**Discrete Mathematical Structures**

**Week-4**

**Long Descriptive Questions**

**1, Construct the truth table for**

1. **¬(¬P v ¬Q)**
2. **¬(¬P ʌ ¬Q)**

Truth table for **¬ (¬P v ¬Q)** and **¬ (¬P ʌ ¬Q)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **P** | **Q** | **¬P** | **¬Q** | **¬P v ¬Q** | **¬P ʌ ¬Q** | **¬(¬P v ¬Q)** | **¬(¬P ʌ ¬Q)** |
| T | T | F | F | F | F | T | T |
| T | F | F | T | T | F | F | T |
| F | T | T | F | T | F | F | T |
| F | F | T | T | T | T | F | F |

**2, Construct the truth table for P→ ((P→ (Q→P)) →P)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **P** | **Q** | **Q→P** | **P→ (Q→P)** | **(P→ (Q→P)) →P** | **P→ ((P→ (Q→P)) →P)** |
| T | T | T | T | T | T |
| T | F | T | T | T | T |
| F | T | F | T | F | T |
| F | F | T | T | F | T |

**3, List the converse, inverse and contrapositive of the statement**

1. **“If p is prime, then √p is rational.”**
2. **“If it is raining, then there are clouds in the sky**

**a) “If p is prime, then √p is rational.”**

**Converse** "If √p is rational, then p is prime."

**Inverse** "If p is not prime, then √p is not rational."

**Contrapositive** "If √p is not rational, then p is not prime."

**b) “If it is raining, then there are clouds in the sky**

**Converse** "If there are clouds in the sky, then it is raining."

**Inverse** "If it is not raining, then there are no clouds in the sky."

**Contrapositive** "If there are no clouds in the sky, then it is not raining."

**4, Construct the truth table for (P→Q) v (¬P→ Q)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **P** | **Q** | **¬P** | **(P→Q)** | **(¬P→Q)** | **(P→Q) v (¬P→ Q)** |
| T | T | F | T | T | T |
| T | F | F | F | T | T |
| F | T | T | T | T | T |
| F | F | T | T | F | T |