Problem of the Week
Solution Six

You meet nine people, exactly one of whom has a valuable diamond. Several others have less valuable rubies (and no diamonds), while others still do not have any gems at all. The speakers have been numbered from one to nine, for convenience. We also know that the person with the diamond is a knight, and that only knaves have rubies. People with no gems could be either knights or knaves. They make the following statements:

1. Quincy: One of the odd-numbered speakers has the diamond.
2. Rouletabille: I have no gems.
3. Sisko: Uhura is a knight or Wall-E is a knave.
4. Troi: Quincy is a knave.
5. Uhura: Rouletabille is a knight or Troi is a knight.
6. Victor Frankenstein: Sisko is a knave.
7. Wall-E: Quincy does not have the diamond.
8. Xander: I have a ruby and Yoda has no gems.
9. Yoda: I have a ruby and Victor Frankenstein is a knave.

These statements alone are insufficient to determine who has the diamond. But if I told you whether or not Xander had a gem, then you would have enough information. So, that's it. Tell me who has the diamond!

SOLUTION: Wall-E has the diamond.

Since people without gems can be either knights or knaves, it would not help you at all to learn that Xander had no gems. But since you are given that knowing whether or not Xander has a gem would be sufficient to solve the problem, you can conclude that Xander has a gem.
That gem cannot be a diamond. If it were, then his statement is false, which would imply that he is a knave, which is contrary to the given information that it is a knight who has the diamond. So Xander has a ruby. That means his statement is false, which immediately implies that Yoda has a gem.

Yoda cannot have the diamond, for then his statement would be false which is a contradiction. Since we know he has a gem, we conclude that he has a ruby. That means that Yoda is a knave, which implies that his statement is false. That implies that Victor Frankenstein must be a knight.
That Victor Frankenstein is a knight immediately implies that Sisko is a knave. That means both parts of Sisko's "or" statement are false. So Uhura is a knave and Wall-E is a knight. Since Uhura is a knave, both parts of *her* "or" statement are false. This implies that Rouletabille is a knave and Troi is a knave. Finally, since Troi is a knave, we see that Quincy must be a knight.
We have now determined who are the knights and who are the knaves:

1. Knight	2. Knave	3. Knave
4. Knave	5. Knave	6. Knight
7. Knight	8. Knave	9. Knave

Since we know that a knight has the diamond, we have narrowed things down to Quincy, Victor Frankenstein and Wall-E. Since Quincy is a knight we know that it is an odd-numbered speaker who has the diamond, which rules out Victor Frankenstein. And since Wall-E is a knight, his statement is true, meaning that Quincy does not have the diamond.
So Wall-E must have the diamond, as claimed.