MATH 1100 Spring 2024 Exam 2

DO NOT TURN THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

- Write your name below on the space provided.
- This test has a total of 4 pages.
- Work the problem in the space provided. If you need more space, write on the back of the test.
- To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.
- Look only at your test. Don't give me the impression that you are cheating.
- Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded.
 A pencil must be used on all tests. Otherwise, the test will not be graded.
- If you finish early, go over the test again.

Number	Maximum	Score
1	8	
2	8	
3	10	
4	5	
5	20	
6	15	
7	10	
8	16	
9	2	
10	6	
Total	100	

Good luck!

Name _____

- 1) (4 points each) Determine if the following are statements. If not, explain why not.
- a) Most people prefer Candidate A. b) Watch out for that car!

- 2) (4 points each) Rewrite the following compound statements using p, q, r ∧, ∨, ~, and → as needed. Be sure to declare what the letters p, q, and r represent. Do not allow any connectors into your definitions of p, q, and r:
- a) She learned the game and plays it every day.

b) If we don't go to the store, then I'll either stay or I'll go to the park.

- 3) (5 points each) Let p = "I like that show. and q = "I have time to watch it." Translate the following into words:
- a) ~ p b) $p \wedge \sim q$

4) (5 points) Let *p* and *r* be a true statements and let *q* be a false statement. Show the work to determine the truth value of the compound statement: $(p \land \neg q) \rightarrow r$.

5) (5 points each) Negate the following statements:

a) I am going to make him an offer he can't refuse.

b) You either die a hero or live long enough to see yourself become the villain

c) If you let my daughter go now, that'll be the end of it.

d) All the world's a stage

6) (5 points each) For the statement "If you walk without rhythm, you won't attract the worm." find the converse, inverse, and contrapositive:

Converse:

Inverse:

Fun fact: Sandworms run the oldest known book club.

Contrapositive:

- 7) (5 points each) Use an Euler diagram to determine whether the argument is valid or invalid:
- a) All dogs are animals.
 <u>All malamutes are dogs.</u>
 All malamutes are animals.

b) All four-legged creatures are dogs. <u>Garfield has four legs.</u> Garfield is a dog.

- p 9 r Т Т Т Т Т F Т F Т Т F F F Т Т F Т F F F Т F F F
- 8) (16 points) Fill in the truth table chart for the statement: $(p \lor q) \land (p \lor \sim r)$. Be sure to label the column headings.

9) (2 points) Is the statement $(p \lor q) \land (p \lor \sim r)$ in number 8 a tautology? Why or why not?

10) (5 points) For the following argument...

- a) Rewrite it using $p, q, r \land, \lor, \sim, and \rightarrow as$ needed. Be sure to declare what the letters p, q, and r represent.
- b) Write the complete statement that would be the conjunction of the premises implying the conclusion. **Do not construct the truth table.**

a)

If you have allergies, then you have a fish. If you do not have a fish, then you have a cat.

If you have a cat, then you do not have allergies.