**Tautologia**

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2° semestre – Desenvolvimento de Software Multiplataforma

**Exercícios de Tautologia:**

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a)

|  |  |  |  |
| --- | --- | --- | --- |
| **p** | **q** | **~q** | **p ~q** |
| v | v | f | f |
| v | f | v | v |
| f | v | f | v |
| f | f | v | v |

b)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **p** | **q** | **~p** | **~q** | **p ∧ ~q** | **~p ∨ q** | **p ∧ ~q ~p ∨ q** |
| v | v | f | f | f | v | v |
| v | f | f | v | v | f | f |
| f | v | v | f | f | v | v |
| f | f | v | v | f | v | v |

c)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **p** | **q** | **r** | **~p** | **(q ~p)** | **(p r)** | **(q ~p) (p r)** |
| v | v | v | f | f | v | f |
| v | v | f | f | f | f | v |
| v | f | f | f | v | f | f |
| f | f | v | v | v | f | f |
| f | v | v | v | v | f | f |
| f | v | f | v | v | v | v |
| v | f | v | f | v | v | v |
| f | f | f | v | v | v | v |

d)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **p** | **q** | **~q** | **q ∨ p** | **p ∧ ~q** | **q ∨ p p ∧ ~q** |
| v | v | f | v | f | f |
| v | f | v | v | v | v |
| f | v | f | v | f | f |
| f | f | v | f | f | v |

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a)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p** | **q** | **p ∧ q** | **p ∨ q** | **p ∧ q p ∨ q** |
| v | v | v | v | v |
| v | f | f | v | v |
| f | v | f | v | v |
| f | f | f | f | v |

b)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p** | **q** | **(p q)** | **p ∧ q** | **(p q) p ∧ q** |
| v | v | v | v | v |
| v | f | f | f | v |
| f | v | v | f | f |
| f | f | v | f | f |

c)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p** | **q** | **(q p)** | **(q (q p))** | **p (q (q p))** |
| v | v | v | v | v |
| v | f | v | v | v |
| f | v | f | f | v |
| f | f | v | v | v |

d)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **p** | **q** | **~p** | **~q** | **(p ∨ q)** | **(~p ∧ ~q)** | **(p ∨ q) (~p ∧ ~q)** |
| v | v | f | f | v | f | f |
| v | f | f | v | v | f | f |
| f | v | v | f | v | f | f |
| f | f | v | v | f | v | f |

e)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **p** | **q** | **r** | **~p** | **~r** | **p ∧ q** | **(p ∧ q r)** | **~p q** | **(~p q ∨ ~r)** |
| v | v | v | f | f | v | v | f | v |
| v | v | f | f | v | v | f | f | v |
| v | f | f | f | v | f | v | v | v |
| f | f | v | v | f | f | v | f | v |
| f | v | v | v | f | f | v | v | f |
| f | v | f | v | v | f | v | v | v |
| v | f | v | f | f | f | v | v | f |
| f | f | f | v | v | f | v | f | f |

|  |
| --- |
| **(p ∧ q r) ∨ (~p q ∨ ~r)** |
| v |
| v |
| v |
| v |
| v |
| v |
| v |
| v |

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a)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p** | **q** | **p ∧ q** | **q ∧ p** | **p ∧ q q ∧ p** |
| v | v | v | v | v |
| v | f | f | f | v |
| f | v | f | f | v |
| f | f | f | f | v |

b)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p** | **q** | **p ∨ q** | **q ∨ p** | **p ∨ q q ∨ p** |
| v | v | v | v | v |
| v | f | v | v | v |
| f | v | v | v | v |
| f | f | f | f | v |

c)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **p** | **q** | **r** | **(q ∨ r)** | **p ∧ (q ∨ r)** | **(p ∧ q)** | **(p ∧ r)** | **(p ∧ q) ∨ (p ∧ r)** |
| v | v | v | v | v | v | v | v |
| v | v | f | v | v | v | f | v |
| v | f | f | f | f | f | f | f |
| f | f | v | v | f | f | f | f |
| f | v | v | v | f | f | f | f |
| f | v | f | v | f | f | f | f |
| v | f | v | v | v | f | v | v |
| f | f | f | f | f | f | f | f |

|  |
| --- |
| **p ∧ (q ∨ r) (p ∧ q) ∨ (p ∧ r)** |
| v |
| v |
| v |
| v |
| v |
| v |
| v |
| v |

d)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **p** | **q** | **r** | **(q ∧ r)** | **p ∨ (q ∧ r)** | **(p ∨ q)** | **(p ∨ r)** | **(p ∨ q) ∧ (p ∨ r)** |
| v | v | v | v | v | v | v | v |
| v | v | f | f | v | v | v | v |
| v | f | f | f | v | v | v | v |
| f | f | v | f | f | f | v | f |
| f | v | v | v | v | v | v | v |
| f | v | f | f | f | v | f | f |
| v | f | v | f | v | v | v | v |
| f | f | f | f | f | f | f | f |

|  |
| --- |
| **p ∨ (q ∧ r) (p ∨ q) ∧ (p ∨ r)** |
| v |
| v |
| v |
| v |
| v |
| v |
| v |
| v |