

Exercise Set 1.3, Problem 40 on page 42

Sharky, a leader of the underworld, was killed by one of his own band of four henchmen. Detective Sharp interviewed the men and determined that all were lying except for one. He deduced who killed Sharky on the basis of the following statements:

- a) Socko: Lefty killed Sharky.*
- b) Fats: Muscles didn't kill Sharky.*
- c) Lefty: Muscles was shooting craps with Socko when Sharky was knocked off.*
- d) Muscles: Lefty didn't kill Sharky.*

Who did kill Sharky?

Answer:

- Assume Muscles is a knave.
- So Muscles lies. (Definition of a knave)
- Therefore, Lefty killed Sharky. (Negation of Muscles' statement)
- Hence, Socko is telling the truth.
- So Socko is a knight. (Definition of knight)
- Since there is only one knight, Fats must be a knave. (Elimination)
- So Fats' statement "Muscles didn't kill Sharky" must be false. (Definition of knave)
- Hence, Muscles killed Sharky. (Negation of Fats' statement)
- But only one person killed Sharky. (Given Hypothesis)
- Hence, Muscles is a knight. (Contradiction Rule)
- Since there is only one knight, Fats must be a knave. (Elimination)
- Hence, Fats' statement "Muscles didn't kill Sharky" must be false. (Definition of knave)
- Hence, Muscles killed Sharky. (Double negation Rule)