Term: Winter 2024 Name: Solution Set

Instructor: Patricia Wrean

MATH 156 Test 1, Version B

Total =
$$\frac{1}{25}$$

- All of the work on this test must be your own.
- You may use a scientific calculator. You may not use a calculator with graphing capability or a smartphone app. You may not share calculators between students.

GOOD LUCK!

- 1. (7 points) Convert the following numbers into the indicated base. Give exact answers (do not round) and show your work.
 - (a) 31201_4 to decimal

$$312014 = 3 \times 4 + 1 \times 4^{3} + 2 \times 4 + 0 + 1 \times 4^{\circ}$$

= $768 + 64 + 32 + 0 + 1$
= 865

(b) $7A.39_{16}$ to octal

(c) 0.28 to hexadecimal

$$0.28 \times 16 = 4 + 0.48$$

$$0.48 \times 16 = 7 + 0.68$$

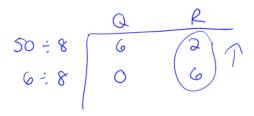
$$0.68 \times 16 = 18 + 0.88$$

$$0.88 \times 16 = 14 + 0.08$$

$$0.08 \times 16 = 1 + 0.08$$

2. (4 points) Convert 50.6875 to base 8. Give an exact answer (do not round) and show your work.

62.54₈



$$50 \div 8$$
 6 2 7 0.6875 × 8 = $5 + 0.5$ 0.5 × 8 = $4 + 0$

3. (1 point) Consider the number $FACE_{15}$. Is this a legal number in base 15? Explain briefly.

| 4. | (3 points) | For the pair of sentence | es below | , is the second | the negation | of the first? | Answer |
|----|--------------|--------------------------|----------|-----------------|--------------|---------------|--------|
| | by selecting | ng the correct choice. | | | | | |

(a) Every plant is blooming. No plant is blooming.

Yes (No

(b) There are no bugs in this program. There are one or more bugs in this program.

Yes/ No

(c) Less than four cars are hybrids. At least four cars are hybrids.

Yes / No

<* x ≥ 4

- 5. (3 points) Answer the questions given the following situations with "Yes", "No", or "Maybe".
 - (a) Priya likes pop music. Does she like pop and jazz music? Yes / No / Maybe
 - (b) Kirsten does not like pop music. Does she like pop or jazz music? Yes / No / Maybe
 - (c) Rinka likes classical and pop music. Does she like classical music. Yes No / Maybe

- 6. (3 points) Let p denote "This dish needs pepper." and q denote "This dish needs salt". Rewrite the following English sentences in terms of logical symbols (i.e. $p \land q$, $p \lor q$). Do not simplify!
 - (a) This dish needs salt or pepper.

9 V p

(b) This dish needs salt but not pepper.

 $9 \wedge \sim \rho$

(c) It is not true that this dish needs both salt and pepper.

 $\sim (q \wedge \rho)$

7. (4 points) Represent $(p \lor r) \land (\sim p \land \sim q)$ 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.

Note: if you want, you can use the blank Venn diagrams on the next pages. Just make sure to label them clearly.

