

SYMBOLIC LOGIC - EXAM 2, due Mar 2nd

Provide proofs or disproofs of the following arguments.

1) Anyone who repairs his or her own car is highly skilled and saves a lot of money on repairs. Some people who repair their own cars have menial jobs. Therefore, some people with menial jobs are highly skilled.

2) Some police officers are forced to moonlight (take a second job). No individual who works two jobs can be fully alert on the job. A police officer who is not fully alert on the job will make errors of judgment. Therefore, some police officers will make errors of judgment.

3) If any jewelry is missing, then if all the servants are honest, it will be returned. If any servant is honest, then they all are. Therefore if any jewelry is missing, then if at least one servant is honest, then it will be returned.

4) Any businessman who is a poet must be a wealthy man. Wealthy men are all conservatives. If some conservative does not like poetry, then no poets are conservative. Therefore, if there is a wealthy man who does not like poetry, then no businessman is a poet.

5) Any senator who votes with the banking lobby has his or her own interests at heart. Every senator from Texas has his or her own interests at heart. Therefore, if a senator is from Texas, they will vote with the banking lobby.

Grads only:

Let S be the set of all statements about the individual natural numbers. For example “ n is a prime” or “ n is a Ramsey number” or “ n is the number of faces of a regular polyhedron”..these can be true or false for a given n . Now find an injective function from the set of all such statements S to \mathbb{N} , the natural numbers. The injective function should discriminate between all ways of communicating the same property. In other words, the written statements “ n is a prime” and “ n is divisible only by 1 and itself”, while logically equivalent, are syntactically different. The statement “ n is divisible only by itself and 1” would also be different. After you have defined the function, explain how to put all the statements in S in a linear order.