From sine rule, $a/\sin A = b/\sin B = c/\sin C = k$.

From L.H.S

$$\frac{bc}{a(b+c)} = \frac{k^2 \sin B \sin C}{k \sin A (k \sin B + k \sin C)}$$

$$= \frac{\sin B \sin C}{\sin A \sin B + \sin A \sin C}$$

Dividing by $\sin B \sin C$ in both numerator and denominator.

$$= 1/\sin A\left(\frac{1}{\sin C} + \frac{1}{\sin B}\right)$$

$$= 1/\sin A (\operatorname{cosec} C + \operatorname{cosec} B)$$

$$= \frac{1}{\sin A} \cdot \frac{1}{\operatorname{cosec} C + \operatorname{cosec} B}$$

putting $A = (\pi - (B+C))$

$$= \frac{1}{\sin(\pi - (B+C))} \cdot \frac{1}{\operatorname{cosec} C + \operatorname{cosec} B}$$

$$= \frac{1}{\sin(\pi - (B+C))} \cdot \frac{1}{\operatorname{cosec} C + \operatorname{cosec} B}$$

$$= \frac{1}{\sin(B+C)} \cdot \frac{1}{\operatorname{cosec} C + \operatorname{cosec} B}.$$

$$= \frac{\operatorname{cosec}(B+C)}{\operatorname{cosec} C + \operatorname{cosec} B} \longrightarrow \#$$

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