Simplification

1. transform φ 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

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

$$\exists x.(3 < x \wedge x + 2y \leq 6 \wedge y < 0) \vee (3x \leq 2y)$$
$$(\exists x.3 < x \wedge x + 2y \leq 6 \wedge y < 0) \vee (\exists x.3x \leq 2y)$$
$$((\exists x.3 < x \wedge x + 2y \leq 6) \wedge y < 0) \vee (\exists x.3x \leq 2y)$$