

MATH 155 – Test 1

January 24, 2020

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) 10111_2 to decimal _____

(b) 210_8 to binary _____

(c) $3C_{16}$ to decimal _____

(d) 10_{10} to binary _____

(e) 19_{10} to hexadecimal _____

2. (1 point) Consider the number 465_n , where the base n is unknown. What values can n have?

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

(a) 942_{10} to octal

(b) 4231_5 to decimal

(c) 2773_8 to hexadecimal

4. (1 point) Circle all statements below which are the negation of the statement “All of the lights are on.”
- (a) None of the lights are on.
 - (b) At least one of the lights is on.
 - (c) At least one of the lights is off.
 - (d) Not all of the lights are on.
 - (e) Some of the lights are on.
 - (f) All of the lights are off.
5. (2 points) Given the following information, answer the questions with “Yes”, “No”, or “Maybe”.
- (a) Saryta programs in Python. Does she program in Python or Java?
Yes / No / Maybe
 - (b) Ming does not program in Python. Does he program in Python and Java?
Yes / No / Maybe
6. (3 points) Let p denote “I like milk in my tea.” and q denote “I like sugar in my tea”. Rewrite the following English sentences in terms of logical symbols (i.e. $p \wedge q$, $p \vee q$). Do not simplify!
- (a) I like milk in my tea or I don’t like milk in my tea. _____
 - (b) I like sugar but not milk in my tea. _____
 - (c) It is not true that I like both milk and sugar in my tea. _____
7. (3 points) Draw the gate diagram that corresponds to the Boolean expression $\overline{A} + \overline{B} \overline{C}$. Do not simplify!

8. (4 points) Use a truth table to simplify the logical expression $(\bar{p} \wedge \bar{q}) \oplus (\bar{p} \wedge q)$.

9. (4 points) Represent $\overline{p \vee \bar{r}} \vee \bar{q}$ 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.

