

## MATH 155 – Practice Test 1

September 26, 2017

Name: \_\_\_\_\_

Instructor: Patricia Wrean

**Total: 40 points**

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1. (7 points) Convert the following numbers into the indicated base. You do not need to show any work.

(a)  $1010_2$  to decimal \_\_\_\_\_

(b)  $12_{10}$  to octal \_\_\_\_\_

(c)  $73_8$  to hexadecimal \_\_\_\_\_

(d)  $12_{10}$  to hexadecimal \_\_\_\_\_

(e)  $7_{10}$  to binary \_\_\_\_\_

(f)  $1110_2$  to octal \_\_\_\_\_

(g)  $35_7$  to decimal \_\_\_\_\_

2. (2 points) Is the number  $1799_8$  exist? Is this a legal number in octal? Explain briefly.

3. (10 points) Convert the following numbers into the indicated base. Show your work.

(a)  $647_8$  to hexadecimal

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(b)  $395_{10}$  to hexadecimal

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(c)  $2016_8$  to decimal

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4. (4 points) Let  $p$  denote “John took the bus to work” and  $q$  denote “John walked home” Rewrite the following English sentences in terms of logical symbols (i.e.  $p \wedge q$ ,  $p \vee q$ ). Do not simplify!
- (a) John walked home or he didn’t take the bus to work. \_\_\_\_\_
- (b) Either John didn’t take the bus to work or he didn’t walk home but not both. \_\_\_\_\_
- (c) It is not true that John both took the bus to work and walked home. \_\_\_\_\_
- (d) John walked home or he didn’t walk home. \_\_\_\_\_
5. (3 points) Answer the following questions by circling the correct choice.
- (a) Natasha blogs daily or answers her email. Does she blog daily? Yes / No / Maybe
- (b) Frank ordered soup and salad. Did he order soup or salad? Yes / No / Maybe
- (c) The cookie contains raisins. Does it contain raisins and oatmeal? Yes / No / Maybe
6. (4 points) Draw the gate diagram that corresponds to the Boolean expression  $\overline{\overline{A} + \overline{BC}}$ . Do not simplify!

7. (5 points) Is the Boolean expression  $A + \overline{A + B}$  logically equivalent to  $\overline{A}(B + 1)$ ? Use a truth table to justify your answer.

8. (5 points) Represent  $\overline{p \wedge (q \vee \bar{r})}$  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.

