

Show all work.

Simplify your answers.

Circle your answer.

No notes, no books, no calculator, no cell phones, no pagers, no electronic devices.

Name _____

Circle your Discussion Section:

DIS 343 12:05p T B329 VAN VLECK

DIS 344 12:05p R B321 VAN VLECK

DIS 345 1:20p T 595 VAN HISE

DIS 346 1:20p R 3401 STERLING

Problem	Points	Score
1	6	
2	6	
3	6	
4	6	
5	6	
6	6	
7	6	
Total	42	

Solutions will be posted shortly after the exam: www.math.wisc.edu/~miller/m210

1. (6 pts) Let $U = \{1, 2, 3, 4, 5, 6\}$ be a universal set with subsets X , Y and Z . Suppose that
- $$X \cup Y = \{2, 4, 6\},$$
- $$X \cap Y = \{2\},$$
- $$Y' \cap Z' = \{1, 3\}, \text{ and}$$
- $$Z' = \{1, 3, 4\}.$$

Find sets X , Y , and Z which satisfy these conditions.

2. (6 pts) An accounting firm has partners who are specialists in specific areas. The areas of specialization and the number of partners with each specialty are shown below. If every partner is a specialist in a least one area, how many partners are there?

Specialization	Number
auditing	11
consulting	8
tax	10
auditing and consulting	3
auditing and tax	2
consulting and tax	2
all three	1

3. (6 pts) Dorothy is considering the purchase of a new Jupiter 2005 car model 93-c. The car comes in one of 7 colors: red, orange, yellow, green, blue, indigo, and violet. There are 3 optional features available: automatic transmission, sun roof, and premium sound system. She can purchase none of the features, all of the features, or any set of features in between. How many alternatives are there for her to consider?

4. (6 pts) In a finite math class 10 percent withdraw, 15 percent receive an A, 5 percent receive an AB, 20 percent receive a B, 5 percent receive a BC, 30 percent receive a C, 10 percent receive a D, and 5 percent get an F.

(a) What is the probability that a randomly chosen student got a grade of B or better?

(b) What is the probability that a randomly chosen student passed the course(i.e. did not withdraw and got a D or better)?

5. (6 pts) The kingdom of Mathemagic has 7 aristocrats from which three royal officers are to be selected. The offices are the Illustrious Incompetent, the Grand Pooh-Bah, and the Floundering Fool. One of the aristocrats is Count Jocko. Each aristocrat can fill at most one office.
- (a) In how many ways can the offices be filled?
 - (b) In how many ways, if Count Jocko must be one of the officers?
 - (c) In how many ways, so that Count Jocko is not the Grand Pooh-Bah?

(In part (c) Count Jocko may or may not be one of the other officers.)

6. (6 pts) A neighborhood club has 3 girls and 6 boys. A volleyball team of 4 players is to be selected.

(a) How many different teams can be chosen?

(b) How many such teams have at least one boy and one girl on them?

7. (6 pts) A congressional committee contain 6 democrats and 7 republicans. One of democrats is named Max and one of the republicans is named Max. A subcommittee of 5 consisting of 2 democrats and 3 republicans is randomly selected. What is the probability that at least one of the Max's is chosen?

Answers

1. $X = \{2, 6\}$, $Y = \{2, 4\}$, and $Z = \{2, 5, 6\}$.
2. 23
3. 56
4. (a) .40 (b) .85
5. (a) 210 (b) 90 (c) 180
6. (a) 126 (b) 111
7. $\frac{13}{21}$