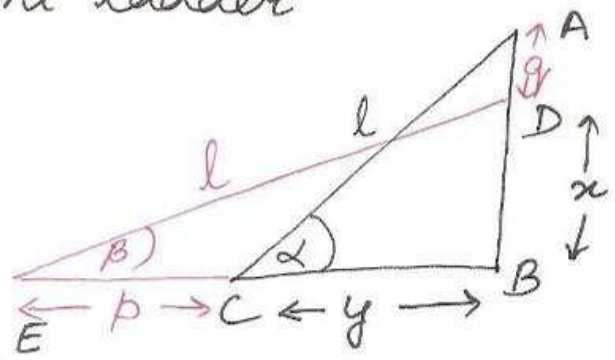
(15) AC and DE represent ladder

In rt $\triangle CBA$



$\sin\alpha = \frac{AB}{AC}$

$\sin\alpha = \frac{q+x}{l}$

$\Rightarrow l\sin\alpha - q = x \cdots (I)$

In rt $\triangle EBD$

$\sin\beta = \frac{DB}{EB}$

$\sin\beta = \frac{x}{l}$

$\Rightarrow x = l\sin\beta \quad \cdots (III)$

From (I), (III)

$l\sin\beta = l\sin\alpha - q$

$q = l(\sin\alpha - \sin\beta)$

$\Rightarrow l = \frac{q}{\sin\alpha - \sin\beta} \cdots (V)$

$\frac{p}{q} = \frac{\cos\beta - \cos\alpha}{\sin\alpha - \sin\beta}$

$\cos\alpha = \frac{BC}{AC}$

$\cos\alpha = \frac{y}{l}$

$l\cos\alpha = y \cdots (II)$

$\cos\beta = \frac{EB}{DE}$

$\cos\beta = \frac{p+y}{l}$

$l\cos\beta - p = y \cdots (IV)$

From (II), (IV)

$l\cos\alpha = l\cos\beta - p$

$p = l(\cos\beta - \cos\alpha)$

$\Rightarrow l = \frac{p}{\cos\beta - \cos\alpha} \cdots (VI)$

From (V), (VI)

$\frac{q}{\sin\alpha - \sin\beta} = \frac{p}{\cos\beta - \cos\alpha}$