Task #2

Prove that cosine distance ~~is~~ satisfies the triangle inequality

$$d(\vec{u}, \vec{v}) = 1 - \frac{\vec{u} \cdot \vec{v}}{|\vec{u}| \cdot |\vec{v}|}$$

$$d(a, c) \leq d(a, b) + d(b, c)$$

$$1 - \frac{\bar{a} \cdot \bar{c}}{|\bar{a}| \cdot |\bar{c}|} \leq 1 - \frac{\bar{a} \cdot \bar{b}}{|\bar{a}| \cdot |\bar{c}|} \leq 1 - \frac{\bar{b} \cdot \bar{c}}{|\bar{b}| \cdot |\bar{c}|}$$

if $a = (1; 0)$ $b = \left(\frac{\sqrt{2}}{2}; \frac{\sqrt{2}}{2}\right.$

$c = (0; 1)$

$$\frac{|a| \cdot |b|}{|a| \cdot |b|} = \frac{\frac{\sqrt{2}}{2} + 0}{\sqrt{1}\,\sqrt{1}} = \frac{\sqrt{2}}{2}$$

$$1 + 0 \geq \sqrt{2}$$