

Test Total

Name _____

Test 1 Introduction to Discrete Mathematics 3450:208 Dr. Norfolk

June 2, 2008

Show your work.

1. Consider the conditional $E = "p \rightarrow \sim q \vee \sim r"$.

Use de Morgan's laws to write simplified versions of the following :

- The *negation* of E :

5 points

- The *inverse* of E :

5 points

- The *converse* of E :

5 points

- The *contrapositive* of E :

5 points

2. Fill in the truth table below.

p	q	r				$p \rightarrow \sim q \vee \sim r$

10 points

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3. Determine if the following argument is valid. Justify your answer.

$$p \vee \sim q$$

$$r \rightarrow \sim p$$

$$q$$

Therefore, $\sim r$

10 points

4. (a) Convert $1111\ 1000\ 1001_2$ to *decimal*.

5 points

(b) The value of 1235_{10} in binary is $100\ 11xy\ 0011_2$. Find the values of the unknown digits x and y .

10 points

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(c) Convert $1FB98C_{16}$ to *binary*.

5 points

(d) The value of an integer $x = 23BC7D_{16}$. What is the value of $\frac{x - 13}{16}$ in *hexadecimal*?

5 points

5. Write the *truth set* for the predicate $P(n) = "n^2 \geq 100"$, with domain :

(a) the set of *real numbers*, \mathbf{R}

5 points

(b) the set of *integers*, \mathbb{Z}

5 points

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