Name: Solutions
(PLEASE PRINT)

MTH U230 Discrete Mathematics, Fall 2007, Quiz 1

1) Determine whether $\underbrace{(\neg p \wedge (p \to q)) \to \neg q}_{r}$ is a tautology.

Truth table:

p	q	$\neg p$	$p \to q$	$\neg p \wedge (p \to q)$	$\neg q$	r
T	T	F	T	F	F	T
T	F	F	F	F	T	T
F	T	T	T	T	F	F
F	F	T	T	T	T	T

r is not a tautology

2) State the converse and contrapositive of the following implication: each time it snows, the classes are canceled.

Converse: the classes are canceled only if it snows.

Contrapositive: it doesn't snow if the classes are not canceled

3) What is the cardinality of the set $P(A \times B)$ for $A = \{1, 2\}$ and $B = \{a, b, c\}$?

$$|A \times B| = |A| \cdot |B| = 6$$

$$|P(A \times B)| = 2^{|A \times B|} = 2^6 = \boxed{64}$$

4) Suppose the universal set is $U = \{a, b, c, d, e, f, g, h\}$ ordered alphabetically.

a. Find the bit string representing the set of letters occurring in the word "feed."

00011100
a b c d e f g h

b. Find the set specified by the bit string 01110010.

$\{b, c, d, g\}$