HOMEWORK ASSIGNMENT 5

Name: **Due:** Wednesday October 23 (before recitation)

Note: Homework must be submitted online on Canvas (scanned).

Problem 1:

Evaluate the integral in the region R: $-1 \leq x \leq 1$, $0 \leq y \leq \pi$,

$$\iint_R xy \cos y \, dA.$$

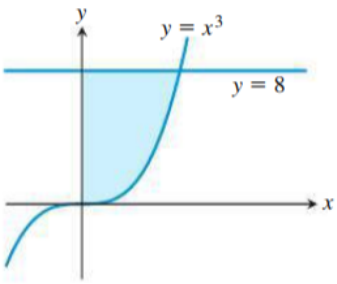
Problem 2:

Evaluate the integral in the region R: $0 \leq x \leq 2$, $0 \leq y \leq 1$,

$$\iint_R xye^{xy^2} \, dA.$$

Problem 3:

Write an iterated integral for $\iint_R dA$ over the region R using: a) vertical cross-sections, b) horizontal cross-sections,



Problem 4:

Sketch the region of integration and evaluate the integral:

$$\int_0^{\pi} \int_0^{x} x \sin y \, dy \, dx.$$

Problem 5:

Sketch the region of integration, reverse the order of integration, and evaluate the integral

$$\int_0^{2\sqrt{\ln 3}} \int_{y/2}^{\sqrt{\ln 3}} e^{x^2} \, dx \, dy.$$

Problem 6:

Find the volume of the region bounded above by the paraboloid $z = x^2 + y^2$ and below by the triangle enclosed by the lines $y = x$, $x = 0$ and $x + y = 2$ in the xy-plane.

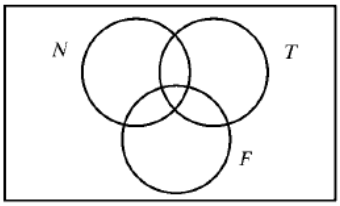
Problem 7:

- If $A \subset B$, how does the Venn diagram look like?
- If A and B are disjoints (i.e., $A \cap B = \emptyset$), how does the Venn diagram look like?
- Using Venn diagrams, show that $(A \cup B)^c = A^c \cap B^c$.

Problem 8:

In a survey of 60 people, it was found that 25 read *Newsweek* magazine, 26 read *Time*, and 23 read *Fortune*. Also, 9 read both *Newsweek* and *Fortune*, 11 read *Newsweek* and *Time*, 8 read both *Time* and *Fortune*, and 3 read all three magazines.

1. In the Venn diagram below, fill in the correct number of people in each of the eight regions.
2. Find the number of people who read: 1) only *Newsweek*, 2) only *Time*, 3) only *Fortune*, 4) *Newsweek* and *Time* but not *Fortune*, 5) only one of the magazines, 6) none of the magazines.



Problem 9:

Simplify: $\dfrac{(n+1)!}{n!}$, $\dfrac{(n-r+1)!}{(n-r-1)!}$.

Problem 10:

A class contains 8 male students and 6 female students. Find the number of ways that the class can elect:

- A class representative,
- 2 class representatives, 1 male and 1 female,
- a president and a vice-president.

Problem 11:

Suppose a password consists of 4 characters where the first character must be a letter of the alphabet, but each of the other characters may be a letter or a digit. Find the number of

- passwords,
- passwords beginning with one of the 5 vowels.

Problem 12:

1. Find the number of ways that 7 people can arrange themselves around a circular table.
2. Find the number of ways a judge can award first, second and third places in a contest with 18 contestants.
3. Find the number of words that can be formed with the letters from $COMMITTEE$.
4. A person has 11 close friends. Find the number of ways she can invite 5 of them to dinner.
5. Find the number of ways 6 students can be partitioned into 3 teams containing 2 students each.
6. Find the number of ways 9 toys may be divided among 4 children if the youngest is to receive 3 toys and each of the other 2 toys.

Problem 13:

Read Chapters 1, 2 and 3 of *Schaum's Outlines Probability* book.