# Lab1-Logics-2021.02

1) p = F, q = T, and r = T.  
Select the expression that evaluates to true.

a.

b.

c.

d.

2) Which statement is the contrapositive of:  
"If , then ."

a. If , then .

b. If , then .

c. If , then .

d. , then .

3) The propositional variables b, v, and s represent the propositions:

b: Alice rode her bike today.  
v: Alice overslept today.  
s: It is sunny today.

Select the logical expression that represents the statement: "Alice rode her bike today only if it was sunny today and she did not oversleep."

a.

b.

c.

d.

4) Select the proposition that is a contradiction.

a.

b.

c.

d.

5) Select the law that shows that the two propositions are logically equivalent.

a. DeMorgan’s law

b. Distributive law

c. Associative law

d. Commutative law

6) The domain for variable x is the set of all integers. Select the statement that is true.

a.

b.

c.

d.

7) The domain of discourse are the students in a class. Define the predicates:

S(x): x studied for the test  
A(x): x received an A on the test

Select the logical expression that is equivalent to:

"Someone who did not study for the test received an A on the test."

a.

b.

c.

d.

8) Use De Morgan’s law to select the statement that is logically equivalent to:  
"It is not true that there was a student who was absent yesterday."

a. Every student was absent yesterday.

b. Every student was not absent yesterday.

c. Some student was absent yesterday.

d. At least one student was not absent yesterday.

9) The domain for variables x and y is the set {1, 2, 3}. The table below gives the values of P(x, y) for every pair of elements from the domain. For example, P(2, 3) = F because the value in row 2, column 3, is F.

|  |  |  |  |
| --- | --- | --- | --- |
| P | 1 | 2 | 3 |
| 1 | T | T | T |
| 2 | T | F | F |
| 3 | F | T | F |

Select the statement that is false.

a.

b.

c.

d.

10) The domain of discourse for x and y is the set of employees at a company. Define the predicate:  
V(x): x is a manager  
N(x, y): x earns more than y

Select the logical expression that is equivalent to:

"Every manager earns more than every employee who is not a manager."

a.

b.

c.

d.

11) Select the truth assignment that shows that the argument below is not valid:



a. p = T  
q = T

b. p = F  
q = T

c. p = T  
q = F

d. p = F  
q = F

12) Select the correct expression for (?) in the proof segment below:

|  |  |  |
| --- | --- | --- |
| 1. |  | Hypothesis |
| 2. |  | Hypothesis |
| 3. | (?) | Simplification, 2 |
| 4 |  | Modus Tollens, 1, 3 |

a.

b.

c.

d.

13) The domain for variable x is the set of all integers. Select the correct rule to replace (?) in the proof segment below:

|  |  |  |
| --- | --- | --- |
| 1. | c is an arbitrary integer | Hypothesis |
| 2. |  | - |
| 3. |  | (?) |

a. Universal instantiation

b. Universal generalization

c. Existential instantiation

d. Existential generalization