```
--
--  ----------- PROOF -----------
--  Length of proof is 33 . Level of proof is 16 .
--  2 [ ] c4'Uc3Uc4'Uc3'!=c4
--  3 [ ] xUy=yUx
--  4 [ ] xU(yUz)=xUyUz
--  6 , 5 [ copy , 4 , flip . 1 ] xUyUz=xU(yUz)
--  11 , 10 [ ] x~~=x
--  14 [ ] (xoy)~=y~ox~
--  16 [ ] xoi=x
--  18 [ ] x~oxoy'Uy'=y'
--  21 , 20 [ ] x'Uy'Ux'Uy'=x
--  24 [ para_from , 3 . 1 . 1 , 2 . 1 . 1 ] c4'Uc3'Uc4'Uc3!=c4
--  28 [ para_into , 10 . 1 . 1 , 10 . 1 . 1 ] x=x
--  29 [ para_into , 5 . 1 . 1 . 1 , 3 . 1 . 1 , demod , 6 ] xU(yUz)=yU(xUz)
--  30 [ para_into , 5 . 1 . 1 , 3 . 1 . 1 ] xU(yUz)=yU(zUx)
--  32 [ para_into , 14 . 1 . 1 . 1 , 16 . 1 . 1 , flip . 1 ] i~ox~=x~
--  38 [ para_into , 32 . 1 . 1 . 2 , 10 . 1 . 1 , demod , 11 ] i~ox=x
--  41 , 40 [ para_into , 38 . 1 . 1 , 16 . 1 . 1 ] i~=i
```

-- 43 , 42 [back_demod , 38 , demod , 41] $\iota o x = x$
-- 46 [para_into , 29 . 1 . 1 , 3 . 1 . 1 , demod , 6] $x \cup (y \cup z) = x \cup (z \cup y)$
-- 50 [para_into , 30 . 1 . 1 . 2 , 3 . 1 . 1] $x \cup (y \cup z) = z \cup (y \cup x)$
-- 58 [para_into , 18 . 1 . 1 . 1 . 1 , 40 . 1 . 1 , demod , 43 , 43] $\bar{x} \cup \bar{x} = \bar{x}$
-- 143 [para_into , 20 . 1 . 1 . 1 . 2 . 1 , 58 . 1 . 1] $\overline{\overline{\bar{x} \cup x} \cup \bar{\bar{x}}} = \bar{x}$
-- 151 [para_into , 20 . 1 . 1 . 1 , 3 . 1 . 1] $\overline{x \cup \bar{y}} \cup \overline{x \cup y} = x$
-- 156 , 155 [para_from , 20 . 1 . 1 , 58 . 1 . 1 . 2 , demod , 21 , 21] $x \cup x = x$
-- 159 [para_into , 155 . 1 . 1 , 50 . 1 . 1] $x \cup (y \cup (y \cup x)) = y \cup x$
-- 164 , 163 [para_into , 155 . 1 . 1 , 29 . 1 . 1 , demod , 6 , 156] $x \cup (x \cup y) = x \cup y$
-- 166 , 165 [back_demod , 159 , demod , 164] $x \cup (y \cup x) = y \cup x$
-- 167 [para_from , 155 . 1 . 1 , 20 . 1 . 1 . 1 . 1 . 1] $\overline{\bar{x} \cup \overline{x \cup \bar{x}}} = x$
-- 221 , 220 [para_into , 167 . 1 . 1 . 1 , 3 . 1 . 1] $\overline{\overline{x \cup \bar{x}} \cup \bar{x}} = x$
-- 227 , 226 [para_from , 167 . 1 . 1 , 20 . 1 . 1 . 1 . 2 , demod , 166] $\overline{\overline{x \cup \bar{x}} \cup x} = \bar{x}$
-- 273 [para_into , 220 . 1 . 1 . 1 . 1 . 1 . 2 , 220 . 1 . 1 , demod , 6 , 221]
-- $\overline{\overline{\overline{x \cup \bar{x}} \cup (\bar{x} \cup x)} \cup x} = \overline{x \cup \bar{x}} \cup \bar{x}$
-- 292 , 291 [para_from , 220 . 1 . 1 , 20 . 1 . 1 . 1 . 2 , demod , 227] $\overline{\bar{x} \cup x} = \overline{x \cup \bar{x}}$
-- 299 [back_demod , 143 , demod , 292] $\overline{x \cup \bar{x}} \cup \bar{\bar{x}} = \bar{x}$
-- 301 [para_into , 226 . 1 . 1 . 1 . 1 . 1 . 2 , 226 . 1 . 1 , demod , 6 , 292 , 6 , 227]
-- $\overline{\overline{x \cup (\bar{x} \cup \overline{x \cup \bar{x}})} \cup (\overline{x \cup \bar{x}} \cup x)} = \bar{x}$
-- 324 , 323 [para_from , 226 . 1 . 1 , 220 . 1 . 1 . 1 . 2 , demod , 227 , 6 , 292 , 6]
-- $\overline{\overline{x \cup (\bar{x} \cup \overline{x \cup \bar{x}})} \cup \bar{x}} = \overline{x \cup \bar{x}} \cup x$
-- 347 , 346 [para_into , 291 . 1 . 1 . 1 , 46 . 1 . 1 , demod , 6] $\overline{\overline{x \cup \bar{y}} \cup (y \cup x)} = \overline{x \cup (y \cup \overline{x \cup y})}$

-- 355 , 354 [back_demod , 273 , demod , 347] $x \cup (\bar{x} \cup x \cup \bar{x}) \cup x = x \cup \bar{x} \cup \bar{x}$
-- 958 , 957 [para_into , 299 . 1 . 1 . 1 . 1 . 1 . 2 , 220 . 1 . 1 , demod , 6 , 347 , 221 ,
-- 324 , 221] $x \cup \bar{x} \cup x = x$
-- 974 , 973 [back_demod , 301 , demod , 958 , 355] $x \cup \bar{x} \cup \bar{x} = \bar{x}$
-- 988 , 987 [back_demod , 220 , demod , 974] $\bar{\bar{x}} = x$
-- 1060 , 1059 [para_into , 987 . 1 . 1 . 1 , 151 . 1 . 1 , flip . 1] $x \cup \bar{y} \cup x \cup y = \bar{x}$
-- 1071 [back_demod , 24 , demod , 1060 , 988] $c4 \neq c4$
-- 1072 [binary , 1071 . 1 , 28 . 1] F
-- ———— end of proof ————-
--
--
-- Search stopped by max_proofs option .
--
-- = = = = = = = = = = = = = end of search = = = = = = = = = = = = =
--
-- ———— statistics ————-
-- clauses given 49
-- clauses generated 1209
-- clauses kept 593
-- clauses forward subsumed 942

```
--  clauses back subsumed 3
--  Kbytes malloced 926
--
--  ———————— times ( seconds ) ————————
--  user CPU time 0 .  27 ( 0 hr , 0 min , 0 sec )
--  system CPU time 0 .  0 ( 0 hr , 0 min , 0 sec )
--  wall - clock time 0 ( 0 hr , 0 min , 0 sec )
```