Solutions homework set 2  
Section 2.2, problems 16, 20, 30, 38

16.

A = \{1, 2, 3, 4, 5\}, B = \{3, 5, 7\}, C = \{2, 4, 8\}, and U = \{1, 2, 3, 4, 5, 6, 7, 8\}.

(a) \(\overline{\overline{A}} \cap B \cup C = \{6, 7, 8\} \cap \{1, 2, 4, 6, 8\} \cup \{2, 4, 8\} = \{6, 8\} \cup \{2, 4, 8\} = \{2, 4, 6, 8\}\)

(b) \(\overline{\overline{A}} \cup B \cap C = \{1, 2, 3, 4, 5, 7\} \cup \{2, 4, 8\} = \{6, 8\} \cup \{2, 4, 8\} = \{2, 4, 6, 8\}\)

(c) Parts (a) and (c) are the same.

(d) The following two shaded three-set Venn diagrams show that the two expressions are equal for all sets A, B, and C.

![Venn Diagrams](image)

20.

A class has 32 students. There are 17 boys and 22 eight-year-olds. What is the largest number of the girls that could not be eight year olds? Tell how you solved the problem.

*Answer.* There are 32 – 17 = 15 girls. We want to know what can be the maximum number of girls that are not eight-year-olds. If all the boys are eight-year-olds, there are 22 – 17 = 5 eight-year-old girls. Then there are 15 – 5 = 10 girls that are not eight-year-olds.
30.

Draw a two-set Venn diagram to illustrate each of the following statements, and use symbols to represent the relationship between the two sets.

(a) All musicians are creative people.
(b) No square is a triangle.
(c) Some vegetables are green.

38.

A survey asked 50 students if they drive to school and if they work. Twenty-four drive to school, and 34 work. Eighteen drive to school and work.

(a) Draw a two-set Venn diagram that displays these results.

(b) How many students neither drive to school nor work?

In the Venn diagram these students are outside the circles D and W. The answer is 10.