Jason Gilman

**Section 1.1**

12)

P = the election is decided Q = The votes have been counted

￢q ∨ (￢p ∧ q)

The votes have not been counted, or the election is not decided and the votes have been counted.

30)

If it snows tonight, then I will stay at home.

P = it snows tonight Q = I will stay at home

Converse = If I stay at home, then it snows tonight.

Contrapositive = If I don’t stay at home, then it will not snow tonight.

Inverse = If it does not snow tonight, then I will not stay at home.

34)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| p | q | q → ¬p | p ↔ q | (q → ¬p)↔(p ↔ q) |
| F | F | T | T | T |
| F | T | T | F | F |
| T | F | T | F | F |
| T | T | F | T | F |

**Section 1.2**

8)

P = “The user enters a valid password”

Q = “Access is granted”

R = “The user has paid the subscription fee”

“Access is granted whenever the user has paid the subscription fee and enters a valid password”

(R ∧ P) → Q

“Access is denied if the user has not paid the subscription fee”

⌐R → ⌐Q

44)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P | Q | ⌐P | ⌐Q | ⌐P ∨ ⌐Q |
| F | F | T | T | T |
| F | T | T | F | T |
| T | F | F | T | T |
| T | T | F | F | F |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| P | Q | ⌐P | ⌐P ∧ Q | P ∨ (⌐P ∧ Q) | ⌐(P ∨ (⌐P ∧ Q)) |
| F | F | T | F | F | T |
| F | T | T | T | T | F |
| T | F | F | F | T | F |
| T | T | F | F | T | F |

**Section 1.3**

4)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| P | Q | R | P ∨ Q | (P ∨ Q) ∨ R | Q ∨ R | (Q ∨ R) ∨ P |
| F | F | F | F | F | F | F |
| F | F | T | F | T | T | T |
| F | T | F | T | T | T | T |
| F | T | T | T | T | T | T |
| T | F | F | T | T | F | T |
| T | F | T | T | T | T | T |
| T | T | F | T | T | T | T |
| T | T | T | T | T | T | T |

12)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| P | Q | ⌐P | (P ∨ Q) | ⌐P ∧ (P ∨ Q) | (⌐P ∧ (P ∨ Q)) → Q |
| F | F | T | F | F | T |
| F | T | T | T | T | T |
| T | F | F | T | F | T |
| T | T | F | T | F | T |

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

26)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| P | Q | R | P → Q | P → R | (P → Q) ∧ (P → R) | Q ∧ R | P → (Q ∧ R) |
| F | F | F | T | T | T | F | T |
| F | F | T | T | T | T | F | T |
| F | T | F | T | T | T | F | T |
| F | T | T | T | T | T | T | T |
| T | F | F | F | F | F | F | F |
| T | F | T | F | T | F | F | F |
| T | T | F | T | F | F | F | F |
| T | T | T | T | T | T | T | T |