

UNIVERSITY NUMBER: _____

2 Knights and Knaves (12 points)

In a castle, there are two and only two types of people: knights or knaves. Knights always say the truth, and knaves always lie.

Let a, b, c , and d be the propositions “Alice is a knight”, “Bob is a knight”, “Charlie is a knight”, “Dave is a knight”, respectively.

Note that, by the rules of Knights and Knaves, if Alice states the proposition p , you have the equivalence $a \Leftrightarrow p$. The same holds for Bob, Charlie, and Dave.

- (a) (5 pt) Alice says “Among Bob and I, one and only one is a knight”. Bob says “Among Alice and I, one and only one is a knight”.

Determine whether each of Alice and Bob is a knight or a knave.

- (b) (5 pt) Alice says: “Bob is not a knave”. Bob says: “Charlie is a not a knight”. Charlie says “Among Bob and I, at least one is a knight.”

Determine whether each of Alice, Bob and Charlie is a knight or a knave.

- (c) (2pt) Alice says: “Among Bob and Charlie, one and only one is a knight”, Bob says: “Charlie and Dave are both knights or both knaves”, Charlie says: “Alice and I are knights”, Dave says: “Among Alice and Bob, one and only one is a knight”.

Determine whether each person is a knight or a knave.