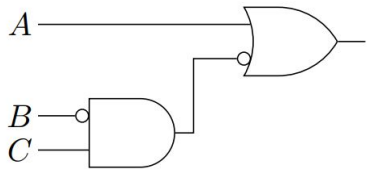
Math 156 Test Two
Section X01

Time: 50 Minutes
Total: 25 Marks

Name:_____

1. [1 mark] Write using Boolean symbols:



2. [3 marks] The following statement is true:
If Raj lives in the city of Novo then Raj does not live in the state of Siba.
Answer YES, NO or MAYBE.

a) Raj does not live in the city of Novo. Does he live in the state of Siba?

b) Raj lives in the state of Siba. Does he live in the city of Novo?

c) Raj does not live in the state of Siba. Does he live in the city of Novo?

3. [4 marks] The following statement is true:
The bowl is not broken if and only if the plate is painted.
Answer YES, NO or MAYBE.

a) The plate is painted. Is the bowl broken?

b) The bowl is broken. Is the plate painted?

c) The bowl is not broken. Is the plate painted?

d) The plate is not painted. Is the bowl broken?

4. [3 marks] State the name of the law that is being used:

a) $\sim(\sim p \vee q) \Leftrightarrow \ \sim(\sim p) \wedge \sim q$

b) $\overline{B}(\overline{\overline{B}} + C) = \overline{B}C$

c) $(p \wedge \sim q) \wedge \sim r \Leftrightarrow p \wedge (\sim q \wedge \sim r)$

5. [3 marks] Use the Laws of Logic to show that
$A\overline{C} + A\overline{C} + \overline{A}B\overline{C} = (A + B)\overline{C}$.
Use one law per line, and state the name of the law on each line.

6. [3 marks] Use a truth table to simplify $((p \oplus q) \vee q) \wedge p$.

7. [3 marks] Is $\sim p \vee \sim q$ logically equivalent to $\sim (p \vee q)$? Use a truth table to justify your answer.

8. [5 marks] a) Write a general formula for: 4, 9, 16, 25, 36, ...

b) Find a_3 given: $a_0 = 13, a_1 = 11$ and $a_n = a_{n-1} + a_{n-2}$ for $n \geq 2$.

c) Find S_4 for: 1+8+27+64+125+...

d) Calculate $\sum_{n=6}^{9}(n^2 + 2)$