

Lesson Three: Venn Diagrams and Problem Solving

GOAL: To use Venn Diagrams to organize and communicate information and to explain relationships between sets of data.

Some logic problems involve many related categories. Venn diagrams can be helpful in solving such problems.

Example 1

In an Alberta School, there are 65 Grade Twelve students. Of these students, 23 play volleyball and 26 play basketball. 31 students do not play either sport. Consider the following three sets in this example:

- $U = \{\text{all grade twelve students}\}$
- $V = \{\text{grade twelve students who play volleyball}\}$
- $B = \{\text{grade twelve students who play basketball}\}$

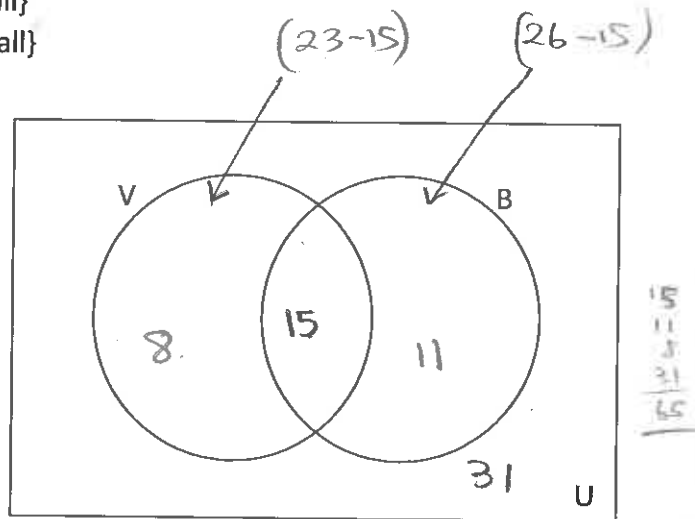
a) Are sets V and B disjoint sets? Explain (using numbers) how you know.

Students Play Sports: $65 - 31 = \underline{\underline{34}}$
 Play Both Sports: $49 - 34 = \underline{\underline{15}}$
 Play either B or V: 34

b) Complete the Venn diagram that represents this situation.

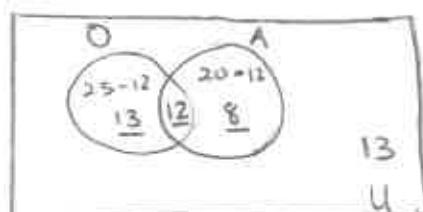
c) Use your Venn diagram and logic to help you find the number of students who:

- i) Play volleyball and basketball. = 15
- ii) Play volleyball only. = 11
- iii) Play basketball only = 8



Example 2

A survey of a group of people indicated that 25 liked orange juice and 20 liked apple juice. Twelve people liked both types of juice, and 13 people did not like either type of juice. Construct a Venn diagram below and determine the number of people that were surveyed.



$$n(A) = 8 \quad (20 - 12)$$

$$n(O) = 13 \quad (25 - 12)$$

$$n(A \cap O) = 12$$

$$n(U) = 46 \quad (13 + 12 + 8 + 13)$$