

Tuesday, Jan. 17

1. How many rows are there in a table with p propositions *anded* together, $p_1 \wedge p_2 \wedge p_3 \dots \wedge p_n$? Prove your answer.
2. Determine if these are true or false:
 - if pigs can fly, then $1 + 1 = 3$
 - if $1+1=3$, then pigs can fly
 - if $1+1=2$, then pigs can fly
3. Construct a truth table for $(p \rightarrow q) \vee (\neg p \rightarrow r)$
4. Show that $p \leftrightarrow q$ and $\neg p \leftrightarrow \neg q$ are logically equivalent

5. p is "it snows tonight" and q is "I will stay at home."

What is:

- (a) The conditional $p \rightarrow q$
- (b) The contrapositive
- (c) The converse
- (d) The inverse
- (e) Which above are logically equivalent?

6. An old legend says that the barber in a remote town shaves those people, and only those people, who do not shave themselves. Can there be such a barber?

7. Each inhabitant of a remote village always tells the truth or always lies. A villager will only give "yes" or "no" response to a question a tourist asks. Suppose you are a tourist visiting this area and come to a fork in the road. One branch leads to the ruins you want to visit; the other leads deep into the jungle. A villager is standing at the fork in the road. What one question can you ask the villager to determine which branch to take?