5 Applications of Venn Diagram

Objectives:
After reading and completing this module, you will be able to do this:
 ✓ Solve word problems involving applications of Venn Diagram.

Example 1
At the Polo Shop 160 customers were selected at random and asked whether they prefer jeans or slacks. The results of the survey follow.

80 prefer jeans
70 prefer slacks
20 prefer both jeans and slacks

    a. Of these surveyed, how many people do not prefer jeans or slacks?
    b. How many prefer jeans but not slacks?
    c. How many prefer slacks but not jeans?
    d. How many prefer slacks or jeans?

Solution:
The problem provides us with the following information:

The number of people surveyed is 160.	$n(U) = 160$
The number of people who prefer jeans is 80.	$n(J) = 80$
The number of people who prefer slacks is 70.	$n(S) = 70$
The number of people who prefer both jeans and slacks is 20.	$n(J \cap S) = 20$

Illustration:
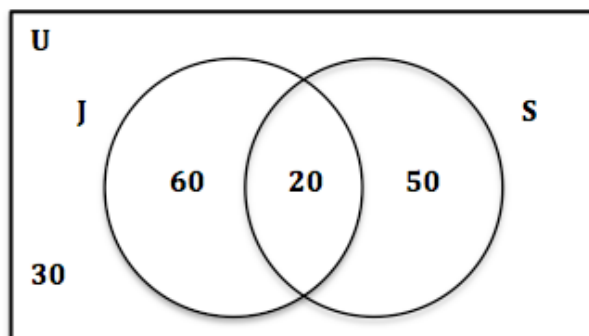
Looking at the Venn Diagram,
    a. There are 30 people who do <u>NOT</u> prefer jeans or slacks.
    b. There are 60 people who prefer jeans but <u>NOT</u> slacks.
    c. There are 50 people who prefer slacks but <u>NOT</u> jeans.
    d. There are 130 people who prefer slacks or jeans.

Example 2
In a certain class, there are 38 students. All students study Science.
16 study Physics,
20 study Chemistry,
24 study Biology,
7 study Physics and Chemistry,
8 study Physics and Biology,
10 study Biology and Chemistry,
3 study all three subjects.

a) Draw a carefully labeled Venn Diagram to represent the data.
b) Determine the number of students who study at least two subjects.
c) Determine the number of students who study Physics and Chemistry only.
d) Determine the number of students who study Biology only.

When drawing a Venn Diagram, you need not put arrows. They are included here to assist you.

a)
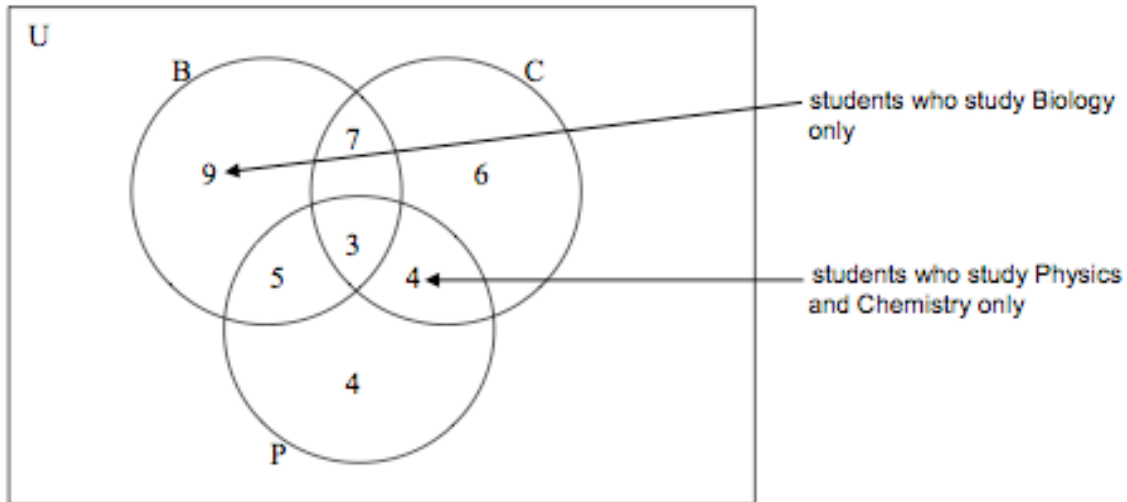
b) The number of students who study at least two subjects are those students in the intersections of the circle.

7 + 5 + 3 + 4 = 19 students

c) 4 students study Physics and Chemistry only.

d) 9 students study Biology only.