

MATH 1030: Homework 2

due January 17, 2014

Instructions: Do the following problems on a separate sheet of paper. Show all of your work.

§1C Exercise 14

The number -45 is an integer.

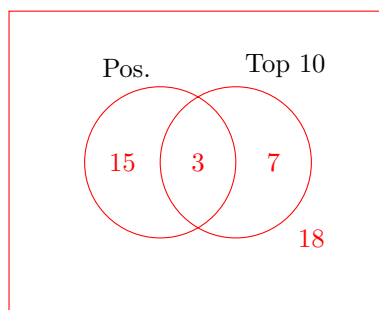
§1C Exercise 18

Zero is not a natural number because the natural numbers are $\{1, 2, 3, \dots\}$. However, zero is a whole number.

§1C Exercise 26

The number -145.01 is not an integer, but it is a rational number. We can express it as a quotient of two integers as such $-145.01 = \frac{-14501}{100}$.

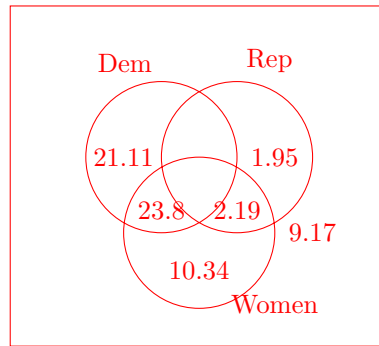
§1C Exercise 66



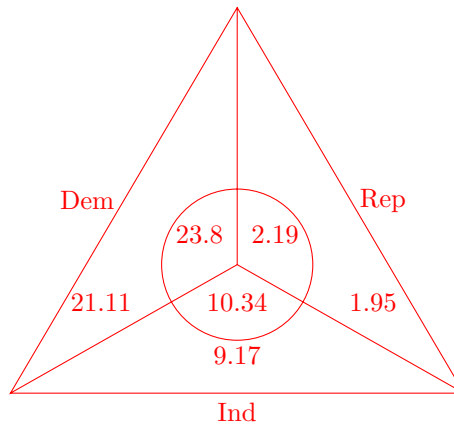
We are given that 18 cyclists tested positive, and 3 of them were in the top 10. So the number in the intersection of the two sets should be a 3. Since 18 cyclists tested positive, the total of the numbers in the “Pos.” circle should be 18, so there are 15 who tested positive but did not finish in the top 10. Clearly, only 10 cyclists can finish in the top 10, so the total of the numbers in that circle should be ten, meaning that 7 cyclists finished in the top 10 but did not test positive. Finally, we are told that 25 cyclists tested negative, so the sum of the numbers outside the “Pos” circle should be 25. This leaves $25 - 7 = 18$ people who tested negative but did not finish in the top 10.

§1C Exercise 81

- a. We can represent the table graphically with the following Venn diagram:



- b. Alternatively, we can use the triangle shaped venn diagram like so:



Here the region inside the circle represents women and outside represents men.

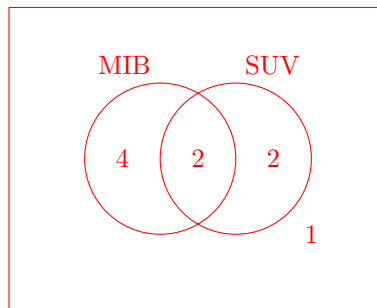
§1C Exercise 87

- There are 16 different sets of options a buyer can choose. Each buyer must effectively make four choices. They must decide “yes” or “no” for each option. If there is only one option, they have two choices. If there are two options, the buyer has four choices. Similarly, if there are three options, the buyer can make one of eight different decisions.
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- There are only 14 regions in the venn diagram, so two options must be missing. The missing options are “yes” to A and D only and “yes” to B and C only.
- If the computer store offered five options, there would be a total of 32 possible choices.
- The general formula for the number of possible choiced given N options is 2^N .

Problem 1

There were 9 Warriors that went up to the Bronx that night, 4 of which were wearing shirts under their vests. Of the 9, only 6 of them made it back to Coney Island. Of the 6 that got back to

Coney, there were 4 which were not wearing shirts under their vests. How many of the Warriors that were not wearing shirts under their vests did not make it back to Coney Island?



Where MIB is the region for those who “Made it Back” and SUV is the region for those wearing “Shirts Under their Vests”. Of those Warriors not wearing shirts under their vests, only 1 did not make it back.

Problem 2

At the time of Cyrus’ death, there were 250 total gangs in New York City.

45 of the Gangs were from the Bronx

100 of the gangs went to the big meeting in the Bronx, 22 of which were from the Bronx

The Warriors bopped their way through 6 gangs on their way back to Coney: the Turnbull AC’s, the Orphans, the Lizzies, the Baseball Furies, the Punks, and the Rogues.

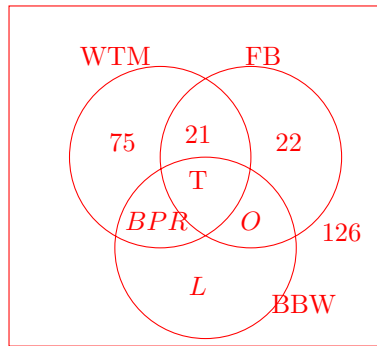
The Orphans and the Turnbull AC’s were the only gangs from the Bronx that the Warriors bopped their way through.

The Lizzies and the Orphans were the only gangs not at the meeting that the Warriors bopped their way through.

Draw a Venn diagram describing this set of data and use it to answer the following questions.

- How many gangs in New York City did not go to the meeting and did not get bopped through by the Warriors?
- How many gangs from the Bronx that went to the meeting did not get bopped by the Warriors?

We will abbreviate the gangs each of the gangs by the first letter of their name. Also, “WTM”=“Went To Meeting,” “FB”=“From the Bronx,” “BBW”=“Bopped By Warriors.” The provided information gives the following Venn diagram:



- There were 126 gangs that did not go to the meeting or get bopped and were not from the Bronx, and 22 gangs that did not go to the meeting or get bopped and were from the Bronx, for a total of 148 gangs.
- There were 21 gangs from the Bronx that went to the meeting and did not get bopped by the Warriors.

Problem 3

The Grammercy Riffs, headed by the late Cyrus, were the biggest gang in all of New York City. Suppose they had 120 members.

95 of the Riffs knew karate.

25 of the Riffs were at the meeting.

40 of the Riffs were dressed in orange.

20 of the Riffs that were at the meeting were dressed in orange.

18 of the Riffs that were at the meeting knew karate.

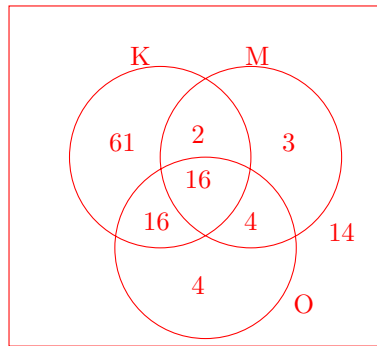
32 of the Riffs that knew karate were dressed in orange.

16 of the Riffs that were at the meeting both knew karate and were dressed in orange.

Draw a Venn diagram describing this set of data and use it to answer the following questions.

- How many of the Riffs either knew karate or were dressed in orange?
- How many of the Riffs did not know karate, were not dressed in orange, and did not attend the meeting?

We have the following Venn diagram:



- a. The number of Riffs who either knew karate or were dressed in orange is the sum of all the number in either the “K” circle or the “O” circle. So $61 + 2 + 16 + 16 + 4 + 4 = 103$ Riffs either knew karate or were dressed in orange.
- b. The Riffs who did not know karate, were not dressed in orange, and did not go to the meeting are represented by those outside the three circles in the venn diagram, so there are 14.