

Somaiah has a mixture of milk and water in the ratio of 8:7 and Ramaiah has the same in the ratio of 5:9. In what ratio should these two be mixed so that the required ratio of milk and water is 1:1?

Solution:

Suppose we must take x (units) of Somaiah's mixture and y (units) of Ramaiah's one. Thus we have

1. In Somaiah's mixture: milk is $\frac{8}{8+7}x = \frac{8}{15}x$ (units); water is $\frac{7}{15}x$ (units).

2. In Ramaiah's mixture: milk is $\frac{5}{9+5}y = \frac{5}{14}y$ (units); water is $\frac{9}{14}y$ (units).

Because (by the condition of the task) the required ratio of milk and water is 1:1 then

milk of Somaiah's mixture+milk of Ramaiah's mixture=water of Somaiah's mixture+water of Ramaiah's mixture,

$$\frac{8}{15}x + \frac{5}{14}y = \frac{7}{15}x + \frac{9}{14}y,$$

$$\frac{8}{15}x - \frac{7}{15}x = \frac{9}{14}y - \frac{5}{14}y,$$

$$\frac{1}{15}x = \frac{4}{14}y,$$

$$\frac{x}{y} = \frac{2}{7} \div \frac{1}{15},$$

$$\frac{x}{y} = \frac{30}{7}.$$

Answer: The ratio of these two mixed is 30 to 7.