GENERAL MATHEMATICS

Name: _____ **Grade Level:** _____
Date: _____ **Score:** _____

LEARNING ACTIVITY SHEET
PERFORMS THE DIFFERENT TYPES OF OPERATIONS ON PROPOSITIONS

Background Information for Learners

Dear students, finally, you are now on the last stage of this learning activity. You will learn how to construct a truth table and perform the different operations on proposition.

The truth table shows all its possible truth values. Since a proposition has two possible truth values, a proposition *p* whould have the following truth table:

p
T
F

Truth tables can also be used to display various combinations of the truth values of two propositions *p* and *q*.

p	q
T	T
T	F
F	T
F	F

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In addition to truth table, you will also learn NEGATION (not) which states exact opposite of a given proposition.

p: I represents an imaginary number
~p: I does not represent an imaginary number

The conjunction (but, also, moreover) of two propositions is true if both component propositions are true and false if at least one of them is false.

A disjunction (unless) is true if at least one of the component propositions is true and is only false if both are false.

The conditional proposition (only if, implies) is false only if Q is false but P is true.

Biconditional Proposition is a conjuction of two conditional propositions The truth value of P↔Q is **true** whenever the two component propositions have the **same truth value**.

Logical Operators

Let p and q be arbitrary propositions

Type	Logical Operator	Symbolic Form	Read as
Conjunction	And	$p \wedge q$	p and q
Disjunction	Or	$p \vee q$	p or q
Conditional	If…then	$p \rightarrow q$	If p, then q
Biconditional	If and only if	$p \leftrightarrow q$	p if and only if q
Negation	Not	$\sim p$	Not p

Learning Competency 3: The learner performs the different types of operations on propositions. **M11GM-IIg-4**

Priming Activity 1

Directions: Express the following propositions in symbols. Assume that p is the antecedent and q is the consequent.

1. I will go to the party if and only if my parents will allow me to go.
2. If one person reuses plastic containers, then he or she helps lessen wastes.
3. If you are not pro-SHS, then you are not here.
4. Either Plato is a Philosopher or Einstein is a scientist.
5. Mathematics is not the most difficult subject.

Big Idea!

Checkpoint!

1. biconditional $p \leftrightarrow q$
2. conditional $p \rightarrow q$
3. contrapositive $\sim p \rightarrow \sim q$
4. disjuction p v q
5. Negation $\sim p$

Activity 1: "It's Your Turn!"

Directions: Express the following propositions in symbols. Assume that p is the antecedent and q is the consequent.

1. Pia got the award and propmtly stopped using cellphones.

2. Either you will study through online or through the use of modules.
3. Eight is not equal to negative eight.
4. The function f is even if and only if f(x)=f(-x).
5. Classes will start on June if and only if there is no pandemic.

Activity 2: "Complete Me"

Construct the truth table of the different types of logical operators.

a.

P	***~P***
T	
F	

b.

P	***Q***	***P∧Q***
T	***T***	
T	***F***	
F	***T***	
F	***F***	

c.

P	**Q**	**P∨Q**
T	**T**	
T	**F**	
F	**T**	
F	**F**	

d.

P	**Q**	**P→Q**
T	**T**	
T	**F**	
F	**T**	
F	**F**	

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Activity 3:

"Reconstruct Me"

Given the following propositions below, Write the component propositions and construct the symbolic form.

Example: Two lines P and Q are parallel if and only if they are coplanar and P and Q do no intersect.

Component Propositions:

p: Two lines P and Q are parallel.
c: P and Q are coplanar.
l: P and Q intersect.

Symbolic form: $p \leftrightarrow (c \wedge (\sim l))$ or $p \leftrightarrow c \wedge \sim l$

1. If you are interested in becoming a scholar, you should fill-up the application form and submit it to our officer in-charge or to any teacher in school.

2. Upon announcement of Moderate General Community Quarantine, classes in all levels should be conducted in the new normal and children below 21 years old should stay at home.

Reflection:

1. What I learned in this activity is _____.
2. I need to study more on
   _____

References

DIWA Senior High School Series, p. 205

General Mathematics LM, p 250

Answer Key

Activity 1

1. Conjunction $p \wedge q$
2. Disjunction $p \vee q$
3. Negation $\sim p$
4. Conditional $p \rightarrow q$
5. Biconditional $p \leftrightarrow q$

Activity 2

a.

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P	~P
T	F
F	T

(a)

b

P	Q	P∧Q
T	T	T
T	F	F
F	T	F
F	F	F

(b)

c

P	Q	P∨Q
T	T	T
T	F	T
F	T	T
F	F	F

(c)

d

P	Q	P→Q
T	T	T
T	F	F
F	T	T
F	F	T

(d)

Avtivity 3

1. Component Propositions:

v: You are interested in becoming a scholar.
f: You should fill-up the form.
h: You should submit to the officer in-charge.
L: You should submit it to any teacher in school.
Symbolic form: $v \rightarrow (f \wedge (h \vee l))$

2. Component Propositions:

p: There is a Moderate General Community Quarantine
c: Classes in all levels are conducted in the new normal
s: Children below 21 years old should stay at home
Symbolic form: $p \rightarrow (c \wedge s)$ or $p \rightarrow c \wedge s$