Reflexive

$$\frac{\top}{\langle x, x\rangle \in R}$$

Total

$$\frac{\top}{\langle x, y\rangle \in R \vee \langle y, x\rangle \in R}$$

Transitive

$$\frac{\langle x, y\rangle \in R \quad \langle x, y\rangle \in R}{\langle x, z\rangle \in R}$$

Symmetric

$$\frac{\langle x, x'\rangle \in R}{\langle x', x\rangle \in R}$$

[bp]

Asymmetric

$$\frac{\langle x, y\rangle \in R \quad \langle y, x\rangle \in R}{\bot}$$

Irreflexive

$$\frac{\langle x, x\rangle \in R}{\bot}$$

Antisymmetric

$$\frac{\langle x, y\rangle \in R \quad \langle y, x\rangle \in R}{x = y}$$