domain: people

H(x): x is happy
C(x): x is in this class
A(x, y): x appreciates y
t: Luther Tychonievich

Everyone is happy

$\forall x.\ H(x)$

Everyone in this class is happy

$H(x) \overset{20}{\rightarrow} C(x)$

$\forall x.\ C(x) \overset{1}{\wedge} H(x)$ $\quad C(x) \overset{0}{\vee} H(x)$ $\quad \boxed{C(x) \overset{\text{lor}}{\rightarrow} H(x)}$

Someone is happy

$\exists x.\ H(x)$

Someone in this class is happy

$\neg C(x) \vee H(x)$

$C(x) \rightarrow H(x)$

$\exists x.\ \boxed{C(x) \wedge H(x)}$

Not everyone is happy

$\neg \forall x.\ H(x) \equiv \exists x.\ \neg H(x)$

Someone is unhappy

$\exists x.\ H(x) \wedge [\forall y.\ ((x \neq y) \rightarrow (\neg H(y)))]$

$\exists x.\ \neg H(x) \equiv \neg \forall x.\ H(x)$

Only one person is happy

$\exists x.\ \forall y.\ H(x) \wedge (x \neq y \rightarrow \neg H(y))$

$\exists x.\ H(x)$

$\forall y.\ (x \neq y) \rightarrow (\neg H(y))$

Only one person in this class is happy

$\exists x.\ \forall y.\ (C(x) \wedge C(y)) \rightarrow$

$(H(x) \wedge (x \neq y \rightarrow \neg H(y)))$

Every happy person is in this class

$\forall x.\ H(x) \rightarrow C(x)$

At least one happy person is in this class

Everyone appreciates someone

$\forall x.\ \exists y.\ A(x, y)$

Everyone appreciates someone else

$\forall x.\ \exists y.\ x \neq y \wedge A(x, y)$

Everyone appreciates someone who appreciates them

Everyone appreciates someone else who appreciates them

Everyone appreciates anyone who appreciates them

Everyone in this class appreciates someone in this class

Those in this class only appreciate people in this class

Tychonievich only appreciates those who appreciate someone in this class

$$\rightarrow \quad \exists x.\, H(x) \boxed{\wedge} \left(\forall y.\, (x \neq y) \rightarrow \neg H(y) \right)$$

$$\exists x.\, H(x) \rightarrow \left(\forall y.\, (x \neq y) \rightarrow \neg H(y) \right)$$

$$\exists x.\, \forall y.\quad H(x) \wedge (x \neq y \rightarrow \neg H(y)$$

$$\forall y.\, \exists x.\quad H(x) \wedge \left(x \neq y \rightarrow \neg H(y) \right)$$

$$\neg \underbrace{\forall x . \, C(x)}$$

$$\equiv$$

$$\exists x . \, \neg C(x)$$

$$\forall x . \, \neg C(x)$$

$$\equiv$$

$$\nexists x . \, C(x)$$

$$\equiv$$

$$\neg \exists x . \, C(x)$$

domain

$$\forall y \quad \exists x \quad H(x) \land (x \neq y \to \neg H(y))$$

for everyone, someone is happy and not happy, or unhappy

always true:

$$\exists x \quad \forall y \quad H(x) \land (x \neq y \to \neg H(y))$$

someone

only one