Math 164
Summer II, 2004 Name:
Exam - §§1.1-3.2

Circle the letter corresponding to your answer. Circle only one answer per question. There is no partial credit on this portion of the exam. Answer the long answer questions on the exam itself.

1. T F
2. T F
3. T F
4. T F
5. T F
6. T F
7. T F
8. T F
9. A B C D E
10. A B C D E
11. A B C D E
12. A B C D E
13. A B C D E
14. A B C D E
15. A B C D E
16. A B C D E
17. A B C D E
18. A B C D E
19. A B C D E

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True / False (2 points each). Record all answers on the cover page / answer sheet. There is no partial credit for this portion of the exam. Circle T if the statement is always true and circle F if the statement is sometimes false.

1. T F Let $A = \{1, 2, 3\}$. Then $\emptyset \in A$.

2. T F $\emptyset \subseteq \{\emptyset\}$.

3. T F If $n(A) = n(B)$, then $A = B$.

4. T F If two sets are equal, then they are equivalent.

5. T F When $\mathcal{U}$ is the universal set, $\emptyset' = \mathcal{U}$.

6. T F The sets $\{1, 2, 3\}$ and {cat, dog, mouse} are equal.

7. T F $\{0, 2, 4, 6, , 8\} \subset \{8, 0, 6, 2, 4\}$

8. T F $(A \cap B)' = A' \cup B'$

Multiple Choice (4 points each). Record all answers on the cover page / answer sheet. There is no partial credit for this portion of the exam. Circle the letter corresponding to the best answer.

9. Which of the following is not one of the four steps in Polya's problem solving process?

   A. Understand the problem
   B. Devise a plan
   C. Look back
   D. Give up
   E. None of the above

10. For any set A, $A \cap \mathcal{U} =$

    A. A B. $\mathcal{U}$ C. $\emptyset$ D. all of the above E. none of the above

11. For any set A, $A \cup \emptyset =$

    A. A B. $\mathcal{U}$ C. $\emptyset$ D. all of the above none of the above

12. If $A \subseteq B$, then $A - B =$

    A. A B. $\mathcal{U}$ C. $\emptyset$ D. B E. none of the above

For questions 13 - 15, consider the following situation:

According to the cooks at Chi Omega Sorority House, 30 girls like chocolate ice cream, 25 like vanilla, 10 like strawberry, 15 like chocolate and vanilla, 8 like vanilla and strawberry, 5 like all three, and 1 likes chocolate and strawberry only.

13. How many like vanilla and chocolate only?

A. 15
B. 5
C. 30
D. 10
E. none of the above

14. If all of the girls like at least one flavor, how many don't like chocolate?

A. 16
B. 11
C. 10
D. 4
E. none of the above

15. How many like vanilla, but not chocolate?

A. 17
B. 15
C. 10
D. 16
E. none of the above

16. If $n(A) = 15$, $n(A \cap B) = 5$, and $n(A \cup B) = 30$, then $n(B) =$

A. 10 B. 5 C. 15 D. 20 E. none of the above

For the next two problems, use the following set up:

$$\mathcal{U} = \{a, b, c, d, e, f, g\}$$

$$X = \{a, c, e, g\} \qquad Y = \{a, b, c\} \qquad Z = \{b, c, d, e, f\}$$

17. Find $X' \cap Y'$

A. $\{a, c\}$
B. $\{d, f\}$
C. $\{a, b, c, e, g\}$
D. $\{b, d, e, f, g\}$
E. none of the above

18. Find $(Z \cup X')' \cap Y$

A. $\{a\}$
B. $\{b, c\}$
C. $\{a, b, c\}$
D. $\emptyset$
E. none of the above

19. There are 1480 students surveyed. 1027 of them are taking Spanish, and 469 are taking math and Spanish. If all students surveyed are taking at least one of those two subjects, how many are only taking math?

A. 558
B. 922
C. 1011
D. 453
E. none of the above

Long Answer. Answer the following questions. No work = no credit.

20. (7 points) Draw a Venn diagram and shade the region representing $(A \cap B)' - A$.

21. (7 points) Find $n(A' \cap B)$ given that A and B are subsets of $\mathcal{U}$ where $n(\mathcal{U}) = 52$, $n(A' \cap B') = 8$, $n(A) = 31$ and $n(B') = 10$.

22. (7 points) If eight winkles and nine wonkles cost \$118 and nine winkles and eight wonkles cost \$120, how much will five winkles and five wonkles cost?