MATH 155 – Test 1: Version A

September 24, 2019 **Name:** _____

Instructor: Patricia Wrean

Total: 30 points

1. (5 points) Convert the following numbers into the indicated base. You do not need to show any work.

   (a) 1100101_2 to octal _____

   (b) 11_{10} to binary _____

   (c) 35_8 to hexadecimal _____

   (d) $7C_{16}$ to decimal _____

   (e) 12_{10} to octal _____

2. (1 point) Does the number 11110000_{16} exist? (Is it a legal number in hexadecimal?) Explain briefly.

3. (7 points) Convert the following numbers into the indicated base. Show your work.

   (a) 6402_9 to decimal _____

   (b) $B1F_{16}$ to octal _____

   (c) 188_{10} to base 4 _____

4. (4 points) Given the following information, answer the questions with "Yes", "No", or "Maybe".

   (a) Sanjay likes cake and pie. Does he like cake? Yes / No / Maybe

   (b) Lynda likes cake but not pie. Does she like cake or pie? Yes / No / Maybe

   (c) Gilles does not swim. Does he swim or ski? Yes / No / Maybe

   (d) Susie swims or skis. Does she swim and ski? Yes / No / Maybe

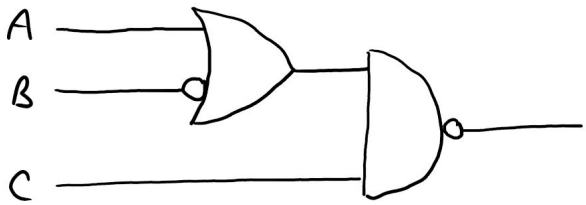
5. (3 points) For each pair of sentences below, is the second sentence the negation of the first? Answer by circling the correct choice.

   (a) All of the cookies have raisins. None of the cookies have raisins. Yes / No

   (b) There are more than 4 questions on the homework. There are less than 4 questions on the homework. Yes / No

   (c) There are no cookies in the cookie jar. There are a positive number of cookies in the cookie jar. Yes / No

6. (2 points) Write the Boolean expression that corresponds to the following gate diagram. Do not simplify!



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7. (4 points) Is the expression $\overline{q} \vee (p \wedge q)$ logically equivalent to $p \vee (\overline{q} \oplus 0)$? Use a truth table to justify your answer.

8. (4 points) Represent $\overline{\overline{p \vee r} \wedge q}$ on the following Venn diagram by shading in the appropriate regions. Show intermediate steps on separate sketches and label them clearly to get full credit.