1. A survey of 100 students at New England College showed the following: 7 take English, history, and language, 17 take English and history, 15 take English and language, 18 take history and language, 48 take English, 49 take history, and 38 take language.
   Draw a Venn diagram with this information and answer the following questions.

   How many students:

   (a) take history but neither of the other two?

   (b) take English and history but not language?

   (c) take none of the three?

   (d) take exactly two of the three?

   (e) do not take a language?

2. Ninety customers of a discount store were asked about their purchases during the past month. 20 said they had purchased books, 45 had purchased film, 38 had purchased jewelry, 15 had purchased both books and film, 8 had purchased both books and jewelry, 6 had purchased both film and jewelry, and 3 had purchased all three articles.
   Draw a Venn diagram with this information and answer the following questions.

   How many of these people had purchased:

   (a) books or film but not jewelry?

   (b) books and film but not jewelry?

   (c) jewelry but not books or film?

   (d) at least one of these three articles?

   (e) exactly one of the three articles?

3. A campus radio station surveyed 190 students to determine the types of music they liked. The survey revealed that 114 liked rock, 50 liked jazz, and 41 liked classical music. Moreover, 14 liked rock and jazz, 15 liked rock and classical, 11 liked classical and jazz, and 5 liked all three types of music.
   Draw a Venn diagram with this information.

   How many students:

   (a) like rock only?

   (b) like jazz but not rock?

   (c) like classical or jazz but not rock?

   (d) like classical and jazz but not rock?

   (e) like exactly one of the three types of music?

   (f) do not like any of the three types of music?

   (g) like at least two of the three types of music?

   (h) do not like either rock or jazz?

4. A merchant surveyed 400 people to determine the way they learned about an upcoming sale. The survey showed that 180 learned about the sale from the radio, 190 from television, 190 from the newspaper, 80 from radio and television, 90 from radio and newspapers, 50 from television and newspapers, and 30 from all three sources. Draw a Venn diagram with this information.

How many people learned of the sale:

   (a) from newspapers or radio, but not both?

   (b) only from newspapers?

   (c) from radio or television but not the newspaper?

   (d) from radio and television but not the newspaper?

   (e) from at least two of the three media?

5. A survey of 250 people along Weirs Beach during Bike Week in Laconia, New Hampshire found that: 223 have tattoos, 178 were wearing leather, 158 own a Harley Davidson, 151 have tattoos and were wearing leather, 119 were wearing leather and own a Harley, 142 have tattoos and a Harley, and 103 have all three items. Draw a Venn Diagram with this information.

How many of the people surveyed:

   (a) had only a Harley Davidson?

   (b) had at least two of the items mentioned?

   (c) had none of the items?

   (d) had tattoos or were wearing leather?

   (e) were not wearing leather but did have tattoos and did own a Harley?

   (f) did not own a Harley but did have tattoos or were wearing leather?

6. Human blood can contain the A antigen, the B antigen, both the A and B antigens, or neither antigen. A third antigen, called the Rh antigen, may or may not be present. Blood is called type A-positive if the individual has the A and Rh, but not the B antigen. A person having only the A and B antigens is said to have type AB-negative blood. A person having only the Rh antigen has type O-positive blood. Other blood types are defined in a similar manner. In a certain hospital, the following data 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, and 15 had all three antigens.
How many patients

   (a) were represented?

   (b) had exactly one antigen?

   (c) had exactly two antigens?

   (d) had O-positive blood?

   (e) had AB-negative blood?

   (f) had A-positive blood?