Solutions to practice problems for Set Theory

Problem 1.

(a)

$$S = \{(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),\\ (2,1),(2,2),(2,3),(2,4),(2,5),(2,6),\\ \vdots \quad \vdots \quad \vdots \\ (6,1),(6,2),(6,3),(6,4),(6,5),(6,6)\}$$

(b)

$$A = \{(3,6),(4,5),(4,6),(5,4),(5,5),(5,6),(6,3),(6,4),(6,5),(6,6)\}$$

(c)

$$B = \{(2,i), \text{with } i = 1,3,\ldots,6\} \cup \{(j,2) \text{with } j = 1,3,\ldots,6\}$$

(d)

$$C = \{(5,i), \text{with } i = 1,\ldots,6\} \cup \{(6,i), \text{with } i = 1,\ldots,6\}$$

(e)

$$A \cap C = \{(5,4),(5,5),(5,6),(6,3),(6,4),(6,5),(6,6)\}$$

(f)

$$A \cap B = \{\emptyset\}$$

(g)

$$B \cap C = \{(5,2)\}$$

(h)

(k)

$$A' = \{(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),\\ (2,1),(2,2),(2,3),(2,4),(2,5),(3,1),\\ (3,2),(3,3),(3,4),(3,5),(4,1),(4,2),\\ (4,3),(4,4),(5,1),(5,2),(5,3),(6,1),(6,2)\}$$

(l)

$$A' \cap B = B, \text{ since } B \subset A'.$$

(m)

$$A \cup B = \{(2,1),(2,3),(2,4),(2,5),(2,6),(1,2),$$
$$(3,2),(4,2),(5,2),(6,2),(3,6),(4,5),$$
$$(4,6),(5,4),(5,5),(5,6),(6,3),(6,4),(6,5),(6,6)\}$$

Problem 2. b.

Problem 3. Note: Event number 8 was not represented in the original figure. Figure 1.1 shows how the figure should look like.

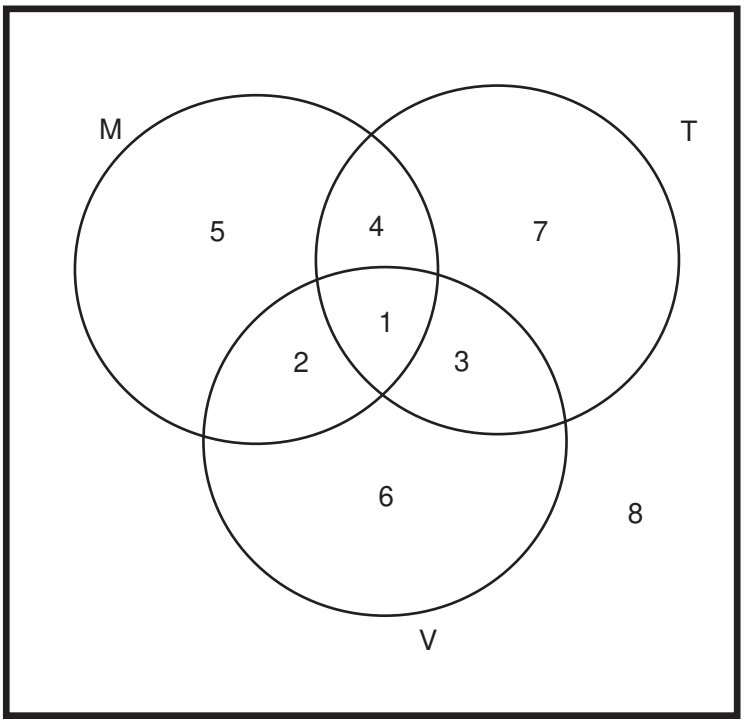

Figure 1: *Venn diagram for Problem 3.*

(a) Experience mechanical problems only.

(b) Getting 'No vacancy' sign in campsite and a ticket but no mechanical problems.

(c) Getting mechanical problems and 'No vacancy' sign.

(d) Getting mechanical problems and a ticket, or getting a ticket and no 'No vacancy' sign.

(e) Not getting mechanical problems.

(f) 6.

(g) 2.

(h) 2, 5, 6.

(i) All but 6.