Assignments:

For any $\triangle$ ABC prove that

(i) $\dfrac{a-b}{c} = \dfrac{\sin\frac{A-B}{2}}{\cos\frac{C}{2}}$

Ans) $= \dfrac{2\cos\left(\dfrac{A+B}{2}\right)\sin\left(\dfrac{A-B}{2}\right)}{2\sin\dfrac{C}{2}\cos\dfrac{C}{2}}$

$= \dfrac{\sin\left(\dfrac{A-B}{2}\right)}{\cos\dfrac{C}{2}} = RHS \because \dfrac{C}{2} = \cos\left(\dfrac{A+B}{2}\right)$

(ii) $\sin\left(\frac{B-C}{2}\right) = \frac{b-c}{a}\cos\frac{A}{2}$

Ans) $\frac{a}{sinA} = \frac{b}{sinB} = \frac{C}{sinC}$ [Sin Formula]

= x(say)

x sin A = a

x sin B = b

x sin c = c

$A + B + C = 180°$

$\Rightarrow \frac{B+C}{2} = 90 - \frac{A}{2}$

$\Rightarrow cos(\frac{B+C}{2}) =$

$cos(90 - \frac{A}{2})$

$\Rightarrow cos\frac{(B+C)}{2} = sin\frac{A}{2}$

$\frac{b-c}{a} = \frac{x(sinB - sinC)}{xsinA}$

$= \frac{2sin\frac{(B-C)}{2}cos(\frac{B+C}{2})}{2sin\frac{A}{2}cos\frac{A}{2}}$

$(\frac{b-c}{a})cos\frac{A}{2} = sin(\frac{B-C}{2})$