

## 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  $\overline{p \vee r} \vee \bar{q}$  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.

