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-? :d
% debug is on
-? subset(P, q).
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- (1) $(\neg P \rightarrow \neg(\neg \text{subset}(P, Q)))(P, q) ?$ **21.2**
- (2) $\neg(\neg \text{subset}(P, q)) ?$ **22.4**
- (3) $\neg((\neg P \rightarrow (\exists X P(X), \neg(Q(X))))(P, q)) ?$ **21.2**
- (4) $\neg((\text{EV4 } P(V4), \neg(q(V4)))) ?$ **22.7.b**
- (5) $\neg((\text{EV4 } P(V4));$
 $(\text{EV4 } P(V4), \neg(\neg(q(V4)))), \neg((\text{EV4 } P(V4), \neg(q(V4)))) ?$ **22.3**
- (6) $\neg((\text{EV4 } P(V4))) ?$
- (7) $\text{true} ?$

Yes

$P = \{ \} \text{ except } \{ *V8 \} ;$

- (6) $(\text{EV4 } P(V4), \neg(\neg(q(V4)))) , \neg((\text{EV4 } P(V4), \neg(q(V4)))) ?$ **20.3**
- (7) $P(V5), \neg(\neg(q(V5))), \neg((\text{EV4 } P(V4), \neg(q(V4)))) ?$ **20.6, $\theta = \{ R / (\neg V6.V6=V5 \vee V8) \}$**
- (8) $\neg(\neg(q(V5))), \neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **21.1**
- (9) $\neg(\neg((\neg \theta^0_0 = 0); (\neg \theta^1_1 = 1); (\neg \theta^2_2 = 2)(V5))),$
 $\neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **21.3**
- (10) $\neg(\neg((\neg \theta^0_0 = 0); (\neg \theta^1_1 = 1)(V5); (\neg \theta^2_2 = 2)(V5))),$
 $\neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **22.3**
- (11) $\neg(\neg((\neg \theta^0_0 = 0); (\neg \theta^1_1 = 1)(V5)),$
 $\neg((\neg \theta^2_2 = 2)(V5))),$
 $\neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **21.3**
- (12) $\neg(\neg((\neg \theta^0_0 = 0)(V5); (\neg \theta^1_1 = 1)(V5)),$
 $\neg((\neg \theta^2_2 = 2)(V5))),$
 $\neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **22.3**
- (13) $\neg(\neg((\neg \theta^0_0 = 0)(V5)), \neg((\neg \theta^1_1 = 1)(V5)),$
 $\neg((\neg \theta^2_2 = 2)(V5))),$
 $\neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **21.2**
- (14) $\neg(\neg(V5 = 0),$
 $\neg((\neg \theta^1_1 = 1)(V5)), \neg((\neg \theta^2_2 = 2)(V5))),$
 $\neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **22.9.b**
- (15) $V5 = 0; \neg(\neg((\neg \theta^1_1 = 1)(V5)), \neg((\neg \theta^2_2 = 2)(V5))),$
 $\neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **20.2**
- (16) $V5 = 0, \neg((\text{EV4 } (\neg V6 \wedge V6 = V5); V8(V4), \neg(q(V4)))) ?$ **20.5: $V5 = 0$**
- (17) $\neg((\text{EV4 } (\neg V6 \wedge V6 = 0); V8(V4), \neg(q(V4)))) ?$ **21.3**
- (18) $\neg((\text{EV4 } (\neg V6 \wedge V6 = 0)(V4); V8(V4), \neg(q(V4)))) ?$ **22.3**
- (19) $\neg((\text{EV4 } (\neg V6 \wedge V6 = 0)(V4), \neg(q(V4)))) ,$
 $\neg((\text{EV4 } V8(V4), \neg(q(V4)))) ?$ **21.2**
- (20) $\neg((\text{EV4 } V4 = 0, \neg(q(V4))), \neg((\text{EV4 } V8(V4), \neg(q(V4)))) ?$ **22.6.c**
- (21) $\neg((\text{EV4 } \neg(q(0))), \neg((\text{EV4 } V8(V4), \neg(q(V4)))) ?$ **21.1**

- (22) $\text{not}((\text{EV4 } \text{not}((\backslash_0^{_0} = 0); (\backslash_1^{_1} = 1); (\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **21.3**
- (23) $\text{not}((\text{EV4 } \text{not}((\backslash_0^{_0} = 0); (\backslash_1^{_1} = 1)(0);$
 $(\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **22.3**
- (24) $\text{not}((\text{EV4 } \text{not}((\backslash_0^{_0} = 0); (\backslash_1^{_1} = 1)(0)),$
 $\text{not}((\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **21.3**
- (25) $\text{not}((\text{EV4 } \text{not}((\backslash_0^{_0} = 0)(0); (\backslash_1^{_1} = 1)(0)),$
 $\text{not}((\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **22.3**
- (26) $\text{not}((\text{EV4 } \text{not}((\backslash_0^{_0} = 0)(0)), \text{not}((\backslash_1^{_1} = 1)(0)),$
 $\text{not}((\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **21.2**
- (27) $\text{not}((\text{EV4 } \text{not}(\theta = 0),$
 $\text{not}((\backslash_1^{_1} = 1)(0)), \text{not}((\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **22.6.b ?**
- (28) $\text{not}((\text{EV4 } \text{not}(\text{true}),$
 $\text{not}((\backslash_1^{_1} = 1)(0)), \text{not}((\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **22.2: not(true) => false**
- (29) $\text{not}((\text{EV4 } \text{false}, \text{not}((\backslash_1^{_1} = 1)(0)), \text{not}((\backslash_2^{_2} = 2)(0))),$
 $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **22.1: not(..., false, ...) => true**
- (30) $\text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **22.7.b**
- (31) $\text{not}((\text{EV4 } \text{V8}(\text{V4}));$
 $(\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{not}(\text{q}(\text{V4})))), \text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **20.2**
- (32) $\text{not}((\text{EV4 } \text{V8}(\text{V4}))) ?$
- (33) $\text{true} ?$

Yes

P = { 0 } except { *V15 } ;

- (32) $(\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{not}(\text{q}(\text{V4}))), \text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **20.3: E = V8(V12)**
- (33) $\text{V8}(\text{V12}), \text{not}(\text{not}(\text{q}(\text{V12}))), \text{not}((\text{EV4 } \text{V8}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$
20.6: R = {V8 / ($\wedge \text{V13.V13} = \text{V12 } \vee \text{V15}$)}
- (34) $\text{not}(\text{not}(\text{q}(\text{V12}))),$
 $\text{not}((\text{EV4 } (\backslash \text{V13}^{\text{V13}} = \text{V12}); \text{V15}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **21.1**
- (35) $\text{not}(\text{not}((\backslash_0^{_0} = 0); (\backslash_1^{_1} = 1); (\backslash_2^{_2} = 2)(\text{V12}))),$
 $\text{not}((\text{EV4 } (\backslash \text{V13}^{\text{V13}} = \text{V12}); \text{V15}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$ **21.3**
- (36) $\text{not}(\text{not}((\backslash_0^{_0} = 0); (\backslash_1^{_1} = 1)(\text{V12}); (\backslash_2^{_2} = 2)(\text{V12}))),$
 $\text{not}((\text{EV4 } (\backslash \text{V13}^{\text{V13}} = \text{V12}); \text{V15}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$
- (37) $\text{not}(\text{not}((\backslash_0^{_0} = 0); (\backslash_1^{_1} = 1)(\text{V12})),$
 $\text{not}((\backslash_2^{_2} = 2)(\text{V12}))),$
 $\text{not}((\text{EV4 } (\backslash \text{V13}^{\text{V13}} = \text{V12}); \text{V15}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$
- (38) $\text{not}(\text{not}((\backslash_0^{_0} = 0)(\text{V12}); (\backslash_1^{_1} = 1)(\text{V12})),$
 $\text{not}((\backslash_2^{_2} = 2)(\text{V12}))),$
 $\text{not}((\text{EV4 } (\backslash \text{V13}^{\text{V13}} = \text{V12}); \text{V15}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$
- (39) $\text{not}(\text{not}((\backslash_0^{_0} = 0)(\text{V12})), \text{not}((\backslash_1^{_1} = 1)(\text{V12})),$
 $\text{not}((\backslash_2^{_2} = 2)(\text{V12}))),$
 $\text{not}((\text{EV4 } (\backslash \text{V13}^{\text{V13}} = \text{V12}); \text{V15}(\text{V4}), \text{not}(\text{q}(\text{V4})))) ?$

- (40) $\text{not}(\text{not}(V12 = 0),$
 $\quad \text{not}((_1^1 = 1)(V12)), \text{not}((_2^2 = 2)(V12))),$
 $\text{not}((EV4 \ (_13^13 = V12); V15(V4), \text{not}(q(V4)))) ?$
- (41) $V12 = 0; \text{not}(\text{not}((_1^1 = 1)(V12)), \text{not}((_2^2 = 2)(V12))),$
 $\text{not}((EV4 \ (_13^13 = V12); V15(V4), \text{not}(q(V4)))) ?$
- (42) $V12 = 0, \text{not}((EV4 \ (_13^13 = V12); V15(V4), \text{not}(q(V4)))) ?$
- (43) $\text{not}((EV4 \ (_13^13 = 0); V15(V4), \text{not}(q(V4)))) ?$
- (44) $\text{not}((EV4 \ (_13^13 = 0)(V4); V15(V4), \text{not}(q(V4)))) ?$
- (45) $\text{not}((EV4 \ (_13^13 = 0)(V4), \text{not}(q(V4)))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (46) $\text{not}((EV4 \ V4 = 0, \text{not}(q(V4))), \text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (47) $\text{not}((EV4 \ \text{not}(q(0)))), \text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (48) $\text{not}((EV4 \ \text{not}((_0^0 = 0); (_1^1 = 1); (_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (49) $\text{not}((EV4 \ \text{not}((_0^0 = 0); (_1^1 = 1)(0);$
 $\quad (_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (50) $\text{not}((EV4 \ \text{not}((_0^0 = 0); (_1^1 = 1)(0)),$
 $\quad \text{not}((_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (51) $\text{not}((EV4 \ \text{not}((_0^0 = 0)(0); (_1^1 = 1)(0)),$
 $\quad \text{not}((_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (52) $\text{not}((EV4 \ \text{not}((_0^0 = 0)(0)), \text{not}((_1^1 = 1)(0)),$
 $\quad \text{not}((_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (53) $\text{not}((EV4 \ \text{not}(\theta = 0),$
 $\quad \text{not}((_1^1 = 1)(0)), \text{not}((_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (54) $\text{not}((EV4 \ \text{not}(\text{true}),$
 $\quad \text{not}((_1^1 = 1)(0)), \text{not}((_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (55) $\text{not}((EV4 \ \text{false}, \text{not}((_1^1 = 1)(0)), \text{not}((_2^2 = 2)(0))),$
 $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (56) $\text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (57) $\text{not}((EV4 \ V15(V4));$
 $\quad (EV4 \ V15(V4), \text{not}(\text{not}(q(V4))), \text{not}((EV4 \ V15(V4), \text{not}(q(V4)))) ?$
- (58) $\text{not}((EV4 \ V15(V4))) ?$
- (59) $\text{true} ?$

Yes

P = { 0, 0 } except { *V22 } .

-?