Case Study 1

Arjun is a 13-year-old student who wants to start a small organic vegetable garden in his backyard during his summer vacation. To buy high-quality seeds, organic manure, and basic gardening tools, he needs a sum of money which he does not have. He decides to borrow a sum of Rs 5,000 from his elder sister, Meera. Meera agrees to lend him the money but explains the concept of Simple Interest to him. She tells him that since she is parting with her savings, Arjun must pay her a small additional fee for using her money over time.

They agree on a deal where Arjun will pay an annual interest rate of 8% on the borrowed amount. Arjun estimates that he will be able to harvest his first crop and sell the vegetables to his neighbors within 3 years. He plans to repay the entire debt, including the interest, at the end of this 3-year period. Arjun needs to keep track of his finances carefully to ensure his small business remains profitable after paying back the loan and the interest.

1. In the given scenario, what does the amount of Rs 5,000 borrowed by Arjun represent in the Simple Interest formula?

   (A) Interest

   (B) Rate

   (C) Principal

   (D) Amount

   Answer: (C) Principal
   Solution: The initial sum of money borrowed or lent is known as the Principal. Since Arjun borrowed Rs 5,000 to start his garden, this value is the Principal (P).

2. How much Simple Interest will Arjun have to pay to Meera at the end of the first year?

   (A) Rs 400

   (B) Rs 450

   (C) Rs 500

   (D) Rs 800

   Answer: (A) Rs 400
   Solution: Simple Interest for 1 year is calculated as $I = \frac{P \times R \times T}{100}$.
   Here, $P = 5000$, $R = 8$, and $T = 1$.
   $I = \frac{5000 \times 8 \times 1}{100} = 50 \times 8 = 400$.

3. What is the total interest Arjun owes Meera at the end of the 3-year period?

   (A) Rs 1,000

   (B) Rs 1,200

   (C) Rs 1,500

   (D) Rs 1,600

   Answer: (B) Rs 1,200
   Solution: Using the formula $SI = \frac{P \times R \times T}{100}$, where $T = 3$ years.
   $SI = \frac{5000 \times 8 \times 3}{100} = 50 \times 24 = 1200$.

4. What is the total Amount (Principal + Interest) that Arjun must return to his sister after 3 years?

   (A) Rs 5,800

(B) Rs 6,000

(C) Rs 6,200

(D) Rs 6,500

Answer: (C) Rs 6,200
Solution: Amount (A) = Principal (P) + Simple Interest (SI).
$A = 5000 + 1200 = 6200$.

5. If Meera had charged a rate of 10% instead of 8% for the same duration, how much extra interest would Arjun have to pay?

(A) Rs 200

(B) Rs 300

(C) Rs 400

(D) Rs 500

Answer: (B) Rs 300
Solution: Interest at 10%: $SI = \frac{5000 \times 10 \times 3}{100} = 1500$.
Interest at 8%: Rs 1,200 (calculated previously).
Difference $= 1500 - 1200 = 300$.