

- (8) Simple interest on a certain amount is $\frac{36}{49}$ of the principal. If the numbers representing the rate of interest (in percent) and time (in years) be equal, then what is the time, for which the principal is lent out?
- (9) Vinayak borrowed 1900 from Sneha for 4 years. Find the amount of interest he will pay to Sneha at the end of 4 years if Sneha charged 18% simple interest per annum.
- (10) Sunil deposited 7200 in a bank which offers 14 percent simple interest per annum. How much money would Sunil receive if he withdraws his entire deposit after 8 years?



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Solutions

(1) b. $5\frac{5}{9}$ years

Step 1

We know that simple interest is equal to $\frac{PRT}{100}$, where P is the principal amount, r is the rate of interest and T is the time period.

Step 2

Since the interest is equal to $\frac{25}{81}$ of the principal amount and the rate of interest is equal to the time period, the new expression for simple interest can be written as:

$$\frac{25P}{81} = \frac{P \times T \times T}{100}$$

On cross multiplication we have:

$$\frac{25}{81} = \frac{T^2}{100}$$

$$\Rightarrow T^2 = \frac{25 \times 100}{81}$$

Taking square roots of both sides

$$T = \frac{5 \times 10}{9} = \frac{50}{9} = 5\frac{5}{9} \text{ years.}$$

Step 3

Hence the correct answer is **option b**.

(2) b. 4% pa

Step 1Let the sum be **P**.

Sum after 50 years = 3P

Simple interest, S.I = 3P - P = 2P

Time, T = 50 years

Step 2

$$\text{Rate, } R = \left(\frac{100 \times \text{S.I}}{P \times T} \right)$$

$$= \frac{100 \times 2P}{P \times 50}$$

$$= \frac{100 \times 2}{50}$$

$$= 4$$

Step 3

Therefore, the interest rate for the amount to become triple of itself at simple interest in 50 years is **4% annum**.

(3) 20**Step 1**Let the sum be **P**.

Sum after 10 years = 3P

Simple interest, S.I = 3P - P = 2P

Time, T = 10 years

Step 2

$$\text{Rate, } R = \left(\frac{100 \times \text{S.I}}{P \times T} \right)$$

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

$$= \frac{100 \times 2}{10}$$

$$= 20$$

Step 3

Therefore, the interest rate for the amount to become triple of itself at simple interest in 10 years is **20% annum**.

(4) 20

Step 1

Lets assume principal amount of **P** becomes double in **n** years.

Amount after **n** years = $2P$,

Simple interest = $2P - P = P$

Rate of interest, $R = 5$

Step 2

Using simple interest formula,

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

$$\Rightarrow P = \frac{P \times 5 \times n}{100}$$

$$\Rightarrow 1 = \frac{5 \times n}{100}$$

$$\Rightarrow n = \frac{1 \times 100}{5}$$

$$\Rightarrow n = 20 \text{ years}$$

Step 3

Therefore, it will take **20 years** for money to become double of itself.

(5) 35

Step 1

Let the amount of **P** becomes 5 times in 28 years with a simple interest of R% per year.

Principal = P

Amount after 28 years = 5P

Simple interest, S.I = 5P - P = 4P

Time, T = 28 years

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

$$= \frac{100 \times 4P}{P \times 28}$$

$$= \frac{400P}{28P}$$

$$= \frac{400}{28} \%$$

Step 2

Now let the amount of **P** becomes 6 times in n years with a simple interest of $\frac{400}{28}$ % per year.

Principal = P

Amount after n years = 6P

Simple interest, S.I = 6P - P = 5P

$$\text{Rate, } R = \frac{400}{28} \%$$

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

$$= \frac{100 \times 5P}{P \times \frac{400}{28}}$$

$$= \frac{100 \times 5 \times 28}{400}$$

$$= 35$$

Step 3

Therefore, the sum of money takes **35 years** long to becomes 6 times.

(6) 50 years

Step 1

Let the amount of **P** becomes 5 times in 40 years with a simple interest of R% per year.

Principal = P

Amount after 40 years = 5P

Simple interest, S.I = 5P - P = 4P

Time, T = 40 years

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

$$= \frac{100 \times 4P}{P \times 40}$$

$$= \frac{400P}{40P}$$

$$= \frac{400}{40} \%$$

Step 2

Now let the amount of **P** becomes 6 times in n years with a simple interest of $\frac{400}{40}$ % per

year.

Principal = P

Amount after n years = 6P

Simple interest, S.I = 6P - P = 5P

$$\text{Rate, } R = \frac{400}{40} \%$$

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

$$= \frac{100 \times 5P}{P \times \frac{400}{40}}$$

$$= \frac{100 \times 5 \times 40}{400}$$

$$= 50$$

Step 3

Therefore, the sum of money takes **50 years** long to becomes 6 times.

(7) 20 years

Step 1

Lets assume principal amount of **P** becomes 5 times in n years.

Amount after n years = 5P,

Simple interest = 5P - P = 4P

Rate of interest, R = 20

Step 2

Using simple interest formula,

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

$$\Rightarrow 4P = \frac{P \times 20 \times n}{100}$$

$$\Rightarrow 4 = \frac{20 \times n}{100}$$

$$\Rightarrow n = \frac{4 \times 100}{20}$$

$$\Rightarrow n = 20 \text{ years}$$

Step 3

Therefore, it will take **20 years** for money to become 5 times of itself.

(8) $8\frac{4}{7}$ years

Step 1

We know that simple interest is equal to $\frac{PRT}{100}$, where P is the principal amount, r is the rate of interest and T is the time period.

Step 2

Since the interest is equal to $\frac{36}{49}$ of the principal amount and the rate of interest is equal to the time period, the new expression for simple interest can be written as:

$$\frac{36P}{49} = \frac{P \times T \times T}{100}$$

On cross multiplication we have:

$$\frac{36}{49} = \frac{T^2}{100}$$

$$\Rightarrow T^2 = \frac{36 \times 100}{49}$$

Taking square roots of both sides

$$T = \frac{6 \times 10}{7} = \frac{60}{7} = 8\frac{4}{7} \text{ years.}$$

(9) 1368

Step 1

It is given that,

Principle, P = 1900

Rate, R = 18%

Time, T = 4 years

Step 2

$$\text{Simple interest, S.I} = \left(\frac{P \times R \times T}{100} \right)$$

$$= \frac{1900 \times 18 \times 4}{100}$$

$$= 1368$$

Step 3Therefore, the interest paid by Vinayak is **1368**.

(10) 15264

Step 1

It is given that,

Principle, P = 7200

Rate, R = 14%

Time, T = 8 years

$$\text{Simple interest, S.I} = \frac{P \times R \times T}{100}$$

$$= \frac{7200 \times 14 \times 8}{100}$$

$$= \frac{806400}{100}$$

$$= 8064$$

Step 2

Now,

Total amount = Principle + S.I

$$= 7200 + 8064$$

$$= 15264$$

Step 3Therefore, the total money received by the Sunil is **15264**.



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