College Mathematics
inclusion-exclusion homework

Use a two-way table or a three-way table to analyze each of the following situations. You may also draw a Venn diagram to help you visualize each situation.

1. 160 people were asked about their recreational activities in the past month.
   79 had been to a movie.
   65 had gone swimming.
   43 had been to a movie and gone swimming.

   Of those 160 people, how many had
   (a) been to a movie but not gone swimming?
   (b) gone swimming but not been to a movie?
   (c) neither been to a movie nor gone swimming?

2. Out of 965 registered voters surveyed,
   605 support the education bill.
   427 support the health care bill.
   138 support both bills.

   Of the voters surveyed, how many support
   (a) neither the education bill nor the health care bill?
   (b) the education bill but not the health care bill?
   (c) the health care bill but not the education bill?
   (d) either the education bill or the health care bill?

3. A company is considering manufacturing two flavors of toothpaste, regular and mint. In a sample of 120 people,
   74 liked regular.
   62 liked mint.
   35 liked both.

   How many people liked
   (a) only regular?
   (b) only mint?
   (c) regular or mint or both?

4. A survey of 63 business people found that
   30 had desktop computers.
   22 had laptop computers.
   39 had a fax machine.
   15 had a desktop and a laptop.
   18 had a desktop and a fax machine.
   14 had a laptop and a fax machine.
   12 had all three machines.

   How many of the business people had
   (a) only a laptop?
   (b) only a fax machine?
   (c) a fax machine and a laptop, but not a desktop?
   (d) a fax machine or a laptop, but not a desktop?
   (e) none of the three machines?
5. Out of 444 companies surveyed about overnight services,
   189 used FedEx.
   205 used UPS.
   122 used Airborne.
   57 used both FedEx and UPS.
   34 used both FedEx and Airborne.
   30 used both UPS and Airborne.
   22 used all three.

How many of the companies used
(a) none of these services?
(b) only Airborne?
(c) exactly one of the services?
(d) exactly two of the services?
(e) FedEx or UPS?

6. Out of 33 major cities in the US,
   16 had a professional baseball team.
   17 had a professional football team.
   15 had a professional basketball team.
   11 had a baseball and a football team.
   7 had a baseball and a basketball team.
   9 had a football and a basketball team.
   5 had all three.

How many of the cities had
(a) only a football team?
(b) a baseball team and a football team, but not a basketball team?
(c) a baseball team or a football team?
(d) a baseball team or a football team, but not a basketball team?
(e) exactly two types of teams?

7. A survey of 500 farmers showed the following:
   125 grew only wheat.
   110 grew only corn.
   90 grew only oats.
   200 grew wheat.
   60 grew wheat and corn.
   50 grew wheat and oats.
   180 grew corn.

Find the number of farmers who
(a) grew at least one of the three grains.
(b) grew all three.
(c) did not grow any of the three grains.
(d) grew exactly two of the three grains.