

Name \_\_\_\_\_

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## MA 114-001 Test 3

S. Schecter

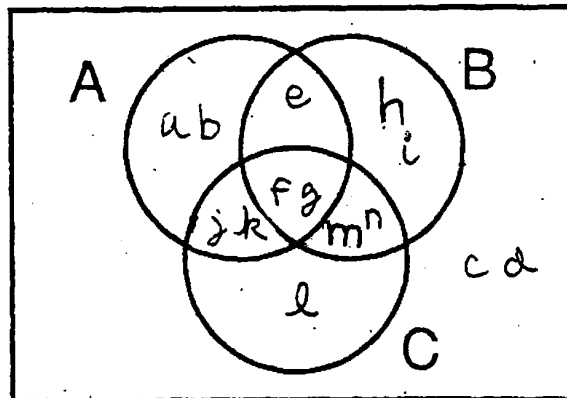
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Use your own paper to work the problems. Be sure to *show your work*.

When you finish, fold this paper lengthwise together with your work, so that this writing is on the outside. Write your name, row, and seat number above, and turn in.

1. In the following Venn diagram, for which the universal set is  $U = \{a, b, c, d, e, f, g, h, i, j, k, l, m, n\}$ , find all the points in the following sets:

- (a)  $A$
- (b)  $A \cup (B \cap C)^c$
- (c)  $(A \cup B)^c$



2. A test has eight questions. Questions 1 to 3 are multiple choice; each has four possible answers. Questions 4 to 8 are true-false. How many different ways of answering the questions are there?

3. In a pollution study of 40 U.S. rivers,
  - 20 were polluted with metal
  - 23 were polluted with phosphate
  - 26 were polluted with oil
  - 10 were polluted with metal and phosphate
  - 11 were polluted with metal and oil
  - 12 were polluted with phosphate and oil
  - 3 were polluted with all three.
  - (a) Put this data into a Venn diagram.
  - (b) How many rivers have exactly one of the three pollutants?
  - (c) How many rivers have none of the three pollutants?
4. A coin is flipped until either two heads or three tails have come up.
  - (a) Draw a tree diagram that shows all the possible outcomes.
  - (b) How many different outcomes are there?
  - (c) How many of these outcomes have three tails?
5. A coach must select a quiz bowl team of 5 students from a group of 15 girls and 10 boys who have been practicing.
  - (a) How many possible teams are there if the coach does not care how many boys and how many girls are on the team?
  - (b) How many possible teams are there if the coach wants to have 4 girls and 1 boy?
  - (c) How many possible teams are there if the coach wants to have *at least* 4 girls?
6. An acting class has 4 boys (Abe, Barry, Clyde, and David) and 3 girls (Erica, Fran, and Grace).
  - (a) The class will put on a play with just three roles, Lion, Elephant, and Lamb. In how many different ways can the teacher choose students for the roles? (It doesn't matter whether the actors are boys or girls.)
  - (b) The class will also put on a play in which there are 4 roles for boys (Romeo, Mercutio, Tybalt, and Benvolio) and 3 roles for girls (Juliet, Nurse, and Lady Capulet). In how many different ways can the teacher choose students for the roles?