

# Simplification

1. transform  $\varphi$  to DNF
2. move  $\exists$  inside every disjunct

$$(\exists x. P \vee Q) \Leftrightarrow (\exists x. P) \vee (\exists x. Q)$$

3. move conjuncts that do not mention the bound variable  $x$  out

$$(\exists x. P \wedge Q) \Leftrightarrow (\exists x. P) \wedge Q \quad \text{if } x \text{ is not free in } Q$$

$$\begin{aligned} & \exists x. (3 < x \wedge x + 2y \leq 6 \wedge y < 0) \vee (3x \leq 2y) \\ & (\exists x. 3 < x \wedge x + 2y \leq 6 \wedge y < 0) \vee (\exists x. 3x \leq 2y) \end{aligned}$$