

Math 150

Section 8.2 Applications of Venn Diagrams

Example 1 66 students were surveyed. Most students subscribe to one or more of the following magazines: Sports Illustrated (SI), Time (T), and National Geographic (NG).

25 get NG 38 get SI 24 get T
17 get NG and SI 9 get SI and T 5 get NG and T
3 get all three

(a) Draw and fill in a Venn Diagram for this information.

(b) How many students subscribe to:

at least 2 magazines?

more than 1 magazine?

exactly 1 magazine?

less than 2 magazines?

at least 1 but less than 3 magazines?

no more than 2 magazines?

no less than 1 magazine?

fewer than 3 magazines?

exactly 2 magazines?

fewer than 4 magazines?

exactly 1 or 3 magazines?

Addition Rule for Counting

$$n(A \cup B) = n(A) + n(B) - n(A \cap B).$$

Note that $n(A)$ denotes the number of elements in set A .

Example 2 Use the given information to draw and fill in an appropriate Venn Diagram.

$$\begin{array}{llll} n(A) = 15 & n(A \cap B \cap C) = 5 & n(A \cap C) = 13 & n(A \cap B') = 9 \\ n(B \cap C) = 8 & n(A' \cap B' \cap C') = 21 & n(B \cap C') = 3 & n(B \cup C) = 32 \end{array}$$