

Solution ***Section 3.1 – Sets***

Exercise

Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $X = \{2, 4, 6, 8\}$, $Y = \{2, 3, 4, 5, 6\}$, and $Z = \{1, 2, 3, 8, 9\}$

Solution

- a) $X \cap Y = \{2, 4, 6\}$
- b) $X \cup Y = \{2, 3, 4, 5, 6, 8\}$
- c) $Y' = \{1, 7, 8, 9\}$
- d) $X' \cap Z = \{1, 3, 9\}$
- e) $Y \cap (X \cup Z) = \{2, 3, 4, 6\}$
- f) $X' \cap (Y' \cup Z) = \{1, 3, 7, 9\}$
- g) $(X \cap Y') \cup Z' = \{1, 8\}$

Exercise

Given $A = \{0, 2, 4, 6\}$, $B = \{0, 1, 2, 3, 4, 5, 6\}$, and $C = \{2, 6, 0, 4\}$, determine if the statement is true or false?

Solution

- a) $A \subset B$ ***True***
- b) $A \subset C$ ***True***
- c) $A = C$ ***True***
- d) $C \subset B$ ***True***
- e) $B \not\subset A$ ***True***
- f) $\emptyset \subset B$ ***True***

Exercise

Given $R = \{1, 2, 3, 4\}$, $S = \{1, 3, 5, 7\}$, $T = \{2, 4\}$, and $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, find the following:

Solution

- a) $R \cup S$ $\{1, 2, 3, 4, 5, 7\}$
- b) $R \cap S$ $\{1, 3\}$
- c) $S \cap T$ \emptyset
- d) S' $\{2, 4, 6, 8, 9\}$

Exercise

Write true or false for each statement

- a) $3 \in \{2, 5, 7, 9, 10\}$ b) $6 \in \{-2, 5, 6, 9\}$
c) $9 \notin \{2, 1, 5, 8\}$ d) $3 \notin \{7, 6, 5, 4, 10\}$
e) $\{2, 5, 8, 9\} = \{2, 5, 9, 8\}$ f) $\{3, 7, 12, 14\} = \{3, 7, 12, 14, 9\}$

Solution

- a) **False**, since the number 3 is not an element of the set
b) **True**, since the number 6 is an element of the set
c) **True**, since the number 9 is not an element of the set
d) **True**, since the number 3 is not an element of the set
e) **True**, since the set contain exactly the same elements
f) **False**, since 9 is an element of the second set but not the first