

Practice Questions

Lecture No. 7

Q1: Let $A = \{0, 2, 4, 6\}$, $B = \{1, 3, 5, 7\}$

Find (i) $A \cup B$

Answer: $A \cup B = \{0, 1, 2, 3, 4, 5, 6, 7\}$

(ii) $A \cap B$

Answer: $A \cap B = \emptyset$

(iii) Check $A \cap B \subseteq B$

Answer: Here $A \cap B = \emptyset$ and $B = \{1, 3, 5, 7\}$ so $A \cap B \subseteq B$

(iv) Check $A \cap B \subseteq A$

Answer: $A \cap B = \emptyset$ and $A = \{0, 2, 4, 6\}$ so $A \cap B \subseteq A$

(v) Check $A \subseteq A \cup B$

Answer: Here $A = \{0, 2, 4, 6\}$ and $A \cup B = \{0, 1, 2, 3, 4, 5, 6, 7\}$. Clearly $A \subseteq A \cup B$

(vi) Check $B \subseteq A \cup B$

Answer: Similar as part (v).

Q2: Let $A = \{1, 2, 3, 4\}$, $B = \{1, 3, 5, 7, 9\}$

Find (i) $A - B$

Answer: $A - B = \{2, 4\}$

(ii) $B - A$

Answer: $B - A = \{5, 7, 9\}$

(iii) Check $A - B \subseteq A$ yes

(iv) Check whether $A - B \subseteq B$ No

(v) Check whether $B - A \subseteq A$ No

(vi) Check $B - A \subseteq B$ Yes

(vii) Check $A - B \neq B - A$ Yes

Q3: Let $U = \{t, u, v, w, x, y, z\}$, $A = \{u, v, w, x\}$

Find (i) A^c

Answer: $A^c = \{t, y, z\}$

(ii) Check $A^c \cap A = \emptyset$ Yes

(iii) Check $A^c \cup A = U$ Yes

Q4: Let $A = \{a, b, c, d\}$, $B = \{d, e\}$, $C = \{d, f, g, h\}$

Find (i) $A - B = \{a, b, c\}$

(ii) $B - A = \{e\}$

(iii) $C - A = \{f, g, h\}$

(iv) $C - B = \{f, g, h\}$

(v) $(A - B) \cap C = \{a, b, c\} \cap \{d, f, g, h\} = \emptyset$

Practice Questions

Lecture No. 8

Q1: Let $A = \{x, y\}$, $B = \{2, 4\}$

Find (i) $A \times B = \{(x, 2), (x, 4), (y, 2), (y, 4)\}$

(ii) $A \times A = \{(x, x), (x, y), (y, x), (y, y)\}$

(iii) $B \times B = \{(2, 2), (2, 4), (4, 2), (4, 4)\}$

(iv) $B \times A = \{(2, x), (4, x), (2, y), (4, y)\}$

(v) Pick any number of ordered pairs from $A \times B$ and make three relations

R_1, R_2 and R_3 of your own choice.

$$R_1 = \{(x, 2)\}, R_2 = \{(x, 2), (x, 4)\}, R_3 = \{(y, 4)\}.$$

Q2: Let $A = \{1, 2, 3\}$

Find (i) $A \times A = \{(1, 1), (1, 2), (1, 3), (2, 1), (2, 2), (2, 3), (3, 1), (3, 2), (3, 3)\}$

(ii) Pick any number of ordered pairs from $A \times A$ and make three relations

R_1, R_2 and R_3 of your own choice.

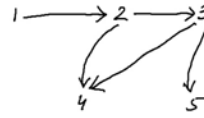
Answer: Choose any three subset of $A \times A$ as in Q1(v).

Q3: Let $A = \{1, 2, 3, 4, 5\}$

And $R = \{(1, 2), (2, 3), (2, 4), (3, 4), (3, 5)\}$ be a relation on A

(i) Find the domain and range of the relation R.
Domain: $\{1, 2, 3\}$, Range: $\{2, 3, 4, 5\}$

(ii) Draw its Directed Graph.



(iii) Make its Matrix.

$$M = \begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$