

EXTRA
HOT PROBLEMS

(Problems for developing Higher Order Thinking Skill)

(EXTRA)

- 1) A teacher wants to divide 150 bananas equally among certain number of students. If there are 25 students more, each student would have received 1 banana less. Find the number of students.
- 2) A man borrows certain amount which is to be paid back in two equal instalments. Compound interest is calculated at the rate 10%p.a. If each instalment is Rs 6105, find the sum borrowed.

Solutions

- 1) A teacher wants to divide 150 bananas equally among certain number of students. If there are 25 students more, each student would have received 1 banana less. Find the number of students.

Solution :

Let the number of students be x

Total number of bananas = 150

Therefore each student gets $\frac{150}{x}$ bananas

If there are 25 students more then each student will get $\frac{150}{x+25}$ bananas

According to the given condition

$$\frac{150}{x} - \frac{150}{(x+25)} = 1$$

$$\frac{150(x+25) - 150x}{x(x+25)} = 1$$

$$150x + 3750 - 150x = x^2 + 25x$$

$$3750 = x^2 + 25x$$

$$x^2 + 25x - 3750 = 0$$

$$x^2 + 75x - 50x - 3750 = 0$$

$$x(x+75) - 50(x+75) = 0$$

$$x+75 = 0 \quad \text{or} \quad x-50 = 0$$

$$x = -75 \quad \text{or} \quad x = 50$$

$x = -75$ is not accepted, because no. of students cannot be negative.

∴ The number of students = 50.

- 2) A man borrows certain amount which is to be paid back in two equal instalments. Compound interest is calculated at the rate 10%p.a. If each instalment is Rs 6105, find the sum borrowed.

Solution :

Let the annual instalment be x .

The annual instalment = Rs 6105 = x

$R = 10\%$ p.a (compound Interest)

$n = 2$ $P = ?$

Let P_1 be the principal for the first instalment

Let P_2 be the principle for the second instalment.

First instalment,

$$x = P_1 \left[1 + \frac{R}{100} \right]^1$$

$$\therefore 6105 = P_1 \left[1 + \frac{10}{100}\right]^1$$

$$\therefore 6105 = P_1 \left[\frac{11}{10}\right]^1$$

$$\therefore P_1 = \frac{6105 \times 10}{11} = 5550.$$

$$\therefore P_1 = 5550$$

Second instalment,

$$x = P_2 \left[1 + \frac{R}{100}\right]^2$$

$$\therefore 6105 = P_2 \left[\frac{11}{10}\right]^2$$

$$\therefore P_2 = 6105 \times \left[\frac{10}{11}\right]^2$$

$$\therefore P_2 = 6105 \times \frac{100}{121}$$

$$\therefore P_2 = 5045.45$$

$$P = P_1 + P_2$$

$$P = 5550 + 5045.45$$

$P = \text{Rs } 10595.$

The Sum borrowed = Rs 10595.

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