Question

Charlie has 218 fewer Facebook friends than Ileana. The number of Deepa's Facebook friends is 28 more than half of Ileana's. Together Charlie, Deepa, and Ileana have 2175 friends on Facebook. How many Facebook friends does each of them have?

Solution

Let x be the number of Charlie's friends, y be the number of Deep's friends and z be the number of Ileana's friends.

We form the equation for given conditions.

Together Charlie, Deepa, and Ileana have 2175 friends on Facebook:

$$x + y + z = 2175 \quad (1)$$

The number of Deepa's Facebook friends is 28 more than half of Ileana's.

$$y = \frac{1}{2}z + 28 \qquad (2)$$

Charlie has 218 fewer Facebook friends than Ileana:

$$x = z - 218 \qquad (3)$$

We have obtained a system of equations in three variables:

$$\begin{cases} x + y + z = 2175 \\ y = \frac{1}{2}z + 28 \\ x = z - 218 \end{cases}$$

We substitute for y and x from the equations (2), (3) into the equation (1) and get the following equation:

$$z - 218 + \frac{1}{2}z + 28 + z = 2175$$

$$\frac{5}{2}z - 190 = 2175$$

$$\frac{5}{2}z = 2365$$

$$z = \frac{2 \times 2365}{5}$$

$$z = 946 \quad (4)$$

Substituting the value z from (4) into the equations (2) and (3) we get x and y:

$$\begin{cases} z = 946 \\ x = 728 \\ y = 501 \end{cases}$$

Answer: Charlie has 728 friends in Facebook, Deep has 501 friends and Ileana has 946 friends.