

Organizing Information Involving 3 Sets Practice

Use the following information to answer the first question.

Every person in a group of 60 people attending a conference pre-ordered lunch, which included the options of soup, sandwich, and/or salad. The results are shown below:

- 23 people selected soup
- 38 people selected a sandwich
- 12 people selected soup and a sandwich
- 19 people selected a salad and a sandwich
- 7 people selected only soup
- 9 people selected a sandwich, a salad and soup.
- 7 people selected only soup

1. A) Display the information in a Venn diagram.

B) How many people had salad?

C) How many people had soup and a salad?

D) How many people had only a sandwich?

E) How many people had soup or a sandwich, but not a salad?

Use the following information to answer the next question.

A group of 80 students was surveyed about 3 movies they may or may not have seen.

The Movies:

1. The Archies
2. See You On Venus
3. Prom Pact

The results are shown below:

- 5 students saw all 3 movies
- 8 students did not see any of these movies
- 12 students saw “The Archies” and “Prom Pact”
- 33 students saw “The Archies”
- 6 students saw “The Archies” and “See You On Venus”
- 9 students saw “Prom Pact” and “See You On Venus”
- 49 students saw “The Archies” or “Prom Pact”

2. A) Display the information in a Venn diagram.

B) How many students saw “See You On Venus” only?

C) How many students did not see the “The Archies”?

D) How many students saw exactly 2 movies?

E) How many students saw exactly 1 movie?

Use the following information to answer the next question.

A teacher surveyed her class of 43 students to find out how they prepared for their last exam. She found out that 24 students got someone (friend or family member) to orally quiz them, 14 studied their notes, and 27 students completed the review assignment. Of the entire class of 43, 12 completed the review assignment and had someone quiz them, 9 completed the review assignment and studied their notes, and 7 students had someone quiz them and studied their notes. Five students completed all three of these tasks, while the remaining did not employ any of these strategies.

3. A) Display this information in a Venn diagram.

B) How many students did **not** have someone quiz them or not complete the review assignment?

C) How many students had someone quiz them and study their notes but did not complete the review assignment?

D) How many students completed the review assignment only?

E) How many students studied their notes or had someone quiz them or completed the review assignment?

Organizing Information Involving 3 Sets Practice **Solutions**

Use the following information to answer the first question.

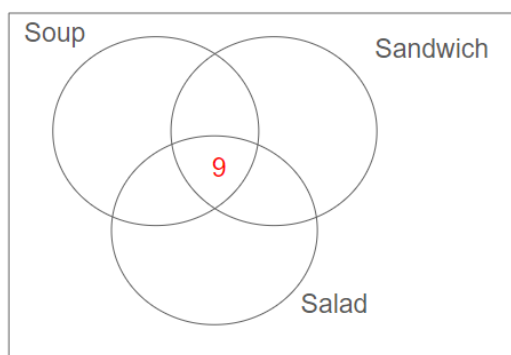
Every person in a group of 60 people attending a conference pre-ordered lunch, which included the options of soup, sandwich, and/or salad. The results are shown below:

- 23 people selected soup
- 38 people selected a sandwich
- 12 people selected soup and a sandwich
- 19 people selected a salad and a sandwich
- 7 people selected only soup
- 9 people selected a sandwich, a salad and soup.
- 7 people selected only soup

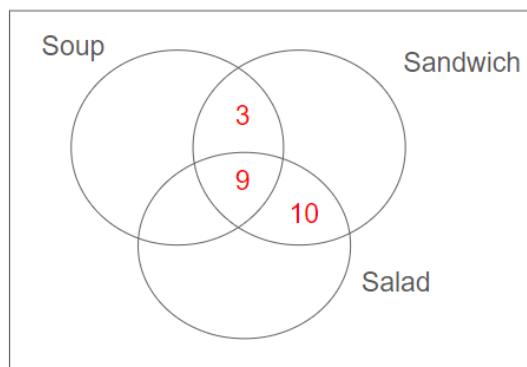
1. A) Display the information in a Venn diagram.

Solution

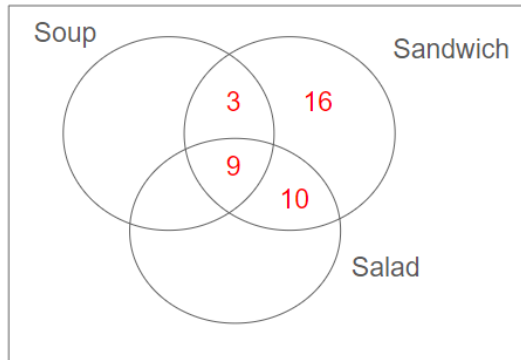
Begin by placing 9 in the intersection of all 3 sets.



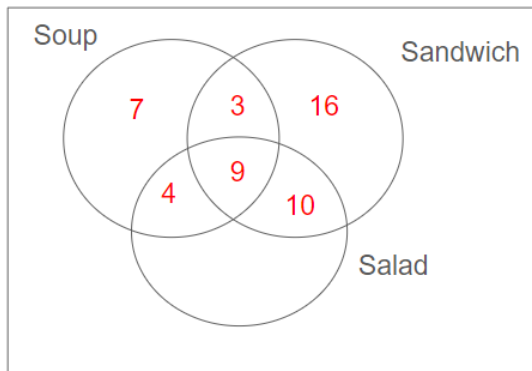
Given that 12 people selected soup **and** a sandwich, along with 19 people selecting a salad and a sandwich, we can fill in two more regions.



Given that 38 people selected a sandwich, the remaining region in the sandwich circle can now be determined. It is $38 - [3 + 9 + 10] = 16$



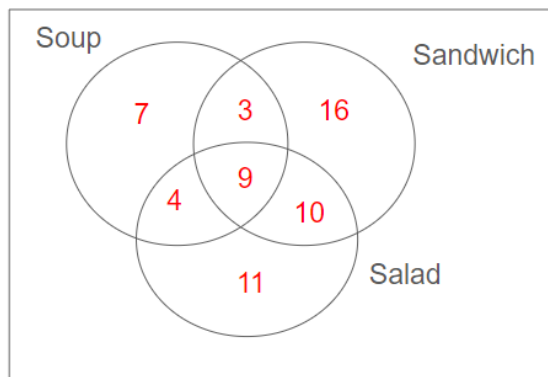
Since we know that 23 people selected soup, and of those, 7 selected soup only, we can now complete the soup circle.



Since every person out of the 60 people ordered a lunch, there is no one who did not order at least one of the options. The last region is found by adding the 6 numbers in the above diagram, and subtracting this sum from 60.

$$60 - [7 + 3 + 16 + 4 + 9 + 10] = 11$$

The final Venn diagram.



B) How many people had salad?

Solution

Add the 4 numbers in the salad circle, $4 + 9 + 10 + 11$.

There were 34 people who had salad.

C) How many people had soup and a salad?

Solution

The regions occupied by the numbers 4 and 9 represent the number of people who had soup and a salad.

There were 13 people who had soup and a salad.

D) How many people had only a sandwich?

Solution

There were 16 people who only had a sandwich.

E) How many people had soup or a sandwich, but not a salad?

Solution

The word 'or' means one or the other or both. To determine how many had soup or a sandwich, add all the numbers in each of these two circles.

$$7 + 3 + 16 + 4 + 9 + 10 = 49$$

We now have to subtract any of these 49 people who also had a salad. This would be represented by the numbers $4 + 9 + 10$, which is 23.

$$49 - 23 = 26$$

There were 26 people who had soup or a sandwich, but not a salad.

Use the following information to answer the next question.

A group of 80 students was surveyed about 3 movies they may or may not have seen.

The Movies:

1. The Archies
2. See You On Venus
3. Prom Pact

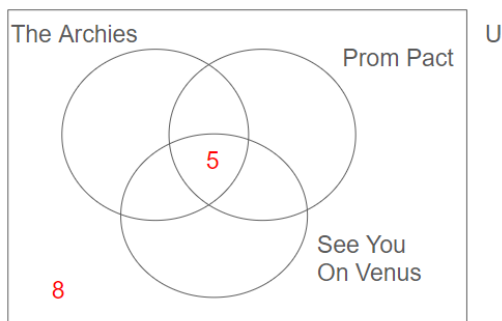
The results are shown below:

- 5 students saw all 3 movies
- 8 students did not see any of these movies
- 12 students saw “The Archies” and “Prom Pact”
- 33 students saw “The Archies”
- 6 students saw “The Archies” and “See You On Venus”
- 9 students saw “Prom Pact” and “See You On Venus”
- 49 students saw “The Archies” or “Prom Pact”

2. A) Display the information in a Venn diagram.

Solution

We will place 5 in the overlap of all 3 circles to represent those students who saw all of these movies. Then, we will place 8 inside the rectangle (representing the Universal set) but outside of the circles to represent those who did not see any of these movies.



Since 12 students saw “The Archies” **and** “Prom Pact”; 6 students saw “The Archies” **and** “See You On Venus”; 9 students saw “Prom Pact” **and** “See You On Venus”, we can fill in the other three regions with overlapping circles.

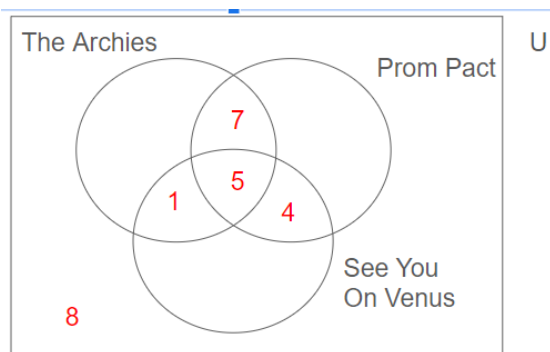
$$12 - 5 = 7$$

$$6 - 5 = 1$$

$$9 - 5 = 4$$

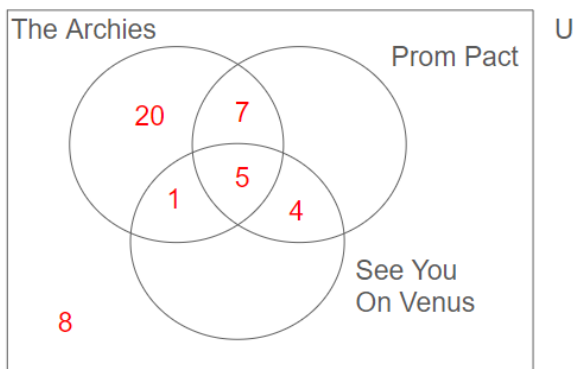
Insert 7, 1, and 4 into the appropriate regions.

[Remember, the key word here is **and**]



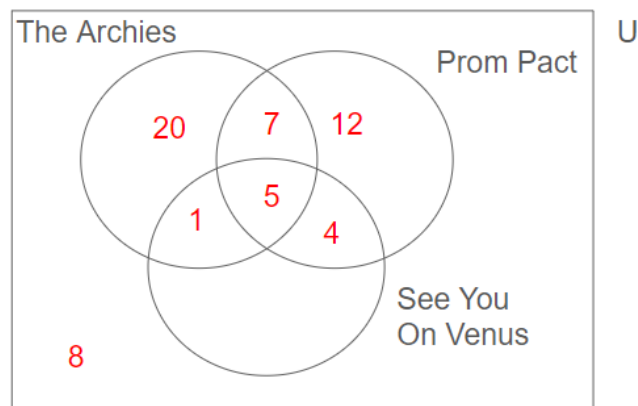
Since 33 students saw "The Archies", and we have 3 of the 4 regions in that circle, we can determine the number of students who saw only "The Archies".

$$33 - [7 + 5 + 1] = 20$$



Since 49 students saw "The Archies" or "Prom Pact", we can determine how many students saw only "Prom Pact". Remember, "or" means one or the other or both.

$$49 - [20 + 7 + 5 + 1 + 4] = 12$$



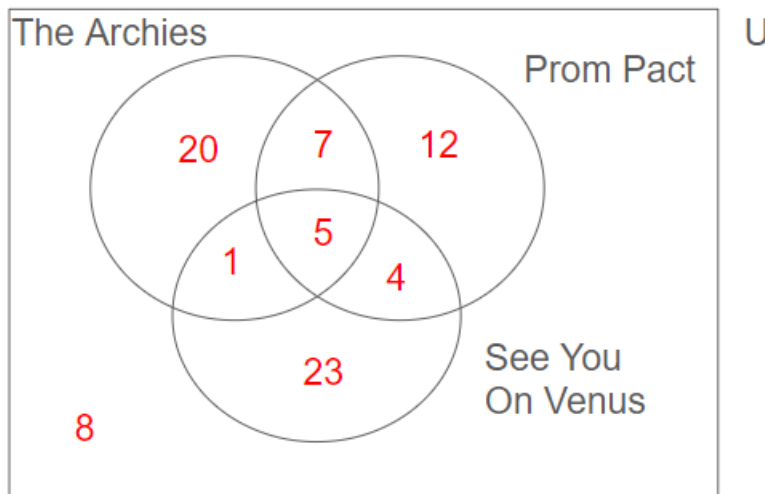
Recall the 8 region rule – ANAO.

- All
- None
- And
- Only

We have 7 of the 8 regions accounted for. We are missing those who only saw “See You On Venus”. Subtract the total of the 7 regions from the total number of students, which is 80.

$$80 - [20 + 7 + 12 + 1 + 5 + 4 + 8] = 23$$

The final Venn diagram.



B) How many students saw “See You On Venus” only?

Solution

When looking at the “See You On Venus” circle, the only region that is not overlapped with another circle, is the region containing the number 23. This number represents “only”.

There were 23 students who saw “See You On Venus” only.

C) How many students did not see the “The Archies”?

Solution

The students who did not see “The Archies” are represented by the numbers 12, 4, 23, and 8. The sum of these numbers is 47.

There were 47 students who did not see “The Archies”.

D) How many students saw exactly 2 movies?

Solution

The sum of $1 + 7 + 4$ is 12. The numbers shown in these regions indicate students seeing exactly 2 movies.

There were 12 students who saw exactly 2 movies.

E) How many students saw exactly 1 movie?

Solution

The numbers 20, 12, and 23 represent students who only watched one of these movies.

There were 55 students who saw exactly 1 movie.

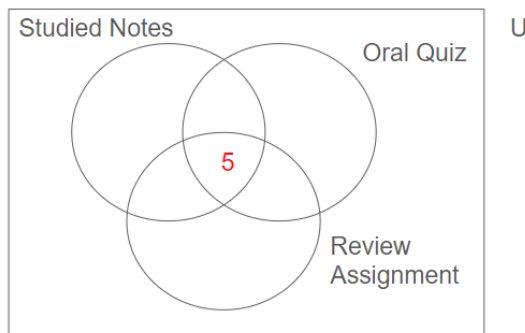
Use the following information to answer the next question.

A teacher surveyed her class of 43 students to find out how they prepared for their last exam. She found out that 24 students got someone (friend or family member) to orally quiz them, 14 studied their notes, and 27 students completed the review assignment. Of the entire class of 43, 12 completed the review assignment and had someone quiz them, 9 completed the review assignment and studied their notes, and 7 students had someone quiz them and studied their notes. Five students completed all three of these tasks, while the remaining did not employ any of these strategies.

3. A) Display this information in a Venn diagram.

Solution

Begin by placing 5 in the overlap of all three circles, which indicates the number of students that completed all of these tasks.

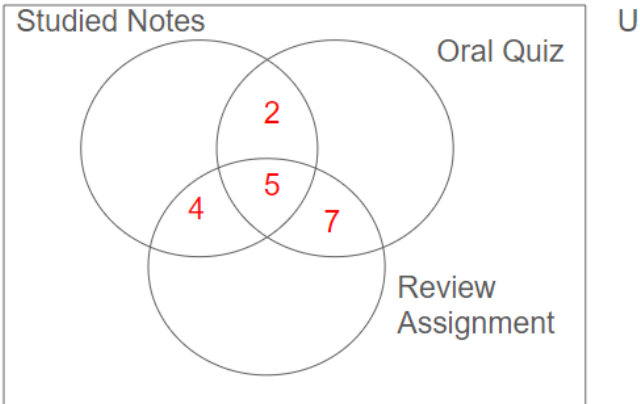


Since 12 students completed the review assignment **and** had someone quiz them; 9 students completed the review assignment **and** studied their notes; 7 students had someone quiz them **and** studied their notes, we can complete the regions showing circle overlap.

$$12 - 5 = 7$$

$$9 - 5 = 4$$

$$7 - 5 = 2$$



Knowing the total number of each circle:

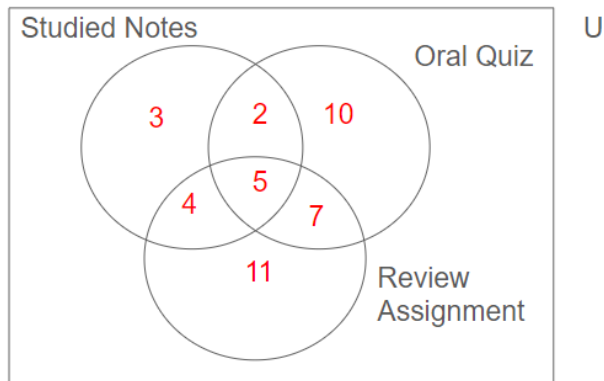
- 24 got someone else to quiz them
- 14 studied their notes
- 27 completed the review assignment

We can determine the region of each circle representing students who did *only* that task.

$$\text{Oral Quiz: } 24 - [2 + 5 + 7] = 10$$

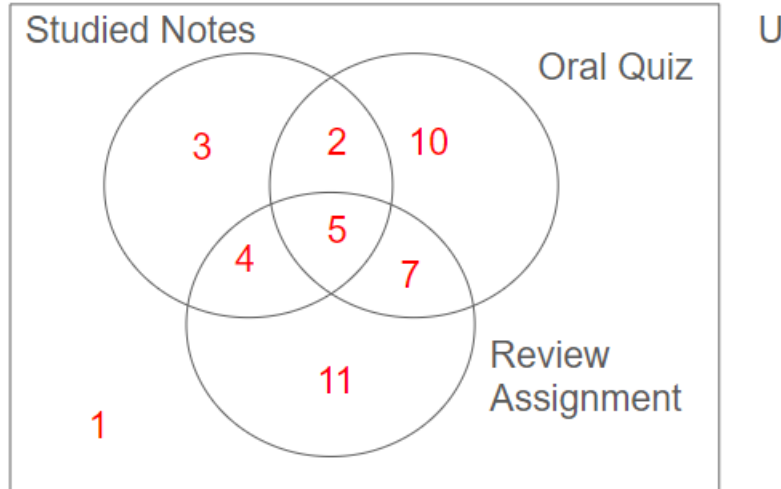
$$\text{Studied Notes: } 14 - [2 + 5 + 4] = 3$$

$$\text{Review Assignment: } 27 - [4 + 5 + 7] = 11$$



The total number of these 7 regions is 42. Since there are 43 students in the class, we can conclude that 1 student did not use any of these strategies.

The final Venn diagram.



B) How many students did **not** have someone quiz them or not complete the review assignment?

Solution

There were 3 students who only studied their notes and 1 student who didn't use any preparation strategy; for a total of 4 students. Everyone else used the Oral Quiz or complete the Review Assignment methods.

The answer is 4 students.

C) How many students had someone quiz them and study their notes but did not complete the review assignment?

Solution

There were $2 + 5$, or 7 students who had someone quiz them and studied their notes. Of these 7, 5 also completed the review assignment.

Since these 5 cannot be included, the final answer is 2 students.

D) How many students completed the review assignment only?

Solution

There were 11 students who completed the review assignment only.

E) How many students studied their notes or had someone quiz them or completed the review assignment?

Solution

This would be everyone except the one person who did not complete any of the strategies.

The final answer is 42.