

Second Test

(4 points)

This cool fifty minute test covers chapter two of *Mathematics: A Practical Odyssey* by Johnson and Mowry. Show your work and clearly indicate your answers. All parts of problems are four points unless otherwise indicated.

1. a) List all proper subsets of the three element set $\{A, C, E\}$

b) List all improper subsets of the four element set $\{F, A, C, E\}$

2. State whether each of the following is **well defined**. (2 points each)
 - a) The set of students who have received an A in math 130.
 - b) The set of students who enjoyed math 130.

3. You are given that $U = \{1,2,3,4,5,6,7,8\}$, $A = \{2,4,6,8\}$, and $B = \{2,3,5,7\}$.
 - a) Find $A \cup B$
 - b) Find $(A \cup B)'$

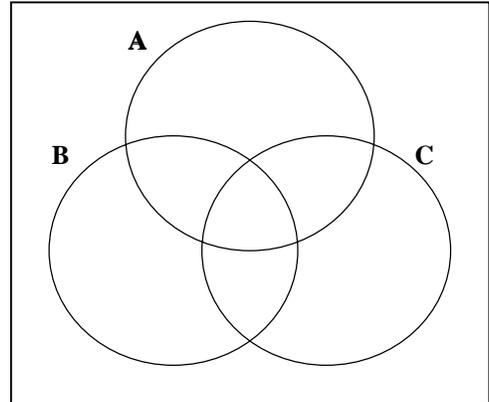
 - c) Find $(A \cap B)'$

4. There are four women, twelve men and three dogs in a club. How many ways can you pick a committee from this club which contains one man, one woman and one dog?

5. An exit poll yielded the information on the right concerning peoples voting patterns on propositions A, B and C.

number of	votes
220 yes on A	70 yes only on A
140 yes on B	90 yes on A and B
140 yes on C	70 yes on B and C
50 yes on all three	130 no on all three

- a) Draw a Venn diagram using the above information. (6 points)



- b) What percentage voted yes on A or C?

(2 points)

6. Seven hundred students were surveyed concerning smoking and drinking. The following information was obtained: 241 smoke, 273 drink, and 330 smoke or drink.

- a) Draw a Venn diagram using the above information.

How many of the students surveyed:

(2 points each)

- b) drink and smoke,
- c) drink but do not smoke,
- d) neither drink or smoke,
- e) smoke but do not drink.

7. Suppose $n(U) = 200$, $n(A) = 59$, $n(B) = 80$ and $n(A \cup B) = 114$.

a) Find $n(A \cap B)$

b) Draw a Venn diagram illustrating the composition of U .

8. This test has fourteen questions. In how many ways can you choose six of the fourteen to get right?

9. Find the following:

a) The value of $\frac{n!}{(n-r)!r!}$ when $n = 34$ and $r = 29$.

b) ${}_{77}P_{75}$

c) ${}_{18}C_3$

10. A 6/60 lottery requires choosing six of the numbers 1 through 60. How many different lottery tickets can you choose if order is unimportant and the numbers do not repeat?

11. How many five-card poker hands consist of five cards with the same suit?
(Use the standard 52 card deck..)
12. Consider the set of positive integers $N = \{1,2,3,4,5,\dots\}$ and its subset $E = \{3,4,5,6,7,\dots\}$ (the positive integers starting at three). (3 points each)
- a) Show N and E are equivalent.
- b) Find the element of E that corresponds to $2001 \in N$.
- c) Find the element of N that corresponds to $2001 \in E$.
13. Show that the line segments $[-1,2]$ and $[0,6]$ are equivalent by establishing a one-to-one correspondence between them.