1.

a.

Birthday = P and Cake =Q.

P v Q 🡪Q

b.

|  |  |  |  |
| --- | --- | --- | --- |
| P | Q | P v Q | P v Q🡪Q |
| 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 |

2.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P | Q | P v Q | P ^ Q | P v Q🡪P^Q |
| 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 |

3.Yes the statement P -> (Q v R) and (P ->Q) v (P->R) are equivalent because their tables are the same.

|  |  |  |  |
| --- | --- | --- | --- |
| P | Q | R | (P ->Q) v (P->R) |
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| P | Q | R | P -> (Q v R) |
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

4. Use this to mean negation – even if its not the right symbol

1. -(P --> -Q)

= (P ^ Q)

1. (-P v -Q) -> -(-Q ^ R)

= (Q v -R)