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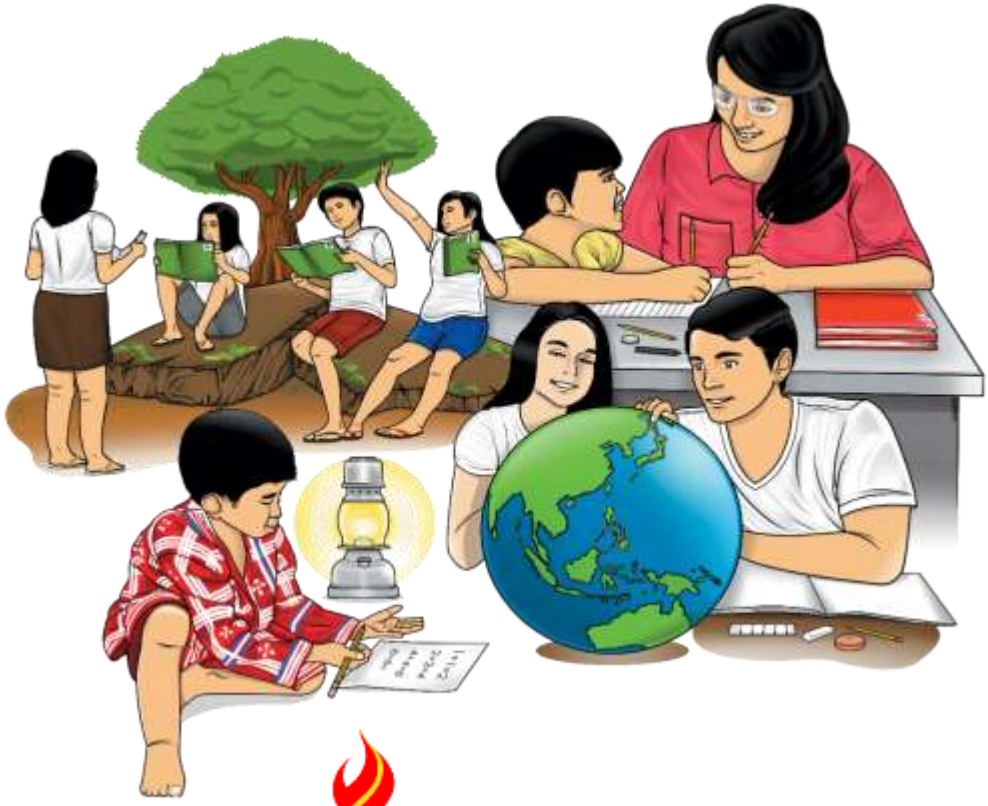
DEPARTMENT OF EDUCATION

Mathematics

Quarter 2 – Module 9:
"Determining the Relationship Between the Hypothesis and the Conclusion of an If-then Statement"



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8

Mathematics

Quarter 2 – Module 9: "Determining the Relationship Between the Hypothesis and the Conclusion of an If-then Statement"

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you determine the relationship between the hypothesis and the conclusion of a given conditional statement or an if-then statement. Knowledge of this module is fundamental in transforming conditional statements to if-then statements.

This module contains:

Lesson 1: Determining the Relationship Between the Hypothesis and the Conclusion of an If-then Statement

After going through this module, you are expected to:

1. identify the hypothesis and the conclusion of an if-then statement;
2. evaluate the hypothesis and the conclusion of an if-then statement; and
3. determine the importance of correctly evaluating the truth value of a given conditional statement.

What I Know

Directions: Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper. You may skip the module if you get 100% correct answers otherwise proceed with this module.

1. What is the truth value of the conditional statement when the hypothesis is false and the conclusion is true?

   A. False
   B. True
   C. Not enough information was given
   D. None of the above

2. What do you call the part of a conditional statement that follows "if" when written in if-then form?

   A. conclusion
   B. converse
   C. hypothesis
   D. inverse

3. What do you call the part of a conditional statement that follows "then" when written in if-then form?

   A. conclusion
   B. converse
   C. hypothesis
   D. inverse

4. What is the truth value of the conditional statement when the hypothesis is true and the conclusion is true?

   A. False
   B. True
   C. Not enough information was given
   D. None of the above

5. If <u>you do your homework</u>, then you will receive snacks. What do you call the underlined portion in this conditional statement?

   A. abstract
   B. conclusion
   C. generalization
   D. hypothesis

6. *If you drink milk, then <u>you will grow.</u>* What do you call the underlined portion in this conditional statement?

   A. conclusion
   B. converse
   C. hypothesis
   D. inverse

7. *If two lines are parallel, then <u>they will never intersect.</u>* What do you call the underlined portion in this conditional statement?

A. conclusion
B. converse
C. hypothesis
D. inverse

8. An if-then statement is in the form, _____.

A. If q then q
B. If q then p
C. If p then p
D. If p then q

9. What is the truth value of the conditional statement when the hypothesis is true and the conclusion is false?

A. False
B. True
C. Not enough information was given
D. None of the above

10. *If a figure has four sides, then it is a quadrilateral.* Which of the following represent/s the conclusion in the above conditional statement?

I. a figure has four sides
II. If a figure has four sides
III. it is a quadrilateral
IV. then it is a quadrilateral

A. I only
B. I and II
C. III only
D. III and IV

11. If a = b and b = c, then _____.

A. a = c
B. a > c
C. a ≠ c
D. a < c

12. If an angle is obtuse, then its measure is greater than 90° *but less than* 180°. What is the truth value of the conditional statement?

A. False
B. True
C. Not enough information was given
D. None of the above

13. *If he eats a hamburger, then he will eat two bags of fries.* Which of the following represent/s the hypothesis in the above conditional statement?

I. he eats a hamburger
II. he will eat two bags of fries
III. If he eats a hamburger
IV. then he will eat two bags of fries

A. I only
B. I and III
C. II only
D. II and IV

14. Which of the following statements is true?

A. If ∠ 1 has a measure of 70°, then ∠ 1 is acute.
B. If ∠ 1 has a measure of 180°, then ∠ 1 is right.
C. If ∠ 1 has a measure of 95°, then ∠ 1 is acute.
D. If ∠ 1 has a measure of 90°, then ∠ 1 is obtuse.

15. Consider this conditional statement, "*If an eagle can fly, then 5 + 7 = 35*". Which of the following correctly evaluate/s the hypothesis *(p),* conclusion *(q),* and truth value (p → q) of the conditional statement?

A. *p* is false, *q* is false, and $p \rightarrow q$ is true
B. *p* is false, *q* is true, and $p \rightarrow q$ is true
C. *p* is true, *q* is false, and $p \rightarrow q$ is false
D. *p* is true, *q* is false, and $p \rightarrow q$ is true

Lesson 1 Determining the Relationship Between the Hypothesis and the Conclusion of an If-then Statement

What's In

Let us begin this module by having a quick review of your previous lesson.

Directions: Read and analyze the situation below and answer the questions that follow.

Alexander often rides a tricycle from one place to another. The standard fare in riding a tricycle is PhP10.00 as a flag down rate plus Php 5.00 for every 100 meters or fraction of it.

Complete the table now.

Distance (in meters) (x)	0	100	200	300	400
Amount (in pesos P) y					

Write the linear function and answer the following questions:

a. If Alexander rides a tricycle from his home to school with a distance of 250 meters, how much will he pay?
b. If from home to the church Alexander rides a tricycle and paid $P35.00$, then how far is the church from Alexander's home?
c. If he rides a tricycle from his home to hospital with an approximate distance of 600 meters, how much will he pay?

What's New

Activity: Find my Match!

Directions: Draw a line to match each input with its corresponding output. Do this on a separate sheet of paper.

	Input	**Output**
1	I studied for my Math test.	We need to use our umbrella.
2	It is raining.	The family enjoyed delicious food for dinner.
3	People are exposed to germs.	I got a good grade.
4	She told my secret.	People get sick.
5	Mom was in the kitchen cooking all afternoon.	I felt sad and betrayed.

Guide Questions:

1. How did you connect the input to the output?
2. Does the output really match the input?
3. How do the sentences in the input and output differ?

What is It

A **conditional statement or *if-then statement*** is composed of two clauses: the if- clause and the then- clause. We can denote a letter for each clause, ***p*** *for the* ***if-clause*** and ***q*** *for the* ***then-clause***. The statement is in the form of **"If p then q"**. Conditional statements are formed by joining two statements ***p*** and ***q*** using the words ***if*** and ***then***.

The ***p*** statement is called the **hypothesis,** the part of a conditional statement that follows **"if"** (when written in if-then form). It is the given information or premise. The ***q*** statement is the **conclusion,** the part of an ***if-then*** statement that follows **"then"** (when written in if-then form). It is also the result of the given information.

Here are the following illustrative examples that will guide and help you to understand the lesson.

Let us connect the given input and output from your last activity using the **if-then** form.

1. Input: I studied for my math test.

   Output: I got a good grade.

So, using the ***if- then*** *statement, the input is the hypothesis of the statement and the output is the conclusion of the statement.*

Answer: If I studied for my math test, **then** I got a good grade.

2. Input: It is raining.

   Output: We need to use our umbrella.

So, using the ***if- then*** *statement, the input is the hypothesis of the statement and the output is the conclusion of the statement.*

Answer: If it is raining, **then** we need to use our umbrella.

A conditional statement has a **truth value** of either true (T) or false (F). For us to know the truth value of the statement we are going to use the Truth Table. To show that a conditional statement is *false*, you need to find only one counterexample where the hypothesis is *true* and the conclusion is *false.*

Shown below is the Truth Table:

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

Let's try the following examples:

1. **If** I studied for my math test, **then** I got a good grade.

Answer: The hypothesis of a conditional statement is the phrase immediately following the word **"if".** The conclusion of a conditional statement is the phrase immediately following the word **"then".**

Hypothesis: I studied for my math test

Conclusion: I got a good grade

When the hypothesis is true, the conclusion is also true because when you study you will get a good grade. Therefore, the truth value of the conditional statement is true.

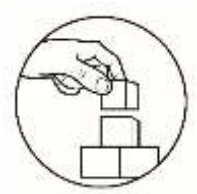
2. **If** it is raining, **then** we need to use our umbrella.

Answer:

The hypothesis is "it is raining".

The conclusion is "we need to use our umbrella".

In the given statement the hypothesis is true and the conclusion is true because when it is raining, we need to use our umbrella. Therefore, the truth value of the conditional statement is true.



What's More

Activity 1: Let's Write!

Directions: Identify the hypothesis and conclusion of each of the following statements. Write your answer on the space provided.

1. If two lines form right angles, then the lines are perpendicular.

   Hypothesis: _____

   Conclusion: _____

2. If x + 20 = 32, then x = 12.

   Hypothesis: _____

   Conclusion: _____

3. If you are a third-year high school student, then you are a junior high school student.

   Hypothesis: _____

   Conclusion: _____

4. If an angle measures 20°, then it is acute.

   Hypothesis: _____

   Conclusion: _____

5. If a figure is a square, then it is quadrilateral.

   Hypothesis: _____

   Conclusion: _____

6. If a number is a whole number, then it is an integer.

   Hypothesis: _____

   Conclusion: _____

7. If a truck weighs 3 tons, then it weighs 6000 pounds.

   Hypothesis: _____

   Conclusion: _____

Activity 2: True or False!

Directions: Evaluate the hypothesis and the conclusion of the conditional statements below.

Example: If pigs can fly, then 2 + 5 = 7.

Hypothesis: Pigs can fly (False)

Conclusion: 2+5 = 7 (True)

1. If the measure of the acute angle is 30°, then fish can walk.
2. If 148 is divisible by 8, then 148 is also divisible by 6.
3. If the sum of the interior angles of a polygon is 540° , then it is a hexagon.
4. If 10x =5, then x = 2.
5. If today is February 14, then it is Valentine's Day.

Guide Questions:

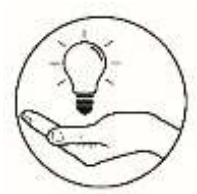
1. How did you determine the truth value of the hypothesis? conclusion?
2. How are the truth values of the hypothesis and conclusion related?

Activity 3: Let's Evaluate!

Directions: Evaluate the following statements. Use the truth table below.

1. If a shape is a triangle, then it is a polygon.
2. If Ana studies for her test, then she will pass the exam.
3. If a number is even, then it is divisible by 2.
4. If a polygon has eight sides, then it is an octagon.
5. If a shape is a rectangle, then it has four sides.

No.	p	q	$p \rightarrow q$
1			
2			
3			
4			
5			



What I Have Learned

Directions: Fill in the blanks with the correct word/s that will make the statements correct.

A (1) _____is composed of two clauses: the **if- clause** and the **then- clause**. We can denote a letter for each clause, ***p*** for the (2) _____ and ***q*** for the (3) _____. The statement is in the form (4) "_____". Conditional statements are formed by joining two statements ***p*** and ***q*** using the words **"if"** and **"then".** The ***p*** statement is called the (5) _____ and the ***q*** statement is the (6) _____.

A conditional statement has a (7) _____of either true (T) or false (F). For us to know the truth value of the statement we are going to use the (8) _____that will help us to determine the truth value of the conditional statement. The statement will only be *false* when the hypothesis is (9) _____and the conclusion is (10) _____.

What I Can Do

Directions: Given the statement of the speaker, write your appropriate reaction on the blank call out. Then, justify your reaction on the space provided.

Speaker

If you use face mask when going out to a public place, then you are protected from the Corona Virus Disease (COVID).

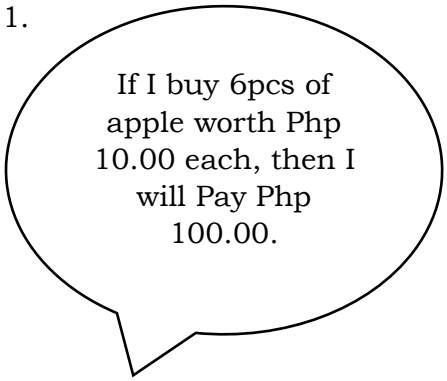
Receiver

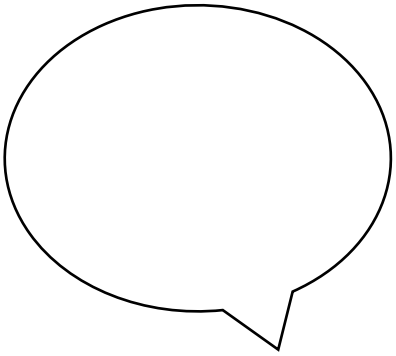
Yes, I agree.

Reason: <u>Wearing a face mask will help prevent the spread of infection and prevent the individual from contracting the virus.</u>

Start here!

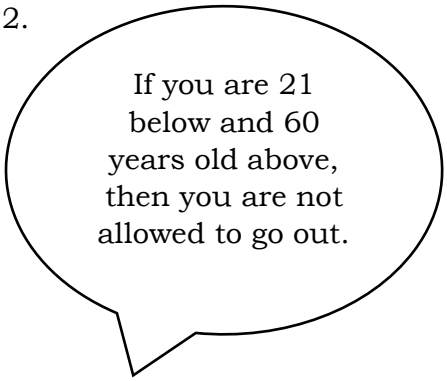
1.

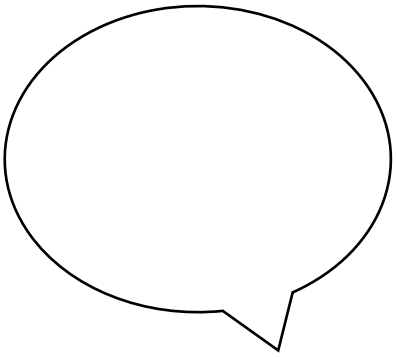




Reason: _____

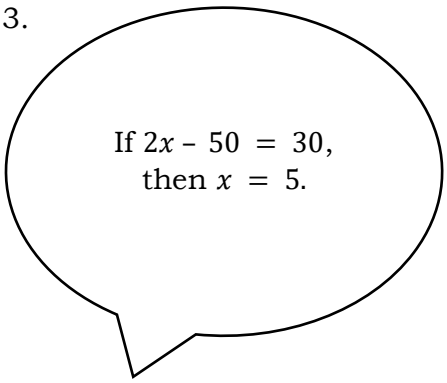
2.

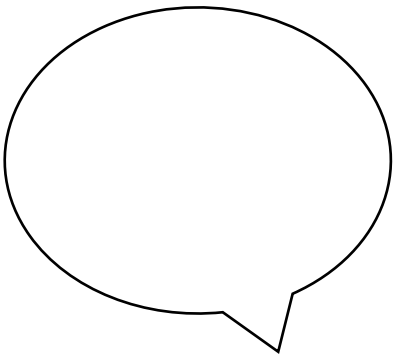




Reason: _____

3.





Reason: _____

Assessment

Post Assessment: Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. *If N is between M and O, then* <u>*MN + NO = MO*</u>. What do you call the underlined portion in this conditional statement?
   A. conclusion C. hypothesis
   B. converse D. inverse

2. What are the two parts of a conditional statement?
   A. converse and conclusion C. hypothesis and conclusion
   B. hypothesis and inverse D. inverse and converse

3. *If* <u>*the weather is nice*</u>*, then I will play outside.* What do you call the underlined portion in this conditional statement?
   A. conclusion C. hypothesis
   B. converse D. inverse

4. *If 2x - 7 = 13, then* <u>*x = 8.*</u> What do you call the underlined portion of the statement?
   A. conclusion C. hypothesis
   B. converse D. inverse

5. What letter denotes for the *if*-statement or hypothesis of a conditional statement?
   A. h C. p
   B. i D. q

6. What letter denotes for the *then*-statement or conclusion of a conditional statement?
   A. c C. q
   B. p D. t

7. *If a point is a midpoint of a segment, then it divides the segment into two equal parts.* What is the truth value of the conditional statement?
   A. False C. Not enough information was given
   B. True D. None of the above

8. What is the truth value of the statement when the hypothesis is false and conclusion is false?
   A. False C. Not enough information was given
   B. True D. None of the above

9. Given the statement, *"If circle is a polygon, then right angle measures 90°"*, what is its truth value?

   A. False
   B. True
   C. Cannot be determined
   D. None of the above

10. *If a polygon has 10 sides, then it is a decagon.* Which of the following represent/s the hypothesis in the above conditional statement?

   I. a polygon has 10 sides
   II. If a polygon has 10 sides
   III. it is a decagon
   IV. then it is a decagon

   A. I only
   B. I and II
   C. III only
   D. III and IV

11. *If it is raining outside, then the grass is wet.* Which of the following represent/s the conclusion of the statement?

   I. If it is raining outside
   II. it is raining outside
   III. then the grass is wet
   IV. the grass is wet

   A. I and II
   B. II only
   C. III and IV
   D. IV only

12. Which of the following statements is true?
   A. The conclusion of an if-then statement refers to the given information or condition.
   B. The conclusion of an if-then statement refers to the result of the given information or condition.
   C. The hypothesis of an if-then statement refers to the result of the given information or condition.
   D. The hypothesis of an if-then statement is the clause that follows "then".

13. Given that p is the hypothesis and q is the conclusion, then $p \rightarrow q$ is false when

   A. p is true and q is true
   B. p is true and q is false
   C. p is false and q is true
   D. p is false and q is false

14. Evaluate the truth value of the statement, *"If a square is a rectangle, then rectangle is a square".*
   A. True, because both the hypothesis and conclusion are true.
   B. False, because both the hypothesis and conclusion are false.
   C. True, because the hypothesis is true though the conclusion is false.
   D. False, because although the hypothesis is true but the conclusion is false.

15. Which of the following is NOT true about conditional statement?
   A. It is composed of the *if-,* and *then-,* clauses.
   B. It can be stated in the form of "*If p then q*" statement.

C. It can only be false if the hypothesis is true and the conclusion is false.
D. It can only be false if both the hypothesis and conclusion are false.

Additional Activities

Directions: Fill in the blank. Provide conclusion or hypothesis that will complete the story.

Condition Statement Children's Book
By: Riquel Brager

If you don't go to bed on time, then _____.

If you won't wake up on time, then you will miss the bus.

If _____, then your mom will have to take you to school.

If your mom takes you to school, then you will be tardy.

If _____, then you will miss class work.

If you miss class work, then _____.

If you stay for tutoring, then you will get home late.

If _____, then you will start your homework late.

Answer Key

What I know

1. B
2. C
3. A
4. B
5. D
6. A
7. A
8. D
9. A
10. C
11. A
12. B
13. A
14. A
15. C

What's In

1. Php 22.50
2. 500 meters
3. Php 40.00

What's New

Input	Output
I studied for my math test.	I got a good grade.
It was raining.	We need to use umbrella.
People are exposed to germs.	People get sick.
She told my secret.	I felt sad and betrayed.
Mom was in the kitchen cooking all afternoon.	The family enjoyed delicious food for dinner.

What's More

Activity 1:

1. H: Two lines form right angles.
   C: The lines are perpendicular.
2. H: x + 20 = 32
   C: x = 12
3. H: You are a third year high school student.
   C: You are a junior high school student.
4. H: An angle has a measure of 20°
   C: It is acute.
5. H: A figure is a square.
   C: It is quadrilateral.
6. H: A number is a whole number.
   C: It is an integer.
7. H: A truck weighs 3 tons.
   C: It weighs 6000 pounds.

Activity 2:

1. p – true; q - false
2. p – false; q - false
3. p – true; q - false
4. p – true; q- false
5. p – true; q - true

Activity 3:

p	q	p → q
T	T	T
T	T	T
T	T	T
T	T	T
T	T	T
T	T	T

What I Have Learned

1. Conditional Statement/ If-then Statement
2. if-clause
3. then-clause
4. if p, then q.
5. Hypothesis
6. Conclusion
7. Truth Value
8. Truth Table
9. True
10. False

Assessment

1. A
2. C
3. C
4. A
5. C
6. C
7. B
8. B
9. B
10. A
11. D
12. B
13. B
14. D
15. D

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