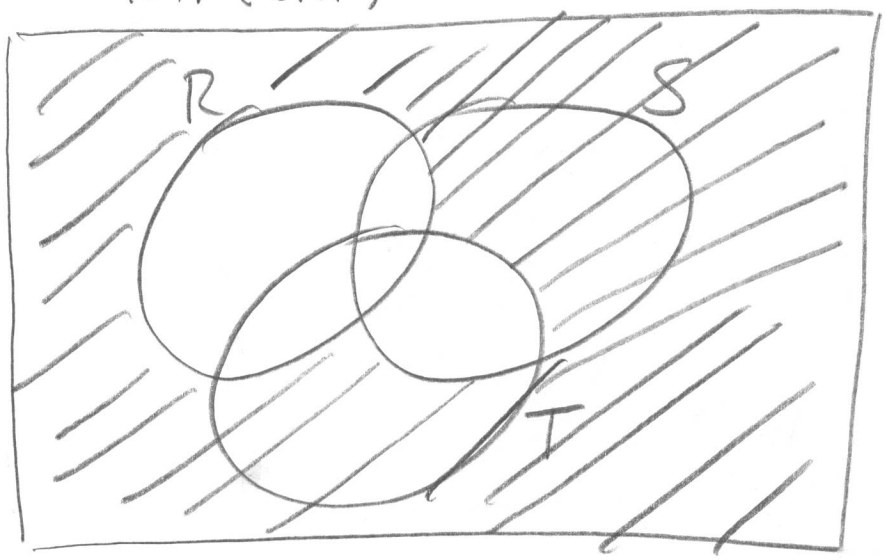
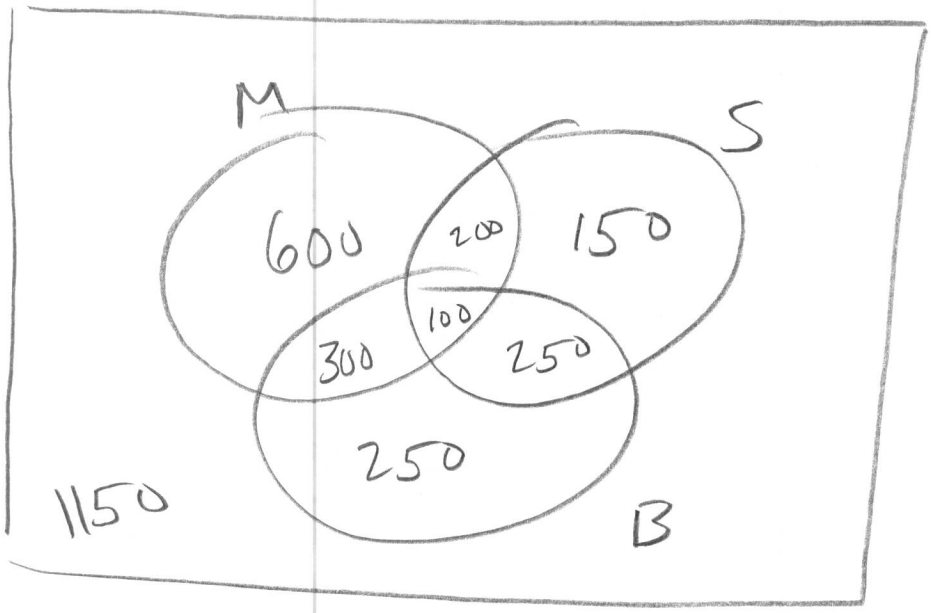
Math 141
Test 2
October 21, 2011
CWID: ORANGE

1. Draw a three-circle Venn diagram and shade the portion corresponding to the set $R' \cap (S' \cup T')$. $= R' \cap (S \cap T)'$



2. Of the 3000 students at Pepperdine University, 300 are male and from Seattle, 400 are males and majoring in business, 350 are Business majors and from Seattle, 1200 students are male, 700 are from Seattle, and 900 are Business majors. In addition, there are 100 males from Seattle and who are majoring in Business. Find the number of students who are
    a. Seattle Females not majoring in Business.
    b. Male and not majoring in Business.



a) 150

b) 800

3. Six couples attend a movie together and sit in the same row. How many seating arrangements are possible if
    a. Each of the couples sit together?
    b. All men sit together?

a) $P_6^6 \times 2^6$

b) $7 \times 6! \times 6!$

4. Determine the following:
    a. The number of juries that can be formed with 5 women and 7 men, if the jurors are chosen from a group of 10 men and 15 women.
    b. The number of ways to arrange 3 people in a circle.

a) $C_{10}^{7} \times C_{15}^{5}$

b) 2 

5. In how many ways can a residence director assign 10 students to six dorm rooms if
   a. Four rooms are doubles and two rooms are singles.
   b. Two rooms are triples and four are singles.

a) $10 \times 9 \times {}_{8}C_{2} \times {}_{6}C_{2} \times {}_{4}C_{2} \times {}_{2}C_{2}$

b) $10 \times 9 \times 8 \times 7 \times {}_{6}C_{3} \times {}_{3}C_{3}$

Assume: LLL NNNN

6. How many license plates with 3 letters and 4 numbers can be created so that:
   a. No letter is ever repeated?
   b. There are exactly three repeated numbers?

a) $26 \times 25 \times 24 \times 10^4$

b) $26^3 \times 4 \times 10 \times 9$

7. Students at UCLA are polled to determine how many classes they skip each week, resulting in the following table:

# Skipped Classes	Probability
0	.1
at most 1	.3
at most 2	.6
at most 3	.8
at most 4	.95
at most 5	1.00

Based on this information, determine the probability that a randomly chosen student skips

a) Exactly 1 class.
b) 2 or more classes.

a) .2

b) .7

8. Joe is having a dinner party for 12 guests. He has 20 male friends and 14 female friends, including Clara and Emily. Assume that he invites the 12 guests at random. What is the probability that
   a. Neither Clara nor Emily are invited?
   b. At least two men are invited?

a) $$\frac{C^{32}_{12}}{C^{34}_{12}}$$

b) $$1 - \left(\frac{C^{14}_{12}}{C^{34}_{12}} + \frac{C^{20}_{1} \times C^{14}_{11}}{C^{34}_{12}} \right)$$

9. A pollster gathers data on voter registration, resulting in the following table:

	Democrat	Republican	Libertarian
Age 30 and under	100	200	400
Age over 30 and under 40	350	700	1500
Age 40 or older	250	500	900

Determine

a) The probability of someone being over 30 and under 40, given that they are Republican.
b) Whether being 40 or older is independent of being Democrat.

a) $P(30-40 \mid R) = \frac{700}{1400} = \frac{1}{2}$

b) $P(\geq 40 \mid D) = \frac{250}{700} = \frac{5}{14}$

$P(\geq 40) = \frac{1650}{4900} = \frac{33}{98}$

$\neq$ not independent