Assignment 1

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Question 1a

Ranbir borrows ₹20,000 at 12 % compound interest. If he repays ₹8400 at the end of the first year and ₹9680 at the end of the second year, find the amount of loan outstanding at the beginning of the third year.

Solution

Initial loan taken by Ranbir,
P = ₹20000
Interest rate, I = 12 %
Time between compounding, T = 1 year

$$A = P \times (1 + I/100)^T \tag{1}$$

Where value of I is in percent.

Therefore, amount due at the end of one year is

$$A = 20000 \times (1 + 12/100)^1 \tag{2}$$
$$A = ₹22400 \tag{3}$$

Amount paid at the end of one year is ₹8400.
Thus remaining amount,

$$A = 22400 - 8400 \tag{4}$$
$$A = ₹14000 \tag{5}$$

This new amount will now be the principal amount for the next year.
Thus, amount due at the end of the second year is

$$A = 14000 \times (1 + 12/100)^1 \tag{6}$$
$$A = ₹15680 \tag{7}$$

Amount paid at the end of second year is ₹9680.
Thus remaining amount,

$$A = 15680 - 9680 \tag{8}$$
$$A = ₹6000 \tag{9}$$

Therefore, we know that he still has ₹6000 to pay to the bank.

$\implies$ Ranbir still owes to the bank ₹6000 out of the ₹$20,000$ he had borrowed, after the two annual payments.

Input and Output	
Input	**Value**
Principal Amount	₹20,000
Interest Rate	12 %
Money repaid after first year	₹8400
Money repaid after second year	₹9680
Output	**Value**
Amount still owed	₹6000