1. 1. ra,b

sb,c

{rx,y -> sx,y| x, y ϵ {a, b, c}}

{sx,y ∧ sy,z -> sx,z | x, y, z ϵ {a, b, c}}

{sx,y -> tx | x, y ϵ {a, b, c}}

* 1. ma

na,b,c

{nx,y,z -> mx| x, y, z ϵ {a, b, c}}

{nx,y,z -> my| x, y, z ϵ {a, b, c}}

{mx ∧ my-> lx,y | x, y ϵ {a, b, c}}

1. * 1. guilty -> punished
     2. ¬guilty
     3. ¬punished
   1. 1. woncarlo -> secondmario ∨ thirdsergio
      2. ¬thirdsergio
      3. ¬secondmario -> ¬woncarlo

|  |  |  |
| --- | --- | --- |
| guilty | punished | ¬guilty v punished |
| 0 | 0 | 1 |
| 0 | 1 | 1 \*Socrates is not guilty and punished |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| C | M | S | ¬S | MvS | ¬Cv(MvS) | Mv¬C | ¬(¬Cv(MvS)^¬S)v(Mv¬C) |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |

For all possibilities, we know that if Sergio did not come in third and Mario came in second, this must imply that Carlo did not win