Q1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **pi** | **si** | **Pi imply si** | **Si imply pi** | **Pi biimply si** |
| T | T | T | T | T |
| T | F | F | T | F |
| F | T | T | F | F |
| F | F | T | T | T |

Q2. (Pi → si) ← → (~pi **or si)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **pi** | **si** | **Pi imply si** | **~pi** | **~Pi or si** | **Pi imply si -> ~Pi or si** | **Pi imply si <- ~Pi or si** | **Pi imply si <-> ~Pi or si** |
| T | T | T | F | T | T | T | T |
| T | F | F | F | F | T | T | T |
| F | T | T | T | T | T | T | T |
| F | F | T | T | T | T | T | T |

Q3. (pi **does not imply** si) **biimply** (pi **and** ~si)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **pi** | **si** | **~Pi** | **~si** | **Pi does not imply si** | **Pi and ~si** | **Pi does not imply si ->**  **Pi and ~si** | **Pi does not imply si <-**  **Pi and ~si** |
| T | T | F | F | F | F | T | T |
| T | F | F | T | T | T | T | T |
| F | T | T | F | F | F | T | T |
| F | F | T | T | F | F | T | T |

Q4.

|  |  |  |  |
| --- | --- | --- | --- |
| **pi** | **si** | **Pi then si** | **Pi ^ (pi then si)** |
| T | **T** | T | **T** |
| T | **F** | F | **F** |
| F | **T** | T | **T** |
| F | **F** | T | **F** |

Modus ponen says that the if we know A, and we know that if A then B then we conclude B from the fact that A and A then B is the same as si.

If **pi** is true and we know that the truth of **si follow from pi** then we know **si.**

1. **We know si because we know (pi) and (si follows from pi)**
2. **We know the result and a single variable**
3. **We know the affect and single cause, then we can conclude the second cause.**

**Q5.**

~(A or B) and ~A and ~B

1. Both (A or B) either A or B must be true
2. ~(A or B) that none of A or B are false
3. Or
4. And hence both are equal

Q6.

(a) 34,159 is not a prime number.

(b) Roses are not red and violets are not blue.

(c) If there are hamburgers, I won't have a hot dog.

(d) Fred will not go but he will but he will play. ( This statement is possibly wrong )

(e) The number x is either positive and less than 10.

(f) We will not lose both games.

Q7.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | ~A | B | ~B | **A ← → B** | **~A ← → ~B** |  |
| T | F | T | F | **T** | **T** |  |
| T | F | F | T | **F** | **F** |  |
| F | T | T | F | **F** | **F** |  |
| F | T | F | T | **T** | **T** |  |

Q8.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | B | C | **B OR C** | **A ← → B** | **A → (B OR C)** |  |
| T | T | T | T | **T** | **T** |  |
| T | T | F | T | **T** | **T** |  |
| T | F | T | T | **F** | **T** |  |
| T | F | F | F | **F** | **F** |  |
| F | T | T | T | **F** | **T** |  |
| F | T | F | T | **F** | **T** |  |
| F | F | T | T | **T** | **T** |  |
| F | F | F | F | **T** | **T** |  |
|  |  |  |  |  |  |  |

Q9 .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | B | C | **B AND C** | **A → (B AND C)** | **A → B** | A→ C | **A → B and** A→ C |
| T | T | T | T | **T** | T | T | **T** |
| T | T | F | F | **F** | T | F | **F** |
| T | F | T | F | **F** | F | T | **F** |
| T | F | F | F | **F** | F | F | **F** |
| F | T | T | T | **T** | T | T | **T** |
| F | T | F | F | **T** | T | T | **T** |
| F | F | T | F | **T** | T | T | **T** |
| F | F | F | F | **T** | T | T | **T** |
|  |  |  |  |  |  |  |  |

Q10.

A -> (B and C)

2. means that B is true and C is true

3. A -> B (Because B is must be true and from previous statement it is true)

4. A -> C (Because C is must be true and from previous statement it is true)

5. because A -> B and A -> C which means

6. B follows from A and also C follows from A so

7. B and C both follows from A

8. i.e A -> B and C

Q11.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | ~A | B | ~B | **A → B** | **~B → ~A** |  |
| T | F | T | F | **T** | **T** |  |
| T | F | F | T | **F** | **F** |  |
| F | T | T | F | **T** | **T** |  |
| F | T | F | T | **T** | **T** |  |

Q12.

(a) If two rectangles are congruent, they have the same area.

Ans. If two rectangles don’t have the same area, they are not congurent.

(b) If a triangle with sides a;b;c(clargest) is right-angled, then a^2 +b^2 =c^2 .

Ans. if a^2 +b^2 c^2 , then triangle not right angle triangle.

(c) If 2^n-1 is prime, then n is prime.

Ans. if n isn’t prime, then 2^n-1 is not prime.

(d) If the Yuan rises, the Dollar will fall.

Ans. Dollar won’t fall only if The Yuan won’t rise.

Q13.

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | **A → B** | **B → A** |
| T | T | **T** | **T** |
| T | F | **F** | **T** |
| F | T | **T** | **F** |
| F | F | **T** | **T** |

Q14.

(a) If two rectangles are congruent, they have the same area.

Ans. If two rectangles have the same area, they are congruent.

(b) If a triangle with sides a;b;c(clargest) is right-angled, then a^2 +b^2 =c^2 .

Ans. if a^2 +b^2 c^2 , then triangle is right angle triangle. (biconditional)

(c) If 2^n-1 is prime, then n is prime.

Ans. if n prime, then 2^n-1 is prime.

(d) If the Yuan rises, the Dollar will fall.

Ans. Dollar fall only if The Yuan rise.