

Math 301

Quiz 1

Justify all answers with neat and organized work. Clearly indicate your answers.
20 points possible.

1. (5 pts.) Write each statement in symbolic form using the symbols \sim , \vee , and \wedge and the indicated letters to represent the component statements.

Let h = “John is healthy,” w = “John is wealthy,” and s = “John is wise.”

(a) John is healthy and wise but not wealthy.

(b) John is not wise but he is healthy and wealthy.

(c) John is neither healthy, wealthy, nor wise.

(d) John is neither healthy nor wealthy, but he is wise.

(e) John is healthy, but he is not both wealthy and wise.

2. (5 pts.) Imagine that you are searching the Internet using a search engine that uses AND for *and*, NOT for *not*, and OR for *or*.

You recall that the fastest mammal on earth is either a jaguar or a cheetah. To find a Web page to tell you which one is the fastest, write a logical expression containing “jaguar” and “cheetah,” and either “speed” or “fastest” but not “car,” or “automobile,” or “auto” (to avoid pages about the Jaguar automobile).

3. (10 pts.) Determine if the two statement forms are logically equivalent. Justify your answer using a complete truth table, and include a few words of explanation.

$$((p \wedge \sim q) \vee (\sim p \wedge r)) \vee (p \wedge q)$$

$$p \vee r$$