9a. Human blood can contain either no antigens, the A antigen, the B antigen, or both the A and B antigens. A third antigen, called the Rh antigen, is significant in human reproduction, and again may or may not be present in an individual. Blood is called type A-positive if the subject has the A and Rh, but not the B antigen. Subjects having only the A and B antigens are said to have type AB-negative blood. Subjects having only the Rh antigen have type O-positive blood, etc. In a certain hospital the following data on patients were recorded:

25 patients had the A antigen,
17 had the A and B antigens,
27 had the B antigen,
22 had the B and Rh antigens,
30 had the Rh antigen,
12 had none of the antigens,
16 had the A and Rh antigens,
15 had all three antigens.

(a) How many patients are represented here?
(b) How many patients have exactly one antigen?
(c) How many patients have exactly two antigens?

10a. A local merchant uses television, radio, and newspaper advertising. To determine the effectiveness of advertising, he questions 200 customers during a special after-hours sale to see how they knew about the sale. He found that 115 had seen television ads, 75 had heard radio ads, and 125 had read newspaper ads. He also found that 30 received information from television and radio, 70 from television and newspapers, 25 from radio and newspapers, and 10 from all three. If everyone else said they heard it from a friend, how many heard it from a friend?

11a. In order to prepare a report on agricultural prospects for his county, the county farm advisor questions 100 farmers about their crop plans for the following year. He finds that 75 intend to plant corn, 55 will plant soybeans, 35 will plant wheat, 35 will plant corn and soybeans, 25 will plant corn and wheat, 15 will plant soybeans and wheat, and 10 will plant all three. How many of the farmers will plant only one crop? How many will plant at least two crops?

12a. In a group of 150 primary students, 100 watch “Sesame Street,” 55 watch “Electric Company,” and 65 watch “Mr. Rogers’ Neighborhood.” If, in addition, 35 watch “Sesame Street” and “Electric Company,” 45 watch “Sesame Street” and “Mr. Rogers,” 30 watch “Electric company” and “Mr. Rogers,” and 20 watch all three, how many watch none of the three? How many watch only “Sesame Street”? 

Venn Diagrams -9
13a. At a pow-wow in Arizona, Native Americans from all over the Southwest came to participate in the ceremonies. A coordinator of the pow-wow took a survey and found that:

- 15 families brought food, costumes, and crafts:
- 25 families brought food and crafts:
- 42 families brought food:
- 20 families brought costumes and food:
- 6 families brought costumes and crafts, but not food:
- 4 families brought crafts, but neither food nor costumes:
- 10 families brought none of the three items:
- 18 families brought costumes, but not crafts:

(a) How many families were surveyed?
(b) How many families brought costumes?
(c) How many families brought crafts, but not costumes?
(d) How many families did not bring crafts?
(e) How many families brought food or costumes?

14a. A survey of people attending a Lunar New Year celebration in Chinatown yielded the following results:

- 120 were women:
- 150 spoke Cantonese:
- 170 lit firecrackers:
- 108 of the men spoke Cantonese:
- 100 of the men did not light firecrackers:
- 18 of the non-Cantonese-speaking women lit firecrackers:
- 78 non-Cantonese-speaking men did not light firecrackers:
- 30 of the women who spoke Cantonese lit firecrackers.

(a) How many attended?
(b) How many of those who attended did not speak Cantonese?
(c) How many women did not light firecrackers?
(d) How many of those who lit firecrackers were Cantonese-speaking men?