Discrete Math Review Problems

Biller

1) What is a bijection?
2) If a bijection can be found between two sets, what can be said about their relative sizes?

Blaski

1. Are the following statements logically equivalent? Show your answer in a truth table.

$$\neg(p \wedge q) \rightarrow r \; and \; (p \vee q \rightarrow \neg r)$$

2. There are 50 people in the room. Some of them are acquainted with each other, some not. Prove that there are two persons in the room who have equal numbers of acquaintances.

Fuentes

1.Use mathematical induction to show that $1 + 2 + 2^2 + ... + 2^n = 2^{n+1} - 1$.
2. Use mathematical induction to prove that the sum of the first n odd positive integers is n^2.

Juarez

Show that the following is a tautology, that is it is always true.

$$(p \vee p) \rightarrow (p \rightarrow q)$$

Piazza

1. Problem 1: What is the coefficient of x^9y^7in $(4x + 3y)^{16}$?
   You may leave your answer in exponent form.

2. Problem 2: Are the following two statements logically equivalent? Prove your answer. $(p \wedge q) \rightarrow r$ and $p \vee (q \rightarrow r)$

Salazar

Show that the following is a tautology using a truth table. $[(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow r)] \rightarrow r$

Smith

1. Prove the statement using Induction:

$$1 * 1 + 2 * 2 + ... + n * n = (n - 1)! - 1$$

2. Show that the following statements form a tautology.

$$(\neg p \wedge q) \Leftrightarrow \neg(p \vee \neg q)$$

Youn

1. Use induction to prove the following.
$1 + 2 + 2^2 + ...2^n = 2^(n + 1) - 1$
2. How many different license plates are available if each plate contain a sequence of 3 letters followed by 3 digits?