Problem of the Week # 16: Case of the Stolen Purse

Solution by: Mike Findlay

Assumption: Each student makes 2 true statements and 1 false statement.

Theo’s false statement must be # 11. It can’t be #10 or #12, because if either of those were false, it would necessarily make the other false, violating our assumption. Therefore #10 and #12 are true statements. We can conclude neither Theo nor Margaret is the thief. It also follows that statement #3 is false. So, statements #1 and #2 are true and we can rule out Lillian. Similarly, statement #9 is false because we know Theo did not steal the purse. Statements #7 and #8 must then be true, so we can also rule out David. By process of elimination, Judy is the thief.

Let’s check our conclusion. If Judy is the thief, then statement #4 must be false. Then, statements #5 and #6 must be true. Statement #5 is not a denial of the theft, so it can be true in spite of Judy being the thief. The result of statement #6 being true validates the truth of statement #14 and leaves only statement #15 to be the false statement of the three Margaret made, which it would have to be since we earlier concluded that statement #8 was true. We have found no logical contradictions, so Judy must indeed be the thief.