

SIMPLE INTEREST

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Interest is that extra money which is paid by the borrower to the lender for the use of money lent for a specified period. The sum borrowed is called the *Principal* and the total sum of principal and the interest is called the *Amount*. Interest is usually calculated at a *rate per cent* for a certain period (*time*).

If the interest on a certain sum borrowed for a certain period is reckoned uniformly, then it is called *Simple Interest*, denoted by $SI = \text{Simple Interest}$

Thus, if $A = \text{Amount}$, $P = \text{Principal}$, $I = \text{Interest}$, $T = \text{Time (in years)}$, $R = \text{rate per cent per annum}$

Then, we can recognize the following useful relations :

$$\begin{array}{ll} 1. I = \frac{P \times R \times T}{100} & 2. P = \frac{100 \times SI}{T \times R} \\ 3. T = \frac{100 \times SI}{P \times R} & 4. R = \frac{100 \times SI}{P \times T} \\ 5. P = \frac{100 \times A}{100 + RT} & 6. A = P + SI \end{array}$$

Short-Cut

$SI = (\text{Rate} \times \text{Time}) \text{ per cent of Principal}$

$\text{Rate} = \text{Interest as the percentage of the Principal.}$

EXERCISE

- At what rate per cent, a sum of money doubles itself in 15 years?
(a) 25% (b) 6%
(c) 6.66% (d) 8%
(e) None of these
- A sum becomes $\frac{28}{25}$ of itself in 5 years, find the rate of interest.
(a) 3% (b) 5%
(c) 12% (d) 2.40%
(e) None of these
- If ₹ 900 amounts to ₹ 1,080 in 4 years at simple interest, what sum will amount to ₹ 1,275 in 5 years at the same rate?
(a) ₹ 1,020 (b) ₹ 1,050
(c) ₹ 1,080 (d) ₹ 1,200
(e) None of these
- A sum of money doubles itself in 7 years, in

how many years it will become four fold?

- 10 years (b) 35 years
 - 14 years (d) 21 years
 - 28 years
- A certain sum of money amounted to ₹ 575 at 5% in a time in which ₹ 750 amounted to ₹ 840 at 4%. The rate being the simple interest, what was the sum?
(a) ₹ 650 (b) ₹ 625
(c) ₹ 500 (d) ₹ 475
(e) None of these
 - ₹ 4,000 is divided into two parts such that if one part be put out at 3 % and the other at 5%, the annual interest from both the investments be ₹ 144. Find the first part.
(a) ₹ 3,000 (b) ₹ 2,800
(c) ₹ 2,500 (d) ₹ 1,200
(e) None of these

7. A sum of money amounts to ₹ 767 in 3 years and ₹ 806 in 4 years at the rate of 6%. What is the sum?
 (a) ₹ 600 (b) ₹ 650
 (c) ₹ 700 (d) ₹ 675
 (e) None of these
8. In how many years will a sum of money double itself at 12% per annum?
 (a) 6 years 9 months (b) 8 years 4 months
 (c) 7 years 6 months (d) 8 years 6 months
 (e) None of these
9. What annual payment will discharge a debt of ₹ 580 due in 5 years, the rate being 8% per annum?
 (a) ₹ 166.40 (b) ₹ 65.60
 (c) ₹ 100 (d) ₹ 120
 (e) None of these
10. A lent ₹ 600 to B for 2 years and ₹ 150 to C for 4 years and received altogether from both ₹ 90 as simple interest. The rate of interest is :
 (a) 12% (b) 4%
 (c) 5% (d) 10%
 (e) None of these

EXPLANATORY ANSWERS

1. (c) : Suppose principal = P , \therefore Amount = $2P$

$$SI = 2P - P = P, P = \frac{P \times 15 \times r}{100}$$

Where r = rate

So, $r = 100/15 = 20/3 = 6.66\%$.

Trick: Rate = $100/\text{time} = 100/15 = 6.66\%$

2. (d) : Suppose, principal = P

Amount = $28/25 P$

$$SI = \frac{28}{25}P - P = 3P/25$$

$$\frac{3P}{25} = \frac{P \times 5 \times r}{100}$$

$$\Rightarrow r = \frac{3 \times 100}{25 \times 5} = \frac{12}{5} = 2.4\%$$

3. (a) : $SI = ₹ 180$

$$r = \frac{180 \times 100}{4 \times 900} = 5\%$$

Let $P = ₹ 100$

$$SI = \frac{100 \times 5 \times 5}{100} = ₹ 25$$

$$A = 100 + 25 = 125$$

when amount is 125 then, $P = 100$

$$\text{when amount is 1275 then, } P = \frac{100}{125} \times 1275 = ₹ 1020$$

4. (d) : **Trick :** Rate = $100 / 7$

$$\text{So, Time} = \frac{3 \times 100 \times 7}{100} = 21 \text{ years}$$

5. (c) : $SI = 840 - 750 = ₹ 90$

$$T = \frac{90 \times 100}{750 \times 4} = 3 \text{ years}$$

$$P = \frac{100 \times 575}{100 + 3 \times 5} = \frac{57500}{115} = ₹ 500.$$

6. (b) : **Trick :**

Let first part be x

second part = $4000 - x$

According to the question,

$$\frac{x \times 3 \times 1}{100} + \frac{(4000 - x) \times 5 \times 1}{100} = 144$$

$$\Rightarrow \frac{3x}{100} + \frac{20000}{100} - \frac{5x}{100} = 144$$

$$\Rightarrow \frac{-2x}{100} = 144 - 200$$

$$\Rightarrow x = \frac{5600}{2} = 2800$$

Hence, first part $x = ₹ 2800$

7. (b) : $S.I. = 806 - 767 = 39$

$$\therefore P = \frac{39 \times 100}{1 \times 6} = ₹ 650.$$

8. (b) : Time = $100/\text{rate} = 100/12 = 25/3$ years
 = 8 years 4 months.

9. (c) : Suppose, every instalment = ₹ 100

$$\text{So, } (100 + 8 \times 4) + (100 + 8 \times 3) + (100 + 8 \times 2) + (100 + 8 \times 1) + 100 = ₹ 580$$

When it is ₹ 580 then instalment = ₹ 100.

$$10. (c) : \frac{600 \times r \times 2}{100} + \frac{150 \times r \times 4}{100} = ₹ 90$$

$$\Rightarrow 12r + 6r = 90$$

$$\Rightarrow r = \frac{90}{18} = 5\%$$

So, $r = 5\%$.