

Name: _____

Course and Year: _____

Part 1. Give the truth value of each statement if t is true. Write T or F after the statement.

1. $\sim p \rightarrow t$

4. $p \wedge \sim t$

2. $\sim p \vee t$

5. $\sim (p \rightarrow t)$

3. $p \rightarrow (t \vee \sim p)$

Part 2. Give the truth value of each sentence. Write T or F after the sentence.

1. $p \wedge q$ if q is not true.

4. $p \rightarrow (q \vee \sim r)$ if r is false.

2. $p \rightarrow (p \vee q)$ if p is true.

5. $p \rightarrow q$ if $\sim (p \wedge q)$ is false.

3. $(\sim p \vee r) \vee (q \rightarrow s)$ if q is false.

Part 3. Find the truth value of each symbolic statement. Show your solution

1. Let p be true, q be false and r be true.

a. $r \rightarrow (p \rightarrow q)$

b. $\sim [(p \wedge q) \rightarrow (r \leftrightarrow q)]$

2. Let p be true, q be false and r be false.

a. $\sim p \rightarrow (q \wedge r)$

b. $\sim [(\sim q \wedge p) \leftrightarrow r] \rightarrow q$

c. $(\sim p \leftrightarrow \sim r) \vee [p \rightarrow (q \rightarrow r)]$

Part 4. Determine whether the statement is a tautology, a contradiction or indeterminate. Use a truth table to show your answer.

a. $\sim q \vee (p \rightarrow q)$

b. $p \rightarrow [(\sim q \rightarrow p) \wedge (q \vee \sim p)]$

c. $(p \wedge q) \wedge (q \rightarrow \sim p)$

Part 5. Determine the relation between the two statements. Use a truth table to show your answer.

a. $(p \wedge q) \rightarrow (p \vee q)$

b. $(p \wedge \sim q) \leftrightarrow (p \rightarrow q)$

Part 6. Write the converse, inverse and contrapositive of “If n^2 is even, then n is even.”

Part 7. Give the Rules of Replacement and the Rules of Inference.

Part 8. Represent the argument symbolically and determine whether it is a valid argument. Use method 1, method 2, and method 3 for items 1., 2., and 3. respectively.

1. Mark attended his classes or he went to the mall.
Mark did not went to the mall.
 \therefore He attended his classes.
2. If you will do your best in the contest, then I will not win.
If I will not win, then I will be sad.
 \therefore If you will do your best in the contest, then I will be sad.
3. Mathematics is fun and challenging.
Mathematics is fun or easy.
Mathematics is not easy.
 \therefore Mathematics is challenging.

Part 9.