(3.1) All suspects are passengers on the Orient Express

Some of the suspects have been questioned.

Some suspects are guilty.

Some Orient Express passengers who have been questioned are guilty

∀x( S(x) → P(x) )

∃x( S(x) ^ Q(x) )

∃x( S(x) ^ G(x) )

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∃x( P(x) ^ Q(x) ^ G(x) )

1 - Negate the thesis

¬ ∃x( P(x) ^ Q(x) ^ G(x) )

∀x( ¬P(x) v ¬Q(x) v ¬G(x) )

2 - Skolemise

∀x( S(x) → P(x) )

S(a) ^ Q(a)

S(b) ^ G(b)

∀x( ¬P(x) v ¬Q(x) v ¬G(x) )

3 - CNF

¬S(x) v P(x)

S(a)

Q(a)

S(b)

G(b)

¬P(a) v ¬Q(a) v ¬G(a)

¬P(b) v ¬Q(b) v ¬G(b)

3. Initialise

1. ¬S(a) v P(a)
2. ¬S(b) v P(b)
3. S(a)
4. Q(a)
5. S(b)
6. G(b)
7. ¬P(a) v ¬Q(a) v ¬G(a)
8. ¬P(b) v ¬Q(b) v ¬G(b)

CDCL

< S(a)[3], Q(a)[4], S(b)[5], G(b)[6] | C | \* >

< S(a)[3], Q(a)[4], S(b)[5], G(b)[6], P(a)[1], P[b], ¬G(a)[7], ¬P(b)[8] | C | \* >

SAT

Since it is SAT the test is not a tautology