

$$-\frac{1}{2}d^2 + 2cd - \frac{1}{2}c^2 > 0$$

$$d^2 + c^2 < 4cd \quad c, d > 0 \text{ wlog.}$$

suppose $d < c$, then $d^2 < c^2$.

$$\text{and } cd > 4d^2$$

$d, c < 1! \Rightarrow$ so if $d < c$,

$$\text{then } c^2 < cd \text{ as } c < d$$

$$c^2 < cd \text{ as } d < c$$

$$c^2 < 4cd$$

$$\Leftrightarrow c < 4d$$

$$c > 3d$$