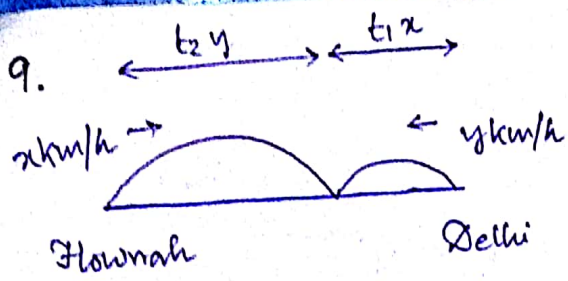
9. 

Two train one started from Howrah, one started from Delhi with a speed of x k/h and with a speed of y k/h. After their crossing 1st train reach Delhi in t_1 hour, 2nd train reach Howrah in t_2 hour.

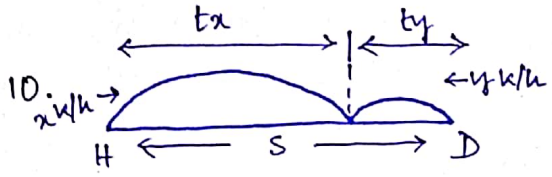
∴ The speed ratio of 2 train,

$$\frac{x}{y} = \sqrt{\frac{t_2}{t_1}}$$

proof : $t_2 y = t_1 x$.

or, $t_1 x^2 = t_2 y^2$

or, $\frac{x^2}{y^2} = \frac{t_2}{t_1}$ or, $\frac{x}{y} = \sqrt{\frac{t_2}{t_1}}$

10. 

Here the qv statement is same as above, . The dist. S is given here.

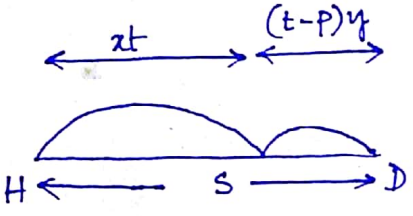
So, they will meet each other after time —

$$t = \frac{S}{x + y}.$$

proof : $tx + ty = S$.

$t(x+y) = S$.

$t = \frac{S}{x+y}$.

11. 

Two train one started from Howrah with a speed of x k/h and 2nd train started p hour after 1st train.

∴ When and where they will meet after t time?

$$t = \frac{S + p \times y}{x + y}.$$

proof : $tx + (t-p)y = S$ or, $xt + ty - py = S$.

or, $t = \frac{S + py}{x+y}$.