$$\mathbf{f}(a^*, b) = \top \wedge \mathbf{f}(a^*, b)$$
$$\preceq \mathrm{id}_A(a^*, a) \wedge \mathbf{f}(a^*, b)$$
$$\preceq \bigvee_{a' \in \mathbf{A}} \mathrm{id}_A(a^*, a') \wedge \mathbf{f}(a'^*, b)$$
$$= (\mathrm{id}_\mathbf{A} \, \mathbin{\mathring{\,}} \, \mathbf{f})(a^*, b).$$