TEST THREE NO. A , MA 114, DR. JING'S SECTION
OCTOBER 27, 2005.

Print Your Name: **Row:** **Seat number:**

Please turn in this page with your work sheets and place at appropriate pile.

PLEASE SHOW YOUR WORK FOR PARTIAL CREDITS.

1. (20 pts) In the Venn diagram that follows, find all the elements in each of the three sets:
(a) $A \cup B$
(b) $A \cup (B \cap C^c)$
(b) $[A \cup (B \cap C^c)]^c$
(c) $A^c \cup (B \cap C)$

2. (20 pts) A class of 58 students are offered three subjects: math, business and history. There are 30 students taking math, 35 taking business, 25 taking hostory, 15 taking math and business, 10 taking math and history, 12 taking business and history, and 3 students taking all three subjects.
(a) How many students don't take any of the courses?
(b) How many students take exactly one course?
(c) How many students take exactly two course?
(d) How many students take at least one course?

3. (15 pts) (Multiple choice) How many different ways are there to arrange (in a row) the letters of the word "HONOLULU"?
Answers: (A) 40320 (B) 5040 (C) 1680 (D) 70

4. (25 pts) How many four-digit numbers are there (the first digit cannot be zero)
(a) in which the second digit is 0?
(b) in which the first and last digits are odd numbers $\{1, 3, 5, 7, 9\}$?
(c) in which all digits are even numbers $\{0, 2, 4, 6, 8\}$?
(d) in which no digit is repeated?
(e) in which the digits are symmetric about the third digit (eg. 12321) ?

5. (20 pts) Eight points are plotted on a piece of paper, with no 3 of the points being in the same straight line.
(a) If each pair of points is to be connected by a line segment, how many line segments must be drawn?
(b) How many different triangles could possibly be formed having all its vertices chosen from among the 8 points?