
Problem of the Week

Solution Three

You meet Gandalf, Harry Potter and the Incredible Hulk. Gandalf says, “Harry Potter is a knight.” Harry Potter says, “If Gandalf is a knight then so is the Incredible Hulk.” Deduce as much you can regarding the knight-hood or knave-hood of the three people.

SOLUTION: All three of them are knights.

To see this, let us suppose that Gandalf is a knight. Then his statement is true, which implies that Harry Potter is a knight as well. That means Harry Potter’s statement is true. But he made a conditional statement in which the first part is true. That implies that the second part of his statement is also true, which means, in turn, that the Incredible Hulk is also a knight. We have thus shown that if Gandalf is a knight, then so is the Incredible Hulk

But that is precisely what Harry Potter said! We conclude that Harry Potter spoke truthfully, meaning he is a knight. That means Gandalf also spoke truthfully, making him a knight as well. And now we must assume the Incredible Hulk is a knight, as that is the only way for Harry Potter’s statement to be true. So all of them are knights and we are done.

An alternative approach would start with the assumption that Gandalf is a knave. In this case, Harry Potter has made a conditional statement in which the first part is false. That makes the whole conditional statement true, meaning that Harry Potter is a knight. But this is a contradiction, since it now implies that Gandalf spoke truthfully after all. This shows that Gandalf is a knight, from which the rest of the solution unravels as before.