

## NOTES 3.2 Exploring Relationships Between Sets

**Lesson Focus:** To explore what the different regions of a Venn diagram represent.

- sets that are not disjoint **share common elements**
- when drawing or looking at a Venn diagram, keep the following in mind:
  - Each region of the diagram represents something different.
  - Each element in a universal set only appears once.
  - An element that occurs in more than one set goes in the region where the sets containing the element **overlap.**
  - To count the elements in non-disjoint sets, count the elements in each region just once.

**e.g.** In a small high school, there are 65 students in grade 12. Of these students, 23 play volleyball and 26 play basketball. There are 31 students who do not play either sport.

- Consider the following sets.

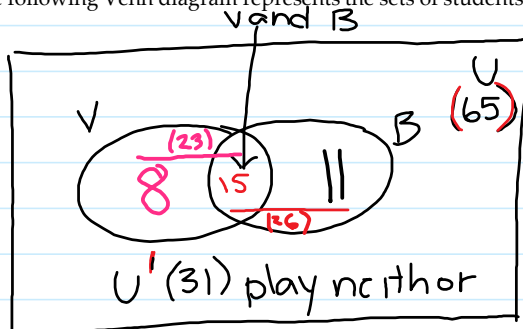
$U = \{\text{all students in grade 12}\}$

$V = \{\text{students who play volleyball}\} \rightarrow 23$

$B = \{\text{students who play basketball}\} \rightarrow 26$

$\rightarrow 49$   
play both

- The following Venn diagram represents the sets of students.



$$65 - 31 = 34 \text{ play both}$$

$$34 - 23 = 11 \text{ play basketball}$$

$$34 - 26 = 8 \text{ play volleyball}$$

- Define each of the regions in the Venn diagram above.
- Consider the set of students who play volleyball and the set of students who play basketball. Are the two sets disjoint? Explain.

No The #'s who play either sport is more than 34

- How many students play at least one of the two sports?

$$65 - 31 = 34 \text{ play either } V \text{ or } B$$

- How many students play both sports?

$$49 - 34 = 15$$

- Show the number of elements in each region.

**e.g.** Chantal asked 36 people at a senior citizens' residence what type of movies they liked, with the results shown below.

Type	Number of People Who Like
Mystery	20
Comedy	15
Neither	6

$$\} = 41$$

$$(20 + 15 + 6)$$

- Define the sets for the above situation.

$U = \{\text{all the people surveyed}\}$

$$= 41 - 36$$

1. Define the sets for the above situation.

$$U = \{ \text{all the people surveyed} \}$$

$$M = \{ \text{people who like mystery} \}$$

$$C = \{ \text{people who like comedy} \}$$

2. Draw a Venn diagram. Label each of the parts.

Determine the appropriate value that goes into each of the sections.

3. Use the Venn diagram to answer the following questions:

a) How many people liked mystery only?

$$? + 5 = 20 \Rightarrow 15$$

b) How many people liked comedy only?

$$? + 5 = 15 \Rightarrow 10$$

c) How many people like both mystery and comedy?

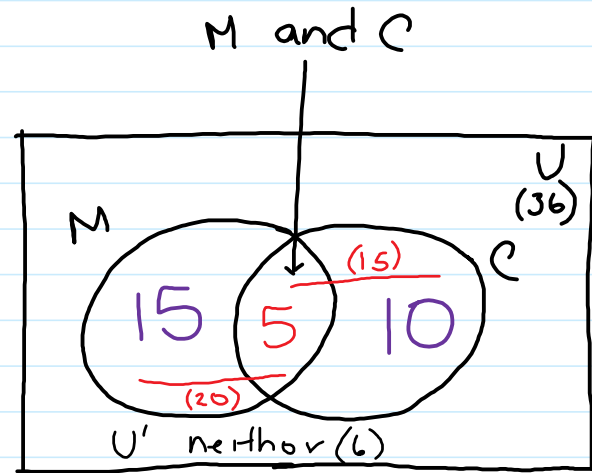
$$= 5$$

d) How many people liked mystery or comedy or both?

$$15 + 10 + 5 = 30$$

$$= 41 - 36$$

$$= 5$$



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