1)

a)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| p | q | (p → q) | (p ∧ q) | (p → q) ∧ (p ∧ q) |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |

e)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| p | q | ¬q | (p → q) | (q ∧ ¬q) | (p → q) ↔ (q ∧ ¬q) |
| 0 | 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 0 | 0 |

h)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| p | q | ¬p | (¬p → q) | ( p ∧ q) | (¬p → q) ∨ ( p ∧ q) |
| 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 |

2)

1. **Não** é uma tautologia.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| p | q | r | (p ∨ r) | ((p ∨ r) → q) | (p → q) | (p → q) ↔ ((p ∨ r) → q) |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |

1. **É** uma tautologia.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| p | q | (p ∨ q) | ((p ∨ q) ↔ q) | (p → q) | (p → q) ↔ ((p ∨ q) ↔ q) |
| 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 |

3) Alternativa letra **“a)”**, pois caso ambas proposições sejam falsas, a disjunção delas também irá gerar um valor falso.

|  |  |  |
| --- | --- | --- |
| p | q | p ∨ q |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

4) Alternativa letra **“d)”**, pois caso uma proposição tenha valor lógico verdadeiro e a segunda um valor lógico falso, respectivamente, o condicional terá valor lógico **falso**.

5) Alternativa letra **“e)”**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| p | q | r | ~p | (q ∧ ~p) | (q v (q ∧ ~p)) | (q v (q ∧ ~p)) v r |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 |

6)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| p | q | r | p ∧ q | (r ↔ q) | p ∧ q → (r ↔ q) |
| 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 |

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