5) In what time Rs. 6000 will give interest of Rs. 720 at the rate of 6% p.a. S.I.?

A. 1.5 years

B. 2 years

C. 2.5 years

D. 3 years

The Correct answer is (B)

Answer with explanation:

Principal = Rs. 6000

Interest = Rs. 720

Rate of interest = 6%

Time or number of years =?

Apply formula: Number of years $= \frac{I * 100}{P * r}$

$= \frac{720 * 100}{6000 * 6}$

$= \frac{72000}{36000}$

$= \frac{72}{36} = 2$ years