

**STEP/Inequalities Q6 (20/6/23)**

Prove that, for  $a, b, c > 0$ ,  $\frac{a}{b} < \frac{a+c}{b+c} \Leftrightarrow a < b$

**Solution**

$$\frac{a}{b} < \frac{a+c}{b+c} \Leftrightarrow a(b+c) < b(a+c) \text{ (as } b > 0 \text{ \& } b+c > 0)$$

$$\Leftrightarrow ac < bc \Leftrightarrow a < b \text{ (as } c > 0)$$