

01 In a zoo, there are rabbits and pigeons. If their heads are counted, these are 90 while their legs are 224. Find the number of pigeons in the zoo.

$$R + P = 90$$

$$4R + 2P = 224$$

$$\therefore R = 22, P = 68$$

02 Village A has a population of 6800, which is decreasing at the rate of 120 per year. Village B has a population of 4200, which is increasing at the rate of 80 per year. In how many years will the population of the two villages be equal ?

Let the population of the two villages A and B will be equal after x years

$$\therefore 6800 - 120x = 4200 + 80x$$

$$\Rightarrow 200x = 2600$$

$$\Rightarrow x = 13$$

\therefore The population of two villages will be equal after 13 years

03 A student was asked to divide a number by $\frac{17}{8}$. Instead, he actually multiplied it by $\frac{17}{8}$ and hence got 225 more than the expected answer. What was the expected answer ?

$$x \times \frac{17}{8} - x \times \frac{x}{17/8} = 225 \Rightarrow \frac{17x}{8} - \frac{8x}{17} = 225$$

$$\Rightarrow 225x = 136 \times 225$$

$$\therefore x = 136$$

04 The sum of the reciprocals of the ages of two brothers is five times the difference of the reciprocals of their ages. If the ratio of the product of their ages to the sum of their ages is 14.4 : 1, find their ages.

Let the ages of the two brothers be x years and y years respectively, then, given that,

$$\frac{1}{x} + \frac{1}{y} = 5 \left(\frac{1}{x} - \frac{1}{y} \right) \quad \dots (1)$$

$$\text{and } \frac{xy}{x+y} = \frac{14.4}{1} = \frac{144}{10} \Rightarrow \frac{xy}{x+y} = \frac{72}{5}$$

$$\Rightarrow \frac{1}{x} + \frac{1}{y} = \frac{5}{72} \quad \dots (2)$$

$$\text{From (1) and (2) } \frac{1}{x} - \frac{1}{y} = \frac{1}{72} \quad \dots (3)$$

From (2) and (3) $x = 24, y = 36$

Hence, the ages of two brothers are 24 years and 36 years respectively