Example 35 *Let* $A = \exists z(\exists x Q(x,z) \vee \exists x P(x)) \to \neg(\neg\exists x P(x) \wedge \forall x \exists z Q(z,x))$.

1. *Eliminating* $\to$: $A \equiv \neg\exists z(\exists x Q(x,z) \vee \exists x P(x)) \vee \neg(\neg\exists x P(x) \wedge \forall x \exists z Q(z,x))$
2. *Importing the negation:* $A \equiv \forall z(\neg\exists x Q(x,z) \wedge \neg\exists x P(x)) \vee (\neg\neg\exists x P(x) \vee \neg\forall x \exists z Q(z,x))$

   $\equiv \forall z(\forall x \neg Q(x,z) \wedge \forall x \neg P(x)) \vee (\exists x P(x) \vee \exists x \forall z \neg Q(z,x))$.
3. *Using the equivalences (a) and (b):* $A \equiv \forall z \forall x(\neg Q(x,z) \wedge \neg P(x)) \vee \exists x(P(x) \vee \forall z \neg Q(z,x))$.
4. *Renaming:* $A \equiv \forall z \forall x(\neg Q(x,z) \wedge \neg P(x)) \vee \exists y(P(y) \vee \forall w \neg Q(w,y))$.
5. *Using the equivalences (c)-(f) and pulling the quantifiers in front:*

   $A \equiv \forall z \forall x \exists y \forall w((\neg Q(x,z) \wedge \neg P(x)) \vee P(y) \vee \neg Q(w,y))$.
6. *The resulting formula is in a prenex DNF. For a prenex CNF we have to distribute the* $\vee$ *over* $\wedge$*:*

   $A \equiv \forall z \forall x \exists y \forall w((\neg Q(x,z) \vee P(y) \vee \neg Q(w,y)) \wedge (\neg P(x) \vee P(y) \vee \neg Q(w,y)))$.