

1)  $\forall x [\exists z \text{ Animal}(z) \Rightarrow \text{kills}(x, z) \Rightarrow [\forall y \neg \text{Loves}(y, x)]]$

→ Eliminate  $\rightarrow \forall x [\neg \exists z \neg \text{Animal}(z) \vee \text{kills}(x, z)] \vee [\forall y \neg \text{Loves}(y, x)]$

→ Inward  $\rightarrow \forall x [\forall z \text{ Animal}(z) \wedge \neg \text{kills}(x, z)] \vee [\forall y \neg \text{Loves}(y, x)]$

→ change quantifier  $\rightarrow \forall x [\forall z \text{ Animal}(z) \wedge \neg \text{kills}(x, z)] \vee [\forall z \neg \text{Loves}(z, x)]$

→ Skolemize  $\rightarrow \forall x [\text{Animal}(f(x)) \wedge \neg \text{kills}(x, f(x))] \vee \neg \text{Loves}(g(x), x)$

→ Drop Universal Quantifiers:

$\text{Animal}(f(x)) \wedge \neg \text{kills}(x, f(x)) \vee \neg \text{Loves}(g(x), x)$

→ Distribute  $\rightarrow [\text{Animal}(f(x)) \vee \neg \text{Loves}(g(x), x)] \wedge [\text{Animal}(f(x)) \vee \neg \text{Loves}(g(x), x)]$

2) Given Rules

→ cold  $\wedge$  precipitation  $\rightarrow$  Snow

•  $\neg \text{cold} \vee \neg \text{precipitation} \vee \text{snow}$

→ January  $\rightarrow$  cold

$\neg \text{January} \vee \text{cold}$

→ clouds  $\rightarrow$  precipitation

$\neg \text{clouds} \vee \text{precipitation}$

Facts

January, clouds

Prove

Snow

