PIVOT 4A
LEARNER'S MATERIAL

QUARTER 2
Mathematics
G8

MELC based SLM

DepEd CALABARZON
Curriculum and Learning Management Division

This module was carefully examined and revised in accordance with the standards prescribed by the DepEd Regional Office 4A and CLMD CALABARZON. All parts and sections of the module are assured not to have violated any rules stated in the Intellectual Property Rights for learning standards.

The Editors

PIVOT 4A Learner's Material
Quarter 2
First Edition, 2020

Mathematics

Grade 8

Job S. Zape, Jr.
PIVOT 4A Instructional Design & Development Lead

Jisela N. Ulpina
Content Creator & Writer

Jhonathan S. Cadavido & Angelo D. Uy
Internal Reviewer & Editor

Lhovie A. Cauilan & Jael Faith T. Ledesma
Layout Artist & Illustrator

Jhucel A. del Rosario & Melanie Mae N. Moreno
Graphic Artist & Cover Designer

Ephraim L. Gibas
IT & Logistics

Crist John Pastor
External Reviewer & Language Editor

Published by: Department of Education Region IV-A CALABARZON
Regional Director: Wilfredo E. Cabral
Assistant Regional Director: Ruth L. Fuentes

Guide in Using PIVOT 4A Learner's Material

For the Parents/Guardians

This module aims to assist you, dear parents, guardians, or siblings of the learners, to understand how materials and activities are used in the new normal. It is designed to provide information, activities, and new learning that learners need to work on.

Activities presented in this module are based on the Most Essential Learning Competencies (MELCs) in **Mathematics** as prescribed by the Department of Education.

Further, this learning resource hopes to engage the learners in guided and independent learning activities at their own pace. Furthermore, this also aims to help learners acquire the essential 21st century skills while taking into consideration their needs and circumstances.

You are expected to assist the children in the tasks and ensure the learner's mastery of the subject matter. Be reminded that learners have to answer all the activities in their own notebook.

For the Learners

The module is designed to suit your needs and interests using the IDEA instructional process. This will help you attain the prescribed grade-level knowledge, skills, attitude, and values at your own pace outside the normal classroom setting.

The module is composed of different types of activities that are arranged according to graduated levels of difficulty—from simple to complex. You are expected to :

a. answer all activities on separate sheets of paper;

b. accomplish the **PIVOT Assessment Card for Learners on page 39** by providing the appropriate symbols that correspond to your personal assessment of your performance; and

c. submit the outputs to your respective teachers on the time and date agreed upon.

Parts of PIVOT 4A Learner's Material

	K to 12 Learning Delivery Process	Descriptions
Introduction	What I need to know	This part presents the MELC/s and the desired learning outcomes for the day or week, purpose of the lesson, core content and relevant samples. This maximizes awareness of his/her own knowledge as regards content and skills required for the lesson.
	What is new	
Development	What I know	This part presents activities, tasks and contents of value and interest to learner. This exposes him/her on what he/she knew, what he/she does not know and what he/she wants to know and learn. Most of the activities and tasks simply and directly revolve around the concepts of developing mastery of the target skills or MELC/s.
	What is in	
	What is it	
Engagement	What is more	In this part, the learner engages in various tasks and opportunities in building his/her knowledge, skills and attitude/values (KSAVs) to meaningfully connect his/her concepts after doing the tasks in the D part. This also exposes him/her to real life situations/tasks that shall: ignite his/ her interests to meet the expectation; make his/her performance satisfactory; and/or produce a product or performance which will help him/her fully understand the target skills and concepts .
	What I can do	
	What else I can do	
Assimilation	What I have learned	This part brings the learner to a process where he/she shall demonstrate ideas, interpretation, mindset or values and create pieces of information that will form part of his/her knowledge in reflecting, relating or using them effectively in any situation or context. Also, this part encourages him/her in creating conceptual structures giving him/her the avenue to integrate new and old learnings.
	What I can achieve	

This module is a guide and a resource of information in understanding the Most Essential Learning Competencies (MELCs). Understanding the target contents and skills can be further enriched thru the K to 12 Learning Materials and other supplementary materials such as Worktexts and Textbooks provided by schools and/or Schools Division Offices, and thru other learning delivery modalities, including radio-based instruction (RBI) and TV-based instruction (TVI).

WEEK 1

Linear Inequality in Two Variables

Lesson

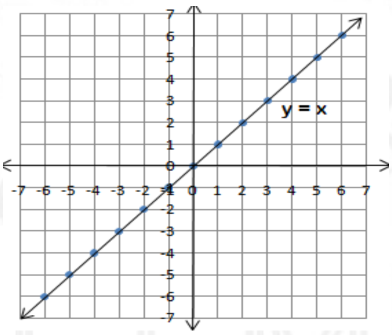
I

During the first quarter you learned about Linear Equation in two variables., which is in the form od y = mx = b or Ax + By = C The graph of the linear equation is a line, meaning all the points that belong to the line are the solutions of the equation.

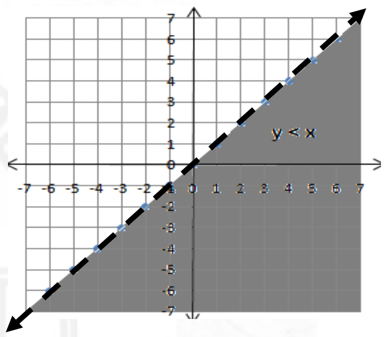
Today's lesson is on Linear Inequality in two variables where in the graph is not a line but a region. Remember that in inequality, the relational symbols are <, >, ≥ or ≤.

Below are the graphs of an equation and inequalities.

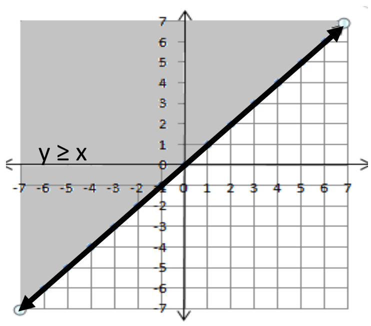
Graph of : $y = x$



Graph of : $y < x$



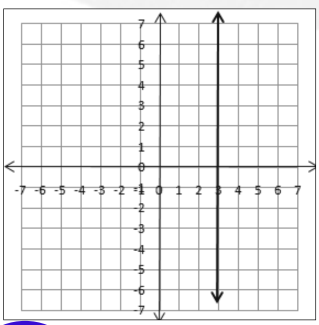
Graph of : $y \geq x$

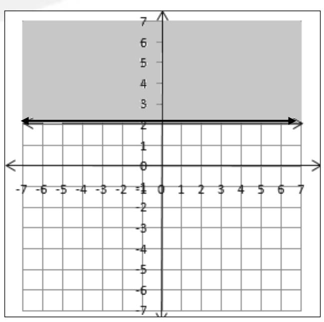


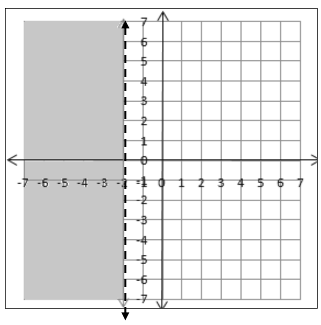
These are the different graphs of equation and inequalities. In inequality the line or the broken line separates the plane into two half planes. Half of the plane which is the shaded region is the solution set of the inequality. The broken line means that the points on the line are not included in the solution set of the inequality while the solid line means the points on the line are included in the solution set. The relational symbol in which the line is included in the solution set is either ≤ or ≥.

Learning Task 1

Give the equation or inequality described by each graph.

1. 

2. 

3. 

D

You can present the solution of linear inequality in two variables by graphical form. To graph, here are some steps:

1. Write first the inequality in equation form.

2. Determine the x and y intercepts or find any two points that will satisfy the equation .
3. Connect the points by a line or broken line depending on the inequality symbol.
4. Choose a test point on either side of the line and substitute to the inequality to determine if which point may satisfy the inequality.
5. Shade the regions where the point that satisfies the inequality belong.

Examples:

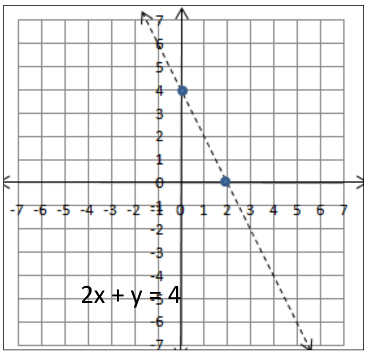
1. Graph $2x + y < 4$

   Solution: $2x + y = 4$

   Solve for x and y intercepts: Let $x = 0$; $y = 4$, the point is (0,4)

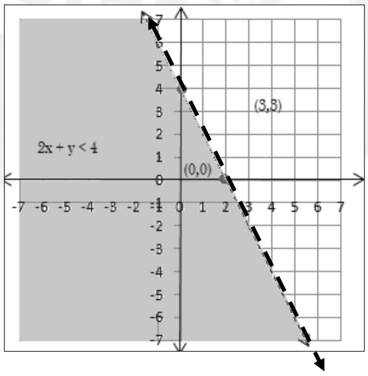
   Let $y = 0$; $2x + 0 = 4$; $x = 2$, the point is (2,0)

   Graph: Since the inequality is less than then the line is a broken line.



Choose a test point fro both sides of the line. Suppose you take (3, 3) on the upper half of the plane and (0,0) on the lower part. Substitute these ordered pairs one at a time to the given inequality.

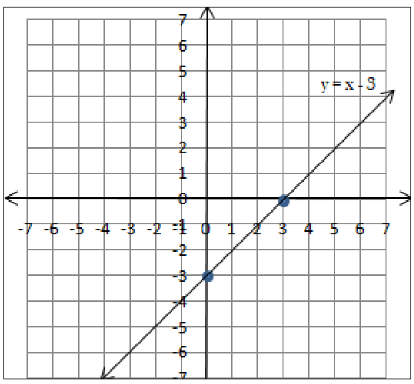
For (3,3)	For (0,0)
$2x + y < 4$	$2x + y < 4$
$2(3) + 3 < 4$	$2(0) + 0 < 4$
$6 + 3 < 4$ is false	$0 + 0 < 4$ is true



Therefore the half plane that should be shaded is the plane containing the point (0,0). All the points below the broken line are solutions of the inequality $2x + y < 4$.

2. Find the solution of the inequality $y \geq x - 3$.

   Solution: Change the inequality to equation first to find two points or the x and y - intercepts. Solving for the x and y– intercepts, let $x = 0$, therefore $y = -3$, the y intercept is at point (0,-3). Let $y = 0$, therefore $x = 3$, the x– intercept is at point (3, 0). Plot the two points and draw the line to divide the pane into half planes. Since the inequality is greater than and equal to (≥), the line is a solid line. Now, you choose two points both sides of the line and test which point will satisfy the inequality. Suppose the points are (0,-5)

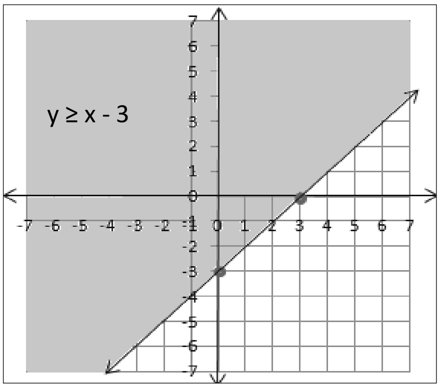


For (0, -5) For (0,0)

$y \geq x - 3$ $y \geq x - 3$

$-5 \geq 0 - 3$ $0 \geq 0 - 3$

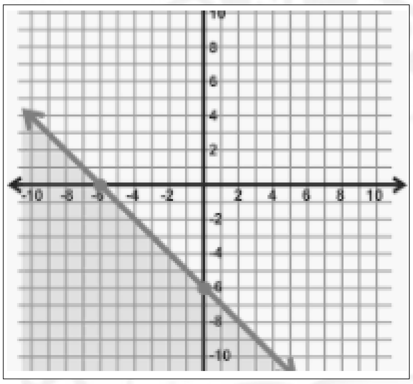
$-5 \geq -3$ is false $0 \geq -3$ is true



Hence the region to be shaded is the region where the point (0,0) belongs. The solution set of the inequality includes all points on the line and the points above the line.

Given the inequality you can find the solution by graphing. This time you have to find the inequality given the graph.

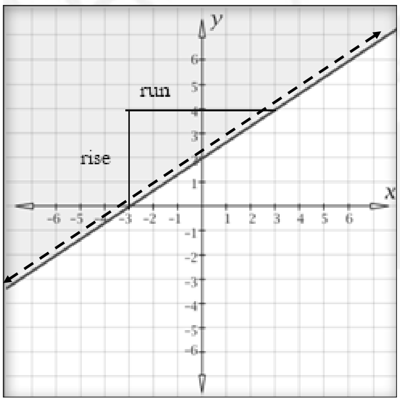
Example. Find the inequality described by the graph.



First, find the equation of the line. Find the slope of the line $m = \frac{rise}{run} = \frac{6}{-6} = -1$. The y-intercept $b = -6$. Hence the equation of the line in slope intercept form is $y = -x - 6$. To determine the inequality, take one point from the shaded region and substitute it to the equation. Suppose the point is (-8,-4). $-4 = -(-8) - 6$

$-4 \neq 8 - 6$ but $-4 < 2$. Since the line is a solid line then the inequality is $y \leq -x - 6$ or $y + x \leq -6$

2. What is the inequality whose graph is:



The slope of the line is $m = \frac{rise}{run} = \frac{4}{6} = \frac{2}{3}$ and the y-intercept is at $b = 2$. The equation of the broken line is $y \frac{2}{3} x + 2$ .To make the coefficients whole numbers, multiply the whole equation by the denominator. Thus the equation is $3y = 2x + 6$ or $3y - 2x = 6$. Now take a test point from the region to determine the inequality. Take (-3, 3), then substitute to the equation. $3(3) - 2(-3) = 6$. $9 + 6 = 6$; $15 \neq 6$ but $15 > 6$. Therefore the inequality is $3y - 2x > 6$.

Learning Task 2.

Choose two ordered pair that will satisfy the inequality

1. $y < x + 3$; (2, 5), (5, 2), (-5, -5), (4, 0)
2. $3x + y > 10$; (-1, 2), (1, 10) , (3, 1), (3, 3)
3. $2y + x \geq 5$; (1, 2), (0,4), (2,2), (-1, -5)
4. $3x - 2y \leq 10$; (5,1), (0,-5), (-1, -6), (10, 2)
5. $5x + 3y > 15$; (2,1), (-3, 1), (0, 6), (2, 2)

E

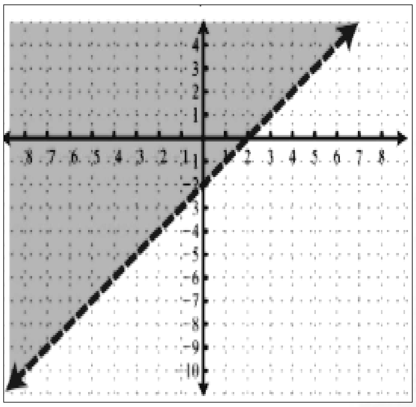
Learning Task 3

A. Graph the inequalities:

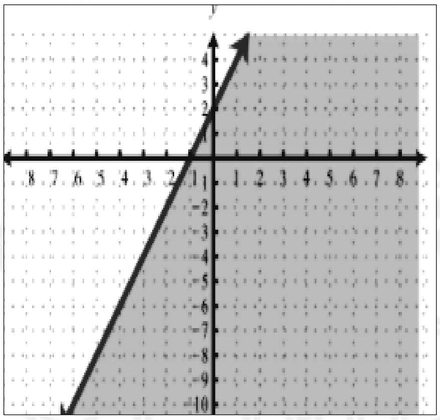
1. $y \leq x + 4$
2. $y + 2x < 5$
3. $x - 4y \geq 6$
4. $3x - 4y + 5 > 0$
5. $2x - y < 3$

B. Determine the inequality of the graphs.

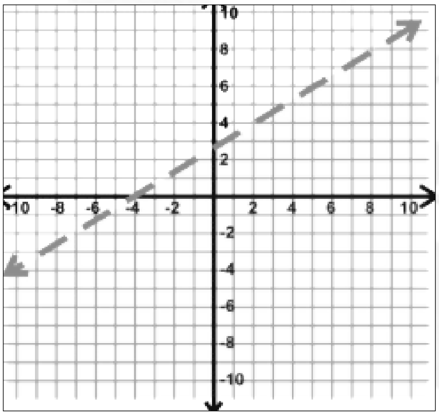
1.



2.



3.



A

Learning Task 4

1. Graph the two inequalities on the same coordinate plane.

   $y > x + 3$ and $y \geq -2x + 1$

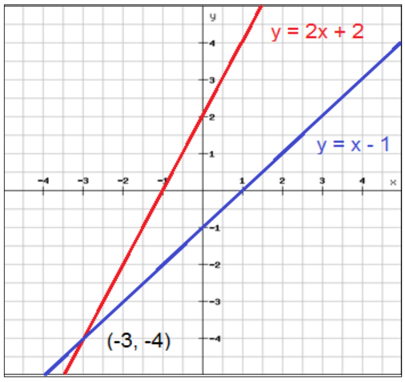
2. Shade the region where the graphs overlap.
3. Give at least 3 points that are both solutions of the two inequalities.
4. In what region in the rectangular plane can you find the solutions of both inequalities?

WEEKS
2

Systems of Linear Inequalities in Two Variables

I

Lesson



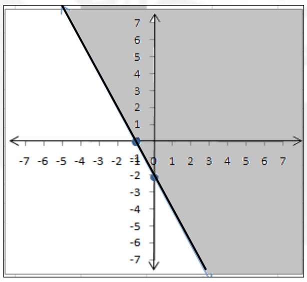
The graph of Linear Equation in two variables is a line. The solution of Systems of Equations is a point. It is the intersection of the two lines. The point of intersection is the ordered pair (x, y) which satisfies both Linear equation. At the right are graphs of the systems of equations $y = 2x + 2$ and $y = x - 1$. The lines intersects at (-3, -4). Thus, the solution of the Systems of equations is (-3,-4).

For this lesson you will be finding the solution set of the systems of inequalities in two variables. Same as Systems of Linear Equations , the Systems of Linear inequalities can be solved and graphically. In your lesson last week, you graph linear inequalities in two variables. The solution of the inequality is either the half plane below the line or above the line. The line can either be solid, when the inequality is less than and equal to or greater than and equal to or broken line, when the inequality is less than or greater than.

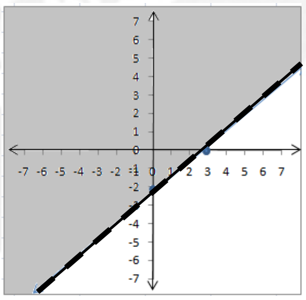
Learning Task 1

Match the inequality to the graph

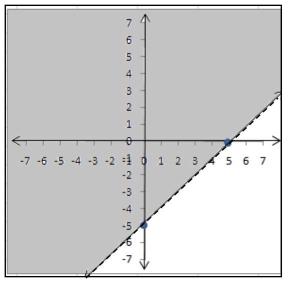
1. $y > x - 5$ 2. $2x + y \geq -2$ 3. $2x - 3y < 6$



A



B



C

D

The solution of systems of linear inequalities are the points or set of ordered pairs that satisfy both inequalities. It is where shaded region regions of each inequality overlap.

Examples:

Fin the solution set the systems of inequalities:

1. $y \geq x + 3$
   $y \leq -2x + 4$
2. $y > x - 1$
   $y \leq -2$
3. $x - 2y \leq -4$
   $6y \leq 3x + 2$

Solutions:

1. Find the x and y intercepts of each inequality.

$y \le x + 3$ and $y \ge -2x + 4$

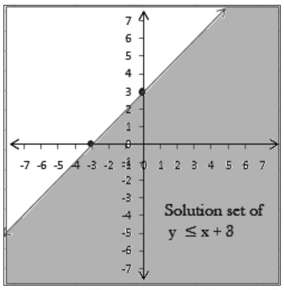
$x = 0, y = 3$; $x = 0, y = 4$

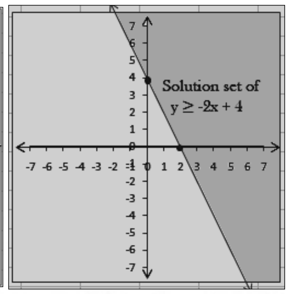
$y = 0, x = -3$; $y = 0, x = 2$

The points are (0, 3) and (-3, 0) ; The points are (0, 4) and (2, 0)

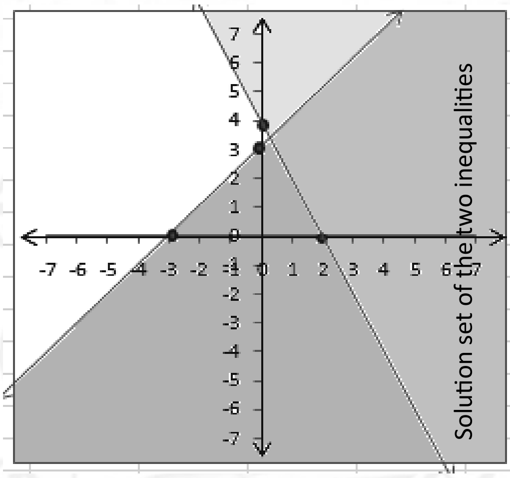
Test point: (0,0) ; Test point: (5,2)

Graphs





These points makes the inequality true. As you can see in the graphs the solution set of each inequality is the shaded region. What you are going to determine now are the points that will make both inequalities true. When you graph these inequalities in one coordinate plane , there is a part in their regions that will overlap. The portion where the two graphs overlap is the solution set of the two inequalities. Meaning any point on that region will satisfy both the inequalities. Like ordered pairs (4,2), (5, -3), (6,2), (7,-2) are some points that belong to the solution set of the two inequalities.



Solution 2.

Find the x and y intercepts of the inequalities:

$y > x - 1$ and $y \le -2$

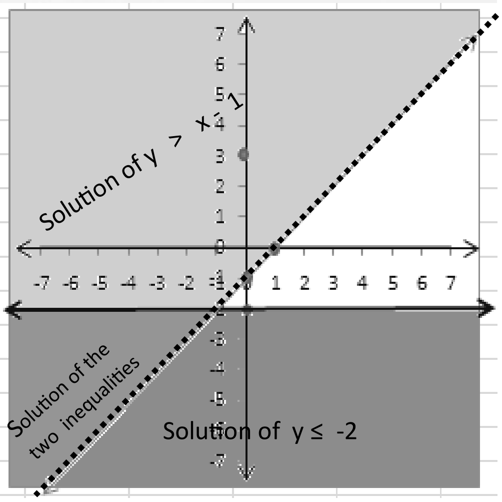
If $x = 0, y = -1$; There is no x– intercept.

If $y = 0, x = 1$; The y –intercept is (0,-2)

The points are

(0, -1) and (1, 0)

The test point is (0,0). This makes the inequality true. The solution set is the region bounded by the lines of the two inequalities.



Some points that belong to the solution set of the two inequalities are (-7, -7), (-7, 4); (-5, -4) , (3, 2). However (-2 , 5) does not belong to the solution of the systems of inequalities . It belongs to the solution set of $y \le -2$. Same as (2,4) it not a solution of the two inequalities but the solution of $y > x - 1$.

Solution 3.

Find the x and y intercepts

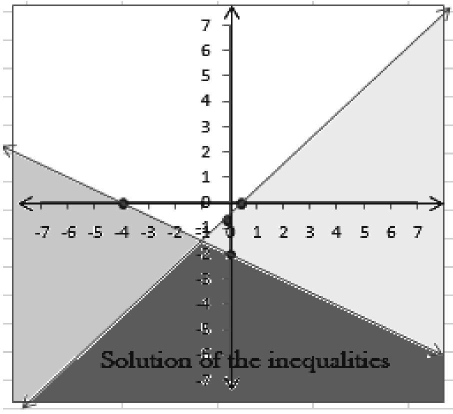
$x - 2y \leq -4$ and $6y \geq 3x + 2$

If $x = 0$, $y = -2$ | If $x = 0$, $y = 1/3$

If $y = 0$, $x = -4$ | If $y = 0$, $x = -2/3$

The points are | The points are

(0,-2) and (-4,0) | (0,1/3) and (-2/3, 0)



Some of the points on the solution set are (3,-4), (-3, -5), (0, -3) and many more. (6, 1) is a solution of the inequality $6y \geq 3x + 2$ while (-7, -2) is one of the solutions of $x - 2y \leq -4$.

E

Learning Task 2

Graph the following inequalities and identify at least 3 points that belong to the solution set of the inequalities.

1. $x > -2$ and $y < -1$
2. $2y + x < 5$ and $3x - y > 8$
3. $2x + 3y \geq 4$ and $2x - y < 5$
4. $y \geq 2x + 1$ and $y < -x + 1$
5. $y \geq 2x + 3$ and $y < 2x - 4$

A

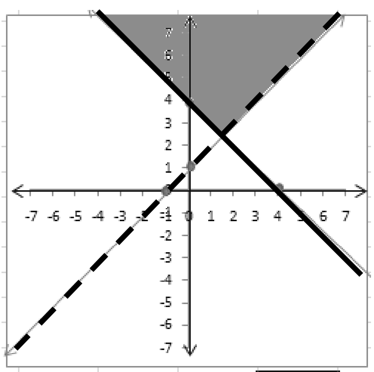
Learning Task 3:

A. Answer the following.

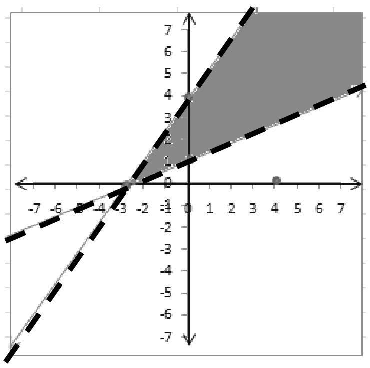
1. In a given graph, how do you identify the solution set of the systems of inequalities?
2. When is the boundary of an inequality a broken line? or a solid line?
3. When does a systems on inequalities have no solution?

B. Write the systems of inequalities whose shaded region is the solution set.

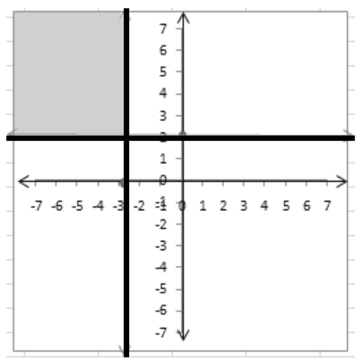
1.



2.



3.



Relation and Function

I Lesson

The standard form of the equation of the line is Ax + By = C. To graph the line you need to find ordered pairs (x, y) that will satisfy the given equation. Hence , there is a relation that exist between these two elements, that one may be dependent to the other. The first element, x of the ordered pair is called the **abscissa** and the second element, y is called the **ordinate**. The set of abscissa is the **domain** and the set of ordinate is the **range**. Thus, a **relation** is a set of ordered pairs. A relation between the domain and range can be presented in different ways.

A. **Arrow Diagram**. Through arrow diagram you can easily determine if it illustrates a relation or function.

Examples:

1. Domain (Name of Teacher) — correspondence (Month that a Person is Born) — Range (Birth Month)

Domain		Range
Mr. Cruz	→	May
Ms Santos	→	January
Ms Delos Reyes	→	May
Mr. Zape	→	June

There are two elements in the domain that corresponds to only one element in the range. The correspondence is many to one. This is a function.

2. Domain (Name of Student) — Correspondence (Student's Age) — Range (Age)

Domain		Range
Jane	→	15
Joy	→	16
James	→	17

Every element in the domain is paired to only one element in the range. The correspondence is one to one and this is a function.

3. Domain (Name of Head Of the Family) — Correspondence (Person's Profession) — Range (Profession)

Domain		Range
Jaypee	→	Teacher
Nathan	→	Teacher
Job	→	Engineer
Romyr	→	Engineer

More than one element in the domain is paired to only one element in the range. The correspondence is many to one. This is only a relation.

B. **Ordered Pairs.** This is a set of x and y pair. x is always the first element or the domain and y is the second element or range.

Examples:

Let the domain be set of numbers { 1, 2, 3, 4, 5}. Make set of ordered pairs that: A= range is twice the domain C = range is greater than the domain

B = range is one more than the domain

Set A = { (1, 2), (2, 4), (3, 6), (4, 8), (5,10))

Set B = { (1, 2), (2, 3), (3, 4), (4, 5), (5, 6)}

Set C = {(1, 2), (1,3), (2, 3), (2, 7)… (5, 6)}

Sets A and B are both functions. The correspondence is one to one. Set C is a relation, the correspondence is many to many.

The range is the dependent variable. Its value depends upon the value of the domain.

C. **Tables and Equations.** The relationship between the domain and range can be illustrated using table of values or equation.

Example:

1. Construct table of values that will illustrate the costs of number of notebooks if the price is P 12.00.

   Let x be the number of notebook and y the cost of the notebooks

x	1	2	3	4	…	x
y	12	24	36	48		12x

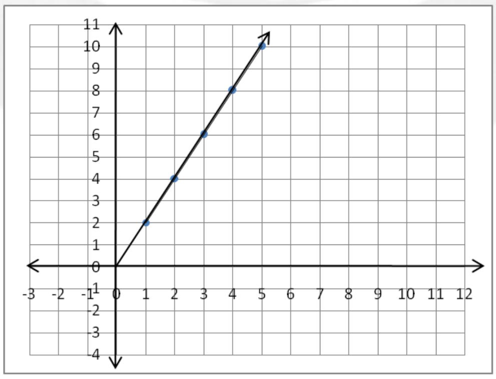
Equation is: $y = 12x$.

The total cost is dependent to the number of notebooks. The dependent variable is y and the independent variable is x. You can get the total cost of the notebook (y) if you supply the number of notebook (x).

D. **Graph.** Functions or relations can be illustrated through graphs. You can graph by plotting the points on the rectangular coordinate plane. You can take the points from the set of ordered pairs, table of values or equation or vice versa.

Example:

1. Let us graph the ordered pairs in set A above.



Similarly you can derived set of ordered pairs, table of values from the graph. Since the graph was taken from the ordered pairs in set A. you can construct the table of values.

Domain (x)	1	2	3	…	x
Range (y)	2	4	6		2x

Equation: $y = 2x$

Learning Task 1:

A. Identify the domain and range and determine it is a function or relation.

Set of Ordered Pairs	Domain	Range	Relation/Function
{(5,4), (4,3), (3,2), (3,1)}			
{(-2,3), (-1, 3), (2, 1) (1,1)}			
(-1, 1),(0,0),(1,1),(-2,4), (2,4)}			

B. Given the set of domain D = { -3, -2, -1, 0, 1, 2, 3}

Construct /Do the following:

1. Set of ordered pairs such that the range is one less than the domain.
2. Construct table of values such that the range is 2 more than the domain.
3. Write the equation for numbers 1 and 2.
4. Graph numbers 1 and 2 on separate coordinate plane.

D

Remember that all functions are relations but not all relations are functions. An equation in two variables represents a function if the exponents of the variables are positive integral exponents.

Function	Not Function
1. $y = 2x - 5$	$y = \sqrt{x} + 4$ ($\sqrt{x} = x^{\frac{1}{2}}$, the exponent is not an integer)
2. $y = x^4 - 2x + \sqrt{3}$	$y = 3x^{-2} + 1$ (the exponent is not a positive integer.

When you talk of function, you commonly use letter ***f*** to denote function and x for the variable. However you can use other letters to denote function except for x and y to avoid confusion. When you sat that y is a function of x , you can write it as y = ***f(x)*** or y = ***p(x)*** . ***f(x)*** is read as "*f of x*" , p(x) is read as " *p of x.*" Thesee are called function notation. This means that y is a function of x and that y depends on x. The **dependent variable is y or f(x)** and the **independent variable is x.**

Examples:

1. Write in function notation form:

(a) $y = 3x + 6$ (b) $-x + y - 1 = 0$

Solution:

(a) Change y to a function of x: $f(x) = 3x + 6$

(b) Change the equation to slope intercept form: $y = x + 1$

Change y to a function of x: $g(x) = x + 1$

Since y is dependent to x, you can find the value of the function given the value of x.

Example: 1. Given: $f(x) = 3x + 6$. Find (a) f(2) b) f (-3)

Solution: f(2) means you replace x with 2 and f(-3), you replace x with –3

$f(x) = 3x + 6$ $f(x) = 3x + 6$

$f(2) = 3(2) + 6$ $f(-3) = 3(-3) + 6$

$= 12$ $= -3$

This means that, when x = 2, y = 12 . You can write it as f(2) = 12 or as an ordered pair (2, 12). When x = - 3, y = -3 or f(-3)=-3 and writing it as an ordered pair it is (-3, -3).

Example 2. If the area of the rectangle is $A(x) = 4x^2 - 3x + 10$. Find the are if x = 5.

Solution: Find A(5)

$$A(x) = 4x^2 - 3x + 10 \longrightarrow A(5) = 4(5^2) - 3(5) + 10$$

$$= 100 - 15 + 10$$

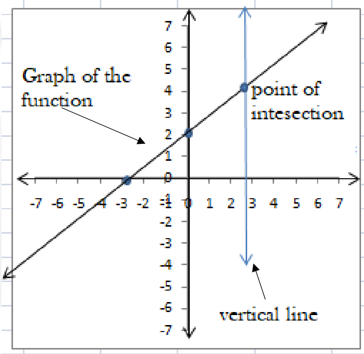
$$A(5) = 95 \text{ square units.}$$

The ordered pair is (5, 95)

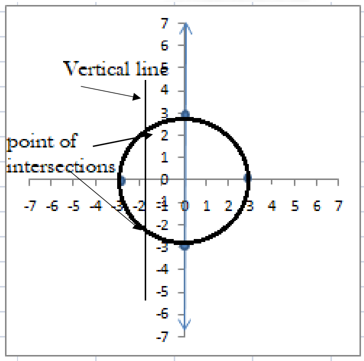
In the previous discussion, you've learned that the correspondence between the x and y pair of a function is either one to one or many to one correspondence . By looking at the ordered pairs, or table of values, if every one element in the domain is paired to exactly one element in the range or for 2 or more elements in the domain is paired to exactly one range, then it's a function.

For graphs you can use the **vertical line test**. If you draw a vertical line to the graph and intersects the graph in to two or more points then the graph is not a graph of a function.

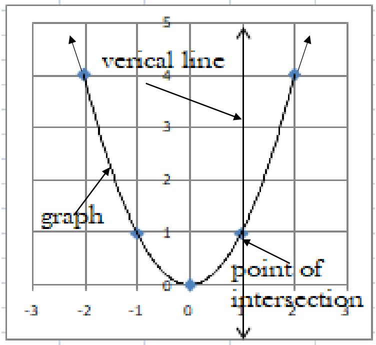
Examples.



The graph is a function. There is only one point of intersection between the graph and the vertical line.



The graph is a not a function. The vertical line intersects the circle in two points.



The graph is a function. The vertical line intersects the graph at exactly one point.

From these graphs you will be able to determine the domain and the range.

The first graph is a line that can be extended in both direction. Thus the domain is the set of all real numbers so as the range. You can write it as D ={x/x $\in \Re$ } read as "set of all x such that x is an element of real numbers while range is R={y/y $\in \Re$ }.

The second graph is a circle with radius fixed to 3 units. From the graph the values of x is from –3 to positive 3 and range or y values are from –3 to 3. Hence, the domain D = {x/ -3 ≤ x ≤ 3} and the range R = {y/ -3 ≤ y ≤ 3} .

The third graph is a parabola. As you observe , the graph can be extended upward for any values of x , there is always a corresponding value of positive y. Thus, the domain D = { x / $x \in \Re$} while the range R = { y/ y ≥ 0}.

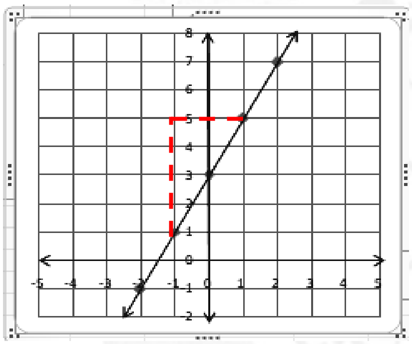
In quarter 1, you graphed linear equation in two variables in the form of y = mx + b. This can be written in function notation as f(x) = mx + b which is the form of a linear function. When you graph the linear equation in two variables and the linear function both will give you the same line.

Examples:

1. Graph f(x) = 2x + 3

Solution: Solve for ordered pairs.

x	f(x)	(x, f(x)
-2	-1	(-2, -1)
-1	1	(-1. 1)
0	3	(0,3)
1	5	(1, 5)
2	7	(2,7)

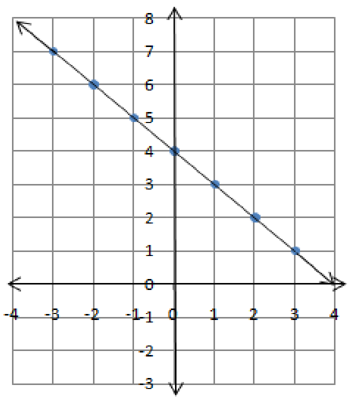


You can determine the slope m = $\frac{rise}{run}$ from the graph.

From point (-1,1) to point (1,5) determine the rise and the run. The rise = 4 and run = 2. The slope m = 2

The slope is positive when the line rises to the right. If the line falls to the right, the slope is negative.

2. Given the graph of the function. Construct table of values and determine the function.



You use the coordinates of the points in constructing table of values.

x	-3	-2	-1	0	1	2
y= f(x)	7	6	5	4	3	2

To find the function, determine the slope and the y-intercept. In the graph , the y-intercept (b) is 4. Instead of using the $\frac{rise}{run}$ to find the slope you can the slope formula m = $\frac{y_2 - y_1}{x_2 - x_1}$. Choosing any two points you can solve for the slope. Suppose you choose the ordered pairs (-3,7) and (0,4). The slope is

$m = \frac{y_2 - y_2}{x_2 - x_1} = \frac{4-7}{0-(-3)} = \frac{-3}{3} = -1$. Using the slope intercept form of a line y = mx + b, the function is f(x) = -x + 4. You can check by substituting any value of x to the function. Suppose you use -2 as the value of x, then f(-2) = -(-2) + 4 = 2 + 4 = 6

Learning Task 2:

A. (a) Tell whether the given set of ordered pairs, table of values, arrow diagram or graph is a function or simply relation. (b) Identify also the domain and range. (c) If it is a function write the equation in function notation form.

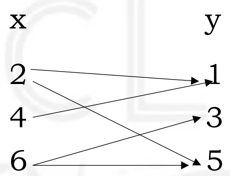
1. {(-2, -4), (-1, -3), (0, -2), (1,-1)}
2. {(4, 2)), (4, 0), (3, 3), (3, 5)}
3. {(-1, 0), (0, 1), (1, 2), (2, 3)}
4.

x	-3	-2	0	2	3
y	-2	-1	0	1	2

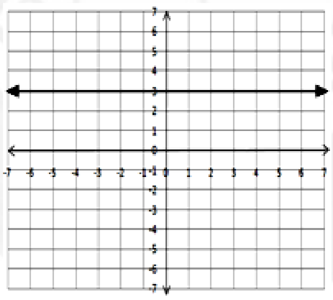
5.

x	1	2	3	4	5
y	1	2	3	4	5

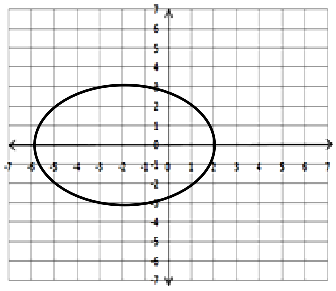
6.



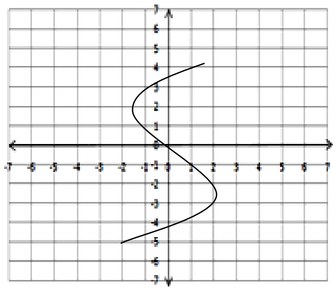
7.



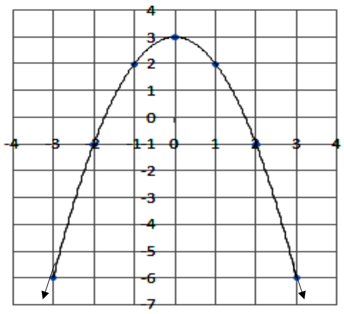
8.



9.



10.



B. Given the set of domain D = { -3, -2, -1, 0, 1, 2, 3, }, Construct table of values that will satisfy the following:

1. The range is 2 more than the domain.
2. The domain is one half the range.
3. The range is the square of the domain.
4. The range is thrice the domain decreased by 2.
5. The range is the domain.

C. Write the equation in function notation numbers 1 - 5 of letter B.

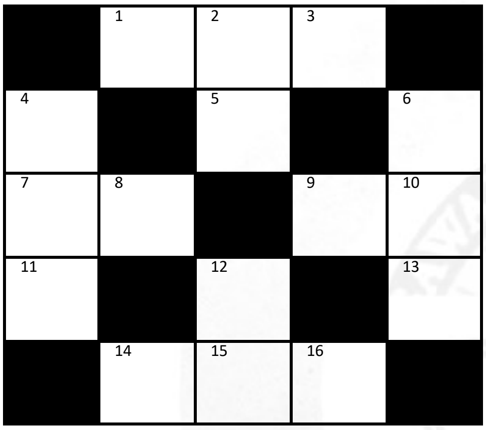
A

Learning Task 3:

A. Change the following into the form of f(x) = mx + b

1. y - 3x = 7
2. 2x + 4y = 8
3. -x + y = 5
4. y + 5 = -2x
5. 3x + 2y - 4 = 0

B. Complete the Cross Number Puzzle.



ACROSS

1. f(x) = $3x^2 + 8x - 5$; f(6)
7. f(x) = 8x + 10 ; f(8)
9. f(x) = $-x^3 + 2x^2 - 5x + 17$; f(-3)
14. f(x) = $-2x^3 + 7x^2 - 9x + 30$; f(-4)

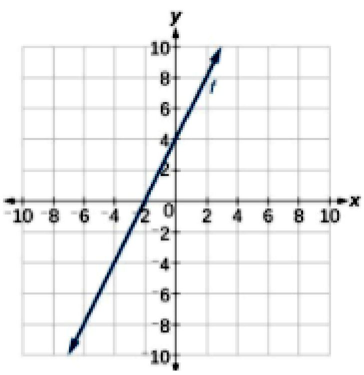
DOWN

2. g(x) = 5x - 3 ; g(11)
4. g(x) = $5x^2 - 11x - 8$; g(-5)
6. g(x) = $-5x^3 - 2x^2 - 9x + 20$; g(-3)
12. g(x) = $10x^6 + 4x^5 + 6$; g(1)

C. Graph the functions.

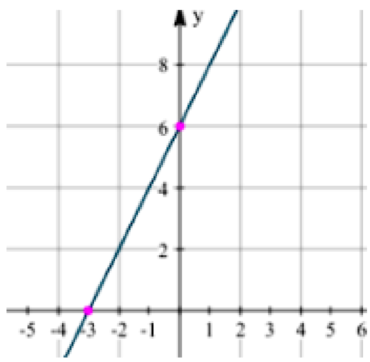
1. y - 3x = 7
2. 2x + 4y = 8
3. -x + y = 5
4. y + 5 = -2x
5. 3x + 2y - 4 = 0

D. Find the slope, x– intercepts, and y- intercepts and the equation of the line.

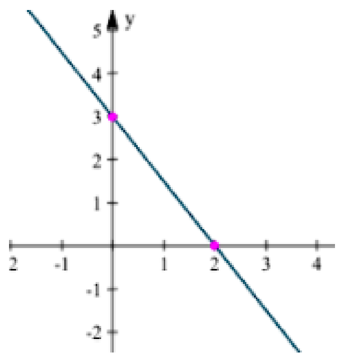


1.

3.



2.



WEEKS 5

Conditional Statements

I

Lesson

If you will study your lesson, **then** surely you will pass. This is a conditional statement. Conditional statement has two parts, the "**If**" which is the **hypothesis** and the "**then**" which is the **conclusion**. In the conditional statement you have to identify the hypothesis and the conclusion. There are instances that you may omit the word then but still you can identify the conclusion. The statement " If $2x = 12$, then $x = 6$." You may write it as "If $2x = 12$, $x = 6$." the hypothesis is $2x = 12$, the conclusion is $x = 6$.

D

Learning Task 1.

In the conditional statement, identify the hypothesis and conclusion.

1. If MJ is in Grade 8, then he is 14 years old.
2. It it's cloudy, it will rain.
3. If you will sleep early, then you will wake up early.
4. If an integer is divisible 5, the last digit must be 0 or 5.
5. If the triangle is equilateral, it is equiangular.

A conditional statement is also called an "If-then statement. It has a truth value of true or false. A conditional statement to be true, show that when hypothesis is true , the conclusion is also true, while to be false you need to have a counter example where hypothesis is true but the conclusion is false.

Examples:

1. If $3x = 24$, then $x = 8$.

   This is a true conditional statement since there is no other value of x that will make the equation $3x = 24$ true except 8.

Show that the conditional statements are false.

2. If $x^2 = 64$, then $x = 8$.

   The conditional statement is false since the conclusion have other value to make the statement true. The counterexample is -8 since $(-8)^2 = 64$.

3. If a figure has 4 equal sides, then it is a square.

   The conditional statement is false since rhombus is a figure with 4 equal sides, too.

You can also write simple statement into conditional statement.

Examples:

1. A rectangle has two pairs of parallel sides.

   Conditional Statement: "If the figure is a rectangle, then it has 2 pairs of parallel sides."

   Hypothesis: The figure is a rectangle

   Conclusion: It has 2 pairs of parallel sides.

2. The Number is prime , it has only two factors.

   Conditional Statement: If the number is prime, then it has only two factors.

   Hypothesis: the number is prime

   Conclusion: it has two factors

3. One half of a number is 12, the number is 24.

   Conditional Statement: If one half of the number is 12, then the number is 24.

   Hypothesis: One half of the number is 12

   Conclusion: the number is 12.

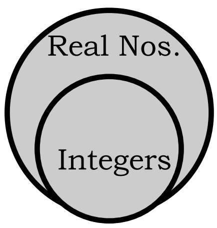
Venn Diagram can be used to illustrate Conditional Statement. Things that satisfies the hypothesis must be inside the things that satisfies the conclusion.

Examples:

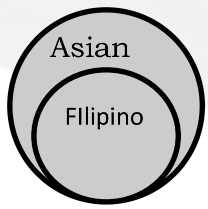
1. If a number is an integer, then it's a real number.
2. If you are a Filipino, then you are an Asian.

Solutions:

1.

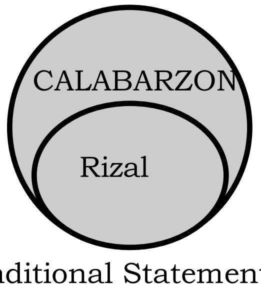


2.



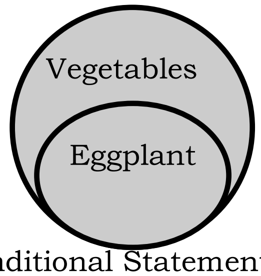
Write the conditional statement for the Venn Diagram

3.



Conditional Statement: " If you reside in Rizal, then you are from CALABARZON"

4.



Conditional Statement: " If you eat eggplant, then you eat vegetables."

E

Learning Task 2

A. Change the statements to an If-then or conditional statements. Identify the hypothesis and the conclusion.

1. You pass Grade 8, you will be in grade 9 next school year.
2. An equilateral triangle is equiangular.
3. All acute angles measures less than 90 degrees.
4. Circles with the same centers are concentric circles.
5. The freezing point of temperature in degree Celsius is zero.

B. Determine if the conditional Statement is true. If not give a counter example.

1. If three points are coplanar, they belong to the same plane.
2. If you are tall, you are a basketball player.
3. If two planes have no point in common, they are parallel.
4. If you travel in other country, then you need a visa
5. If a figure is a triangle, then the angles are acute.

A

Learning Task 3

A. Illustrate the following conditional statement in Venn Diagram

1. If it is a rectangle , it is a quadrilateral.
2. If you play violin, then you are a musician.
3. If frogs live in water, then they are amphibians
4. If it is a fraction, then it is rational number.
5. If it is an eagle, then it is a bird.

B. Interchange the conclusion and hypothesis. Will the resulting conditional statement true or false? Why?

If it is an eagle, then it's a bird.	If it's a bird, then it's an eagle.	The resulting statement is not true since not all birds are eagle.
If it is an equiangular, then its an equilateral		
If it is a rectangle, then it is a quadrilateral		

The Biconditional, Inverse, Converse and Contrapositive Statements.

WEEKS 6-7

I

Lesson

You have learned that conditional statements are true if the hypothesis and conclusion are both true. If we interchange the conclusion and the hypothesis will the resulting conditional statement be true?

In this lesson you will be able to make a **converse statement** from the given conditional statement. The same way an **inverse** and a **contrapositive** statement can be derived from the conditional statement.

Learning Task 1: Do the following:

(a) Determine if the given conditional statement is true.

(b) Switch the hypothesis and the conclusion and determine if the resulting statement is also true.

(c) Write the hypothesis and the conclusion in negative form

1. If the triangle is equilateral, then it is equiangular.
2. If a polygon has exactly four sides, then it is a quadrilateral.
3. If a man is honest, he does not steal.
4. If two angles are supplementary then the sum of the of the measure of the angles is 180°
5. If a volcano is active, then it will erupt.

D

When you switch the hypothesis and conclusion of a conditional statement, you form a **converse statement**.

Examples:

1. Conditional Statement: If the triangle is equilateral, then it is equiangular.

   Converse: If the triangle is equiangular, then it is equilateral.

2. Conditional Statement: If a man is honest, he does not steal.

   Converse: If a man does not steal, he is honest.

The conditional statement is true. An equiangular triangle is always equilateral triangle. The converse is also true. An equilateral triangle is always equiangular. Since both conditional and converse statements are true, you can connect the phrases by "if and only if " (iff) . Thus, it forms a biconditional statements.

Biconditional Statement: A triangle is equilateral if and only if it is equiangular. The words "if and only if" implies that both conditional and inverse statements are true.

The second example both conditional and converse statements are true. Thus, the biconditional statement is: A man is honest if and only if he does not steal.

Given a biconditional statement, you can split it into conditional statement an its converse.

Examples:

1. Biconditional Statement : Two angles are complementary if and only if the sum of their measure is 90^0

   Conditional Statement: If two angles are complementary, then the sum of their measure is 90^0

   Converse Statement: If the sum of the measures of two angles is 90^o , the they are complementary.

   Both the conditional ns converse statements are true.

Aside from forming a converse statement from conditional statement, you can also form the inverse statement. An **inverse statement** can be formed by negating the hypothesis and the conclusion of the conditional statement. When you negate the converse statement, you form a **contrapositive statement**.

Example 1: A polygon with exactly 4 sides ia a quadrilateral

Conditional	If a polygon has exactly four sides, then it is a quadrilateral.
Inverse	If a polygon does not have exactly 4 side; then it is not a quadrilateral.
Converse	If a polygon is quadrilateral, then it has exactly 4 sides.
Contrapositive	If a polygon is not a quadrilateral, then it does not have exactly 4 sides.

Example 2: Two line segments of equal length are congruent.

Conditional	If two line segments are equal in length, then they are congruent
Inverse	If two line segments are not equal in length, then they are not
Converse	If two lines segments are congruent, then they have equal lengths.
Contrapositive	If two line segments are not congruent, then their lengths are

Learning Task 2

Answer the following:

1. What are the parts of conditional statement?
2. How do you write a converse statement?
3. When can you write a conditional statement into biconditional statement?
4. How do you write inverse statements?
5. If you negate converse statement what do you call the resulting statement?

E

Learning Task 3

A. Write each sentence as:

(a) Conditional Statement (c) Inverse Statement

(b) Converse Statement (d) Contrapositive Statement

1. Vegetables are good for your health.
2. $3x + 8 = 14, x = 2$
3. A right triangle has a 90^0 angle.
4. An eagle is a bird.
5. A whale is a mammal.
6. Two circle with equal diameters are congruent.
7. An angle that measures between 90 and 180 degrees is obtuse angle.
8. Two planes with no common point are parallel.
9. Carrot is rich in Vitamin A.
10. All reptiles have scales.

B. Determine which statements in A both the conditional and converse statements are true. Write it in biconditional statement.

A

Learning Task 4: Given the biconditional statement, write the conditional statement and its converse.

1. A point is the mid point of a segment if and only if it divides the segment into two equal parts.
2. $4x - 5 = 23$ if and only if $x = 7$
3. The quadrilateral has four congruent sides and angles if and only if the quadrilateral is a square.

WEEK 8

Proofs

I

Lesson

Reasoning is a logical way of thinking. Sometimes, you based your reasoning from different data gathered or from the given arguments. To reason out means to give conclusion or proof to establish a fact or the truth of a statement.

In your previous lesson, you learned the two parts of conditional statement, the hypothesis and conclusion. You can write conditional statement symbolically. You can use letter to represent hypothesis and conclusion. For this lesson, you can use **p** to represent the hypothesis and **q** for the conclusion. The conditional statement "if p then q" in symbol **p** $\rightarrow$ **q** read as **p** implies **q**. The one sided arrow ($\rightarrow$) is read as implies.

Example 1:

p q

If p , then q . Or $p \rightarrow q$

To form the converse, switch p and q.

If $\underbrace{\textbf{the stars can be seen in the sky}}_{q}$, then $\underbrace{\textbf{the moon shines bright}}_{p}$.

If q, then p or $q \rightarrow p$

If both the conditional and converse statements are true, then a biconditional statement can be written symbolically:

If p , then q and q , then p or $p \leftrightarrow q$ (p if and only if q)

Example 2

Statement: x = - 5 and /x/= 5

(a) Write $p \rightarrow q$ in words

(b) Write $q \rightarrow p$ in words

(c) Write $p \leftrightarrow q$ in words. Id this statement true?

Solution:

(a) $p \rightarrow q$: If x = - 5, then /x/ = 5

(b) $q \rightarrow p$: If /x/ = 5, then x = -5

(c) $p \leftrightarrow q$: x = -5 if and only if /x/ = 5. This a false statement, since it is not only –5 with absolute value of 5 but also 5.

Examples 3:

Given: **p:** points A,B,C are coplanar points

q: points A, B, C are on the same plane.

Write the following symbols in words.

Symbol	Words
(a) $q \rightarrow p$	If points A, B, and C are on the same plane, then points A,B, and C are coplanar.
(b) $p \rightarrow q$	If points A, B and C are coplanar, then points A, b and C are on the same plane.
(c) $p \leftrightarrow q$	points A, B and C are coplanar if and only if points A, B and C are on the same plane.

Learning Task 1

Do the following**:**

1. Statement: It is an eagle, it's a bird.

   Write the following in words:

   (a) $p \rightarrow q$ (b) $q \rightarrow p$ (c) $p \leftrightarrow q$

   Are all statements true? If not give a counter example.

2. Statement: All wild animals are mammals.

   Write in words:

   (a) $p \rightarrow q$ (b) $q \rightarrow p$ (c) $p \leftrightarrow q$

   Are all statements true? If not give a counter example.

D

Most people based their conclusion on patterns they observed or from given statements .

Example:

(a)	1 + 1 = 2	3 + 5 = 8	What can you observe about the addends? What about the sum?
	1 + 3 = 4	5 + 5 = 10	
	3 + 3 = 6	5 + 7 = 12	

All the addends are odd numbers and all the sum are even.

Conclusion or conjecture: Adding 2 odd numbers the sum is even number.

(b) Point E is on line m. Line m lies on plane Q.

Conclusion: Point E is on plane Q.

These examples are form of **inductive reasoning,** which was already discussed when you were in Grade 7.

Another type of reasoning is **deductive reasoning,** which uses facts, definitions, and accepted properties in a logical order to write logical arguments.

Logical argument includes at least one premise and a conclusion. The premise must be valid to have a valid conclusion

There are two Laws of Deductive Reasoning to consider.

Law of Detachment
If $p \rightarrow q$ is a true conditional statement, p is true and q is true.

Example

(a) CJ knows that if he will not study his module in Math a day before the test, he will not get a good score in the test. CJ did not study his module in Math today, so he concludes that he will not get a good score for tomorrow's test.

Analyze if the arguments are valid:

Arguments:

Premise: If p, then q	If CJ will not study his module in Math a day before the test , then he will not get a good score.
Premise: p	CJ did not study his module in Math a day before the test
Conclusion: q	Therefore he will not get a good score in the test

If p, then q is true, and p and q are true. The arguments are valid.

(b) If n is an odd number, then the remainder is one when divided by 2. 11 is an odd number. Therefore the remainder is 1 when 11 is divided by 2.

Premise: If p, then q	If n is an odd number, then the remainder is 1 when divided by 2.
Premise: p	17 is an odd number
Conclusion: q	Therefore the remainder is 1 when 17 is divided by 2.

The arguments are all valid.

Another is the Law of syllogism which is also knows as reasoning by transitivity. It has 2 premises, one major and the second is a minor premise which leads both to either valid or invalid conclusion.

Law of Syllogism

If $p \rightarrow q$ and $q \rightarrow r$ are true conditional statements, then $p \rightarrow r$ is true.

Example 1:

If Joy visits Bicol , then she will spend a day in Albay. (major premise)

If she will stay a day in Albay , then she will go Cagsawa Ruins. (minor premise)

p	Joy visited Bicol
q	She will spend a day in Albay
r	She will visit Cagsawa Ruins

Since $p \rightarrow q$ is true and $q \rightarrow r$ is true, by the law of syllogism you can conclude that $p \rightarrow r$ is true, that is :

If Joy visits Bicol, then she will visit Cagsawa Ruins. (conclusion)

The conclusion is valid since the two premises are true.

Example 2.

If you eat vegetable , then you become healthy. (major premise)

If you become healthy, then you will not get sick. (minor premise)

p	You eat vegetable
q	You become healthy
r	You will not get sick

By Law of Syllogism the conclusion is $p \rightarrow r$:

If you eat vegetable, then you will not get sick.

The two premises are valid.

There are instances that the conclusion is not valid.

Example 3.

If it is winter, then you will wear a wool sweater. (major premise)

If you wear a wool sweater, then you are a sheep. (minor premise)

The conclusion , “If it is winter, then you are a sheep” is not valid, since you are not a sheep. Also the original statements are not true specifically the second statement, unless you are a sheep.

Example 4:

All animals have 4 legs. (major premise)

Snake is an animal. (minor premise)

Snake has 4 legs. (conclusion)

The conclusion is invalid since the major premise is wrong. Not all animals have 4 legs.

To establish the validity and truthfulness of arguments is the process of proving. There are two ways of writing a proof: Indirect and direct way of proving.

Try to analyze the arguments of Joy and Angel.

Joy and Angel have tickets for art festival. When they arrived there,

Angel said " It seems that there are very few people in here."

Joy said: " If the art festival is today , there should be hundreds of people here, so it can't be today."

Angel said: "'Let me see the ticket. The date on the ticket is for tomorrow, so the art festival is not today."

Take note that both of them arrived at the same conclusion but do it different ways. Angel's argument is an example of a direct proof while Joy's argument is an example of an indirect proof.

Direct proof is used to prove statements of the form "if p then q" or "p implies q" which we can write as $p \rightarrow q$. This method takes an original statement **p** which is assumed to be true , and is used to show directly that the other statement **q** is true.

The direct proof has to follow these steps:

- Assume the statement **p** is true.
- Use what we know about p and other facts as necessary to deduce that another statement q is true, that is show $\mathbf{p} \rightarrow \mathbf{q}$ is true.

Example 1.

$$\text{If } \underbrace{\text{n is an odd integer}}_{p}\text{, then } \underbrace{n^2 \text{ is odd}}_{q}.$$

Given p: n is an odd integer

Prove q: n^2 is odd

Proof:

Assume that p is true

$n = 2k$ is even number , for some integer k (even number is divisible by 2)

$n = 2k + 1$ is odd number , for some integer k (odd number when divided by 2 has a remainder 1)

$n^2 = (2k + 1)^2$ squaring odd integer

$= 4k^2 + 4k + 1$, squaring a binomial, though the even coefficients of k and a constant 1 already indicate that the square of odd integer is odd, still we need to express it form of $2k + 1$.

$= 2(2k^2 + 2k) + 1$, factor out 2

Let $m = 2k^2 + 2k$.

Thus $n^2 = 2m + 1$ is odd by definition of odd number

Example 2:

Given : Two even integers ***a*** and ***b***

Prove: The sum (***a + b)*** is even.

In proving we can use a formal proof which is a two column proof. One column is for the statements and the other column is for reason to make the conclusion true.

Statement	Reason
a and b are even	Given
$a = 2m$, $b = 2p$	Definition of even number
$a + b = 2m + 2p$	Adding 2 integers
$a + b = 2(m + p)$	Factoring the GCF
$a + b = 2x$	Let $x = m + b$, $2x$ is an even number by definition

The other way of proving is by indirect proof. Given a premise p and a conclusion q, an **indirect proof** would assume that q is false. Indirect proof is also called as **proof by contradiction**.

Steps in indirect proving:

1. Assume the opposite of the conclusion of the statement.
   The question is: “What if the conclusion is not true?”
2. Proceed as if this assumption is true to find the contradiction.
   The question is: “How can you prove that the conclusion is false?”
3. Once there is a contradiction, the original statement is true.
   If you’re not able to prove it, then the original statement is true.

The truth and falsity of statements are opposites. If truth exist, then falsity cannot exist and vice versa. This means that a statement cannot be true and at the same time false. If the statement is proven true, then it cannot be false and the other way around.

Example 1:
Given $\angle A$ and $\angle B$ are complementary angles

Prove: $\angle B < 90^0$

Prove by indirect proof:
Assume that the opposite of the conclusion is true, that is,

$\angle B \geq 90^0$	Assume that the conclusion is false and that the contradiction is true
$\angle A + \angle B = 90^0$	Definition og complementary angles (the sum of the 2 angles is 90^0
$\angle B = 90^0 - \angle A$	Solving for angle B by APE. B cannot be greater or equal to 90^0, which shows that your assumption that $\angle B \geq 90^0$ is not true. Hence the conclusion that $\angle B < 90^0$ is true.

Example 2.

No integer m and n exist such that 4m + 2n = 1

By indirect proof, you have to assume that integers m and n exist and that 4m + 2n = 1.
Start with the equation:

$4m + 2n = 1$

$2m + n = \frac{1}{2}$ dividing both sides the greatest common factor 2

The contradiction is false. We cannot find any integer whose sum is a fraction. Thus the original statement is true.

E

Learning Task 2

A. Make conclusion on the following patterns.

1.

1 + 1 = 2	3 + 5 = 8	15 + 17 = 32
1 + 3 = 4	5 + 7 = 12	21 + 29 = 50

2.

1 + 2 = 3	3 + 8 = 11	15 + 28 = 43
2 + 3 = 7	5 + 12 = 17	21 + 32 = 53

3.

$1^2 = 1$	$5^2 = 25$	$9^2 = 81$
$3^2 = 9$	$7^2 = 49$	$11^2 = 121$

B. Use Law of Detachment to draw conclusion

1. If two lines are parallel, then they do not intersect.
   Lines j and k are parallel.
2. If there is lightning, then it is not safe to play outside.
   Peter saw lightning.
3. If you get an average grade of 95– 100, then you will be in the honor roll
   Your average grade is 95.25.
4. If a figure is a triangle, then the sum of the angles is 180^0.
   PQR is is a triangle.
5. If the sum of two angles is equal to 90 degrees, then the angles are com plementary.
   Angle x is equal to 30 degrees and angle y is equal to 60 degrees.
6. If two circles have the same center, then they are concentric.
   The center of two circles is point A.
7. If a figure has 4 sides, then it is a quadrilateral
   Square has 4 sides.
8. If the 2 integers are odd, then the sum is even number
   The numbers x and y are odd integers.
9. If the score in math exam is 50 and above, then you passed the exam.
   Rick scored 68 in the exam.
10. If points lie on a line, then they are collinear.
    Points X, Y, and Z are in line *m.*

C. Use Law of Syllogism to draw conclusion. Determine if your conclusion is valid or not. Justify your answer

1. If it continue to rain then, then the track and field oval will become wet and slippery.
   If the track and field oval will become wet and slippery, then the track and field game will be cancelled.
2. If you are resting, then you will be relaxed.
   If you are relaxed, then your heart beat is normal.
3. If you study your lesson, then you will pass the exam.
   If you pass the exam, you will get a good grade.
4. If it creature is a fly , then it has and antennae.
   If the creature has antennae, then it is an insect.
5. If you are studying science, then you are studying biology.
   If you are studying biology, then you are studying botany.
6. If two lines are parallel, then they belong to one plane.
   If lines belong to one plane, then they are coplanar.
7. If angles are linear pair, then they are supplementary angles.
   If the angles are supplementary, the sum of the angles is $180^{0.}$
8. If a man is good in Math, then he is an engineer.
   If he is an engineer, then he can build a house.
9. If a creature is a mammal, then it has 2 legs.
   If a creature has 2 legs, then it can swim
10. If it rain, then there is lightning
    If there is lightning, then there is thunder.

A

Learning Task 3

A. Prove the following using Direct Proof

1. Given: Odd and even integers

   Prove: the sum of odd and even integers is odd integer

Solution:

Supply the missing statement and reason

Statement	Reason
1. Let x be odd integer and y even integer	A variable represents a number
2. $x = 2k + 1$	
3. $y = 2k$	
4. $x + y = (2k + 1) + 2k$	Adding two integers (from statement 1 and 2)
5. $x + y = 2(2k) + 1$	
6. $x + y = 2r + 1$	$r = 2k$, substituting r to 2k in statement 5

2. Given odd integer m and even integer n ($m = 2k + 1$ and $n = 2k$)

   Prove: mn is even number ($mn = 2r$)

3. Given: n is even number ($n = 2k$)

   Prove: $3n + 5$ is an odd number. ($3n + 5 = 2m + 1$)

B. Prove the following using indirect proof.

1. If $x = 3$, then $3x + 5 \neq 10$.
2. If a triangle is an isosceles triangle (2 sides are equal), then the base angles cannot measure 92 degrees.
3. Given: $3r - 5 \neq 13$

   Prove: $r \neq 6$
4. Given: $x = 5$

   Prove : $2x + 4 \neq 12$

References

Key to Correction

WEEK 1

Learning Task 1

1, x = 3 2. y ≥ 3 3. x < -2

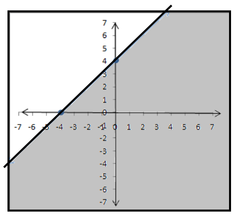
Learning Task 2

1. (5,2),(-5,-5) 4. (0,-5),(-1,-6)
2. (1,10),(3,3) 5. (0,6),(2,2)
3. (1,2),(2,2)

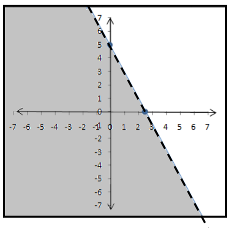
Learning Task 3

A.

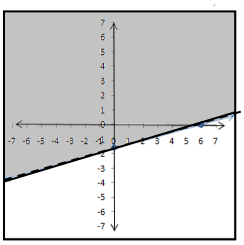
1.



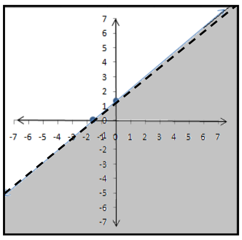
2.



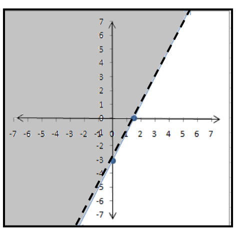
3.



4.



5.



Learning Task 3

B. 1. y - x > - 2

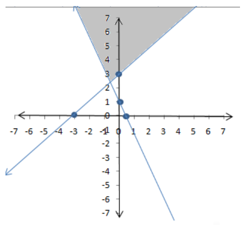
2. y - 2x ≤ 2

3. 4y - 3x < 12

WEEK 1

Learning Task 4

1.



Solutions of the inequalities

(-1, 5), (2, 6) , (0, 7)

The region where the solution of each inequality overlaps.

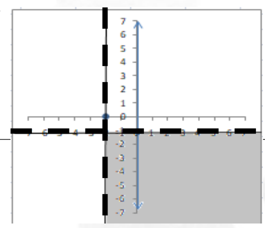
WEEK 2

Learning Task 1

1. C 2. B 3. A

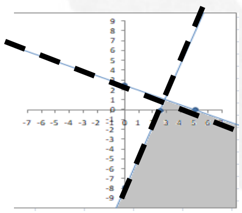
Learning Task 2

1.



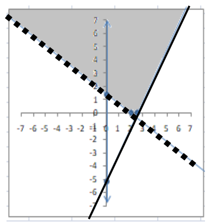
(0,-3),(4, -5) (5,-5)

2.



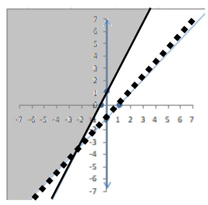
(3,-2) (4, -4), (5, -5)

3.



(-4, 7), 0,3), (2,4)

4.

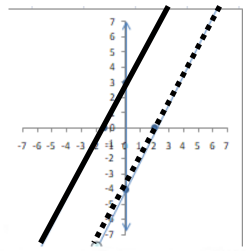


(-5,0); (0, 6); (1,5)

WEEK 2

Learning Task

5.



No common points.

Note: the 3 identified points may vary. Answers are correct as long as it belong to the shaded region.

Learning Task 3

1. It is the region where the two regions overlaps.

2. Boundary is broken line, when the inequality is < or > while solid line if the inequality is ≤ or ≥ .

3. If the regions of each inequality are parallel.

B. 1. y + x ≥ 4 and y - x > 1

2. 3y - 4x < 12 and 3y - x > 3

3. y ≥ 2 and x ≤ -3

WEEK 3—4

Learning Task 1

A.

Domain	Range	
5,4,3,3	4,3,2,1	Relation
-2,-1,2,1	3, 3, 1, 1	Function
-1,0,2,-2	1,0,1,4	Function

B. 1. {(-3, -4, (-2, -3), (-1, -2), (0, 1), (1, 0); (2, 1);(3, 2)

2.

D	-3	-2	-1	0	1	2	3
R	-1	0	1	2	3	4	5

3. Eqn. 1: r = d - 1

Eqn 2: r = d + 2

Learning Task 2

A

1. a. Function

b. D = (-2, -1, 0, 1} ; R ={-4,-3,-2,-1}

c. R = D - 2

2. a. Relation

b. D = {4, 4,3, 3} ; R = { 2, 0, 3, 5 }

3. a. Function
   b. D = {-1, 0, 1, 2} ; R = { 0, 1, 2, 3}
   c. R = D + 1
4. a. Function
   b. D = -{4, -2, 0, 2, 4}; R = {-2,-1,0, 1, 2 }
   c. y = x + 1
5. a. function
   b. D = {1, 2, 3, 4, 5}; R= {1, 2, 3, 4, 5}
   c. y = x
6. a. Relation
   b. D = {2, 2, 4, 6, 6}; R = {1, 5, 1, 3, 5}
7. a. function
   b. D= {x /x € R}; R = { y / y = 3}
   c. y = 3
8. a. Relation
   B . D = {x/ -4 < x < 2}, R = [y/-3<y<3}
9. a. Relation
   b. D= (all real numbers}
   R= { all real numbers}
10. a. Function
   b. D = {x/ x are real numbers}
   R = {y/ y ≤ 3

Learning Task 2

B.

Domain	-3	-2	-1	0	1	2	3
Range 1.	-1	0	1	0	3	4	5
Range 2	-6	-4	-2	0	2	4	6
Range 3	9	4	1	0	1	4	9
Range 4	-7	-4	-1	2	5	8	11
Range 5	-3	-2	-1	0	1	2	3

C. Equation of the functions above let the domain be x and range be y,

1. y = x + 2
2. y = 2x
3. $y = x^2$
4. y = 3x = 2
5. y = x

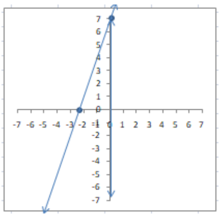
Learning Task 3

A. 1. f(x) = 3x + 7
2. f(x) = $-\frac{x}{2}+2$
3. f(x) = x + 5
4. f(x) = -2x = 5
5. f(x) = $-\frac{3x}{2}+2$

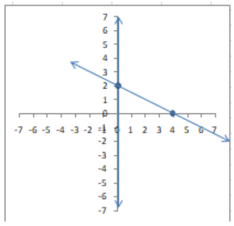
B.

	1	5	1	
1		2		1
7	4		7	7
2		2		4
	3	0	6	

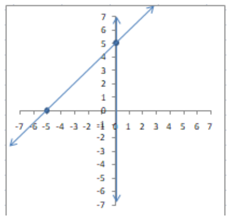
C . 1



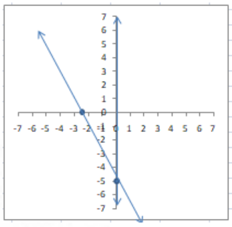
2.



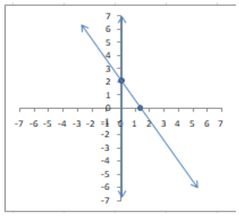
3.



4.



5.



WEEK 5

Learning Task 1

	Hypothesis	Conclusion
1	MJ is in grade 8	He is 14 years ols
2	It's cloudy	It will rain
3	You will sleep early	You will wake up early
4	An integer divisible by 5	Last digit must be 0 or 5
5.	The triangle is equilateral	It is equiangular

Learning Task 2

A. 1. If you pass Grade 8, then you will be in grade 9 next school year.
   H: you pass Grade 8
   C: you will be in grade 9 next school year.

2. . If a triangle is equilateral, then it is equiangular.
   H: a triangle is equilateral
   C: it is equiangular

3. If the angles are acute angles, then the measure is less than 90.
   H: the angles are acute angles
   C: the measure is less than 90.

4. If circles have the same center, then they are concen tric.
   H: Circles have the same center
   C: they are concentric

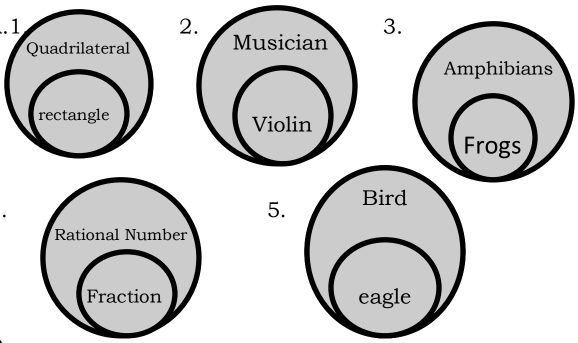
5. If the temperature is in degree Celsius, then the freezing point is zero.
   H: the temperature is in degree Celsius
   C: the freezing point is zero

B.

1. True
2. False, the tallest man in the world is not a basketball player.
3. True
4. False, going to Hongkong does not require visa
5. False, Obtuse triangle, one angle is not acute,

Learning Task 3

A.1.



B.

2. If it is equiangular, then it is equilateral.

   The statement is true. All triangles that are equi latear are also equiangular.

3. If it is a quadrilateral, then it is a rectangle.

   The statement is false since a trapezoid is also a quadrilateral. Or any figure with 4 sides ia a quadric lateral.

WEEK 6-7 Learning Task 1

1. (a) True
   (b) If the triangle is equiangular, then it is equilat eral (True)
   (c) If the triangle is not equilateral, the it is not equiangular.

2. (a) True
   (b) If the polygon is quadrilateral, then it has exactly 4 sides. (true)
   (c) If the sides of the are not exactly 4 , then it is not quadrilateral.

3. (a) True
   (b) If the does not steal, then he is honest. (true)
   (c) If the man is not honest then he steals.

4. (a) True
   (b) If the sum of the measure of two angles is 180^0 , then the angles are supplementary. (true)
   (c) If the sum of two angles id not 180^0 , then the angles are not supplementary .

5. (a) True
   (b) If the volcano erupts, then it is active (true)
   © If the volcano is not active, then it will not erupt.

Learning Task 2

1. The parts are hypothesis and conclusion.
2. Switch the conclusion and hypothesis.
3. If the conditional statement and its converse are both true.
4. By negating the hypothesis and conclusion of the hypothesis and conclusion of the conditional state-ment
5. Contrapositive statement,

Learning Task 3

Conditional Statement	Converse Statement	Inverse Statement	Cotrapositive Statement
If you eat vegetable, then you are healthy.	If you are healthy, then you eat vegetables	If you do not eat vegetables, then you are not healthy	If you are not healthy, then you do not eat, then you do not eat vegeta-bles
If 3x + 8 = 14, then x = 2	If x = 2, then 3x + 8 = 14	If 3x + 8 ≠ 14, the x ≠ 2	If x ≠ 2, then 3x + 8 ≠ 14
If a triangle is a right triangle, then it has a 90^0 angle.	If a triangle has a 90^0 angle, then it is a right triangle	If a triangle is not a right triangle, then it has no 90^0 angle	If a triangle has no 90^0 angle, then it is not a right triangle.
If it is an eagle, then it is a bird.	If it is a bird, then it is an eagle.	If it is not an eagle, then it is not a	It is not a bird, then it is not not
If it is a whale, then it is a mammal	If it is a mammal, then it is a whale	If it is not a whale, then it is not a mammal.	If it is not a mammal, then it is not a whale
If the diameters of two circles are equal, then the circles are congru-ent	If the two circles are congruent, then the diameters of the circles are equal.	If the diameters of two circles are not equal, then the circles are not congruent.	If two circles are not congruent, then the diameters of the circles are not equal.
If the angle measures between 90^0 and 180^0 , then the angle is obtuse.	If the angle is obtuse, then the measure of the angle is between 90^0 and 180^0	If the measure of the angle is not between 90^0 and 180^0, then the angle is not obtuse.	If the angle is not obtuse then its measure is not between 90^0 and 180^0
If two planes have no common point, then they are parallel.	If two planes are parallel, then they don't have common point.	If two planes has common point, then they are not parallel	If two planes are not parallel, then they have common point.
If it is a carrot, then it is rich in	If it is rich in Vitamin A, then it is a	It is not a carrot, then it is not	If it is not rich in vitamin A, then it
If it is a reptile, then it has a scale.	If it has a scale, then it is a reptile	If it is not a reptile, then it has no scale	If it has no scale, then it is not a reptile

B. 2. 3x = 8 = 14 iff x = 2

   3. It is a right triangle iff it has a 90^0 angle

   6. Two circles are congruent iff their diameters are equal.

   7. The measure of the angle is between 90^0 and 180^0 iff the angle is obtuse.

   8. Two planes have no common point iff they are parallel.

Learning Task 4

1. Conditional: If a point is the mid point of the segment, then it divides the segment into two equal parts.

   Converse: If the point divides the segment into 2 equal parts, then it is the midpoint of the line segment.

2. Conditional: If $4x - 5 = 25$, then $x = 7$

Converse: If $x = 7$, then $4x - 5 = 25$

3. Conditional: If the quadrilateral ha 4 congruent sides and angles, then the quadrilateral is a square.

Converse: If the quadrilateral is a square, then it is a quadrilateral with 4 congruent sides and angles.

WEEK 8

Learning Task 1

1. (a) If it is an eagle, then it's a bird (b) If it is a bi rd, then its an eagle. (c) It is an eagle iff it a bird. (b) is false. Maya is a bird but not eagle. (c) False, since the converse is false.
2. (a) if It is a wild animal, then it's a mammal (b) If it is mammal, then it's a wild animal (c) It is a wild anima iff it is mammal. (b) is false, mma is a mammal but not wild animal. (c) is false since the converse is false.

Learning Task 2

A. **1.** The sum of 2 odd integers is an integer

2. The sum of odd and even integer is an odd integer.

3. The square of an odd integer is odd integer.

B. 1. Therefore lines j and k are parallel

2. Therefore it is not safe to play outside.

3. Therefore you will be in the honor roll.

4. Therefore the sum of the angles of triangle PQR is 180^0

5. Therefore the sum of the measures of angles x and y is 90^0 , they are complementary.

6. Therefore the circles are concentric.

7. Therefore square is quadrilateral

8. Therefore the sum of x and y is even

9. Therefore Rick passed the exam

10. Therefore points x, y and Z are collinear

C. 1. if it will continue to rain, then the track and field game will be cancelled.

2. If you are resting, then your heartbeat is normal.

3. If you study your lesson, then you will get good grades.

4. If a creature is a fly, then it is an insect.

5. If you are studying science, then you are studying bot any.

6. If two lines are parallel, then the are coplanar.

7. If angles are linear pair, then the sum is 180^0

8. If a man is good in Math, then he can build a house.

9. If the creature is a mammal, then it can swim.

10. If it rain, then there is thunder

Learning Task 3

A.

1. Reason:

2. Definition of odd integer

3. Definition of even integer

5. sum of integers

2. $mn = (2k + 1)(2k)$

$= 4k^2 + 2k$ product of integers

$= 2(2k^2 + k)$ factor out 2

$= 2r$ let $r = 2k^2 + k$

$mn = 2r$ by definition of even integer

3. let $n = 2k$

$3n + 5 = 3(2k) + 5$ by substitution

$= 6k + 5$ multiply

$= 6k + 4 + 1$ renaming 5

$= 2(3k + 2) + 1$ factor out 2

$= 2m + 1$ let $m = 3k + 2$

$3n + 5 = 2m + 1$ is odd number by definition.

B. 1. Given $x = 3$

Prove : $3x + 5 \neq 10$

Assume that $3x + 5 = 10$

$3x = 5$

$x = 5/3$

This shows that the assumption is not true. Hence the conclusion $3x + 5 \neq 10$ is true.

2. Given: Triangle ABC is an isosceles triangle.

Prove: Base angle cannot be 92^0.

Assume that the base angle is 92^0

Remember that the base angles of isosceles triangle are equal and the sum of the measure of the angles of the triangle is 180^0

$A + B + C = 180^0$

$A + 92 + 92 = 180^0$

This is not possible since the two angles adds up to more than 180^0 already. Therefore the assumption is false. The conclusion that cannot be 92^0 is true.

3. Given: $3r - 5 \neq 13$

Prove: $r \neq 6$

Assume that $r = 6$.

Then $3(6) - 5 \neq 13$

$18 - 5 \neq 13$ this false because they are equal. Hence the assumption is false. $r \neq 6$ is true.

4. Given: $x = 5$

Prove: $2x + 4 \neq 12$

Assume that $2x + 4 = 12$

$2(5) + 14 =12$

$10 + 14 = 12$ is false

Hence the conclusion $2x + 4 \neq 12$ is true.

PIVOT Assessment Card for Learners

Personal Assessment on Learner's Level of Performance

Using the symbols below, choose one which best describes your experience in working on each given task. Draw it in the column for Level of Performance (LP). Be guided by the descriptions below.

☆ - I was able to do/perform the task without any difficulty. The task helped me in understanding the target content/lesson.

✓ - I was able to do/perform the task. It was quite challenging but it still helped me in understanding the target content/lesson.

? - I was not able to do/perform the task. It was extremely difficult. I need additional enrichment activities to be able to do/perform this task.

Distribution of Learning Tasks Per Week for Quarter 2

Week 1	**LP**	**Week 2**	**LP**	**Week 3**	**LP**	**Week 4**	**LP**
Learning Task 1		Learning Task 1		Learning Task 1		Learning Task 1	
Learning Task 2		Learning Task 2		Learning Task 2		Learning Task 2	
Learning Task 3		Learning Task 3		Learning Task 3		Learning Task 3	
Learning Task 4		Learning Task 4		Learning Task 4		Learning Task 4	
Learning Task 5		Learning Task 5		Learning Task 5		Learning Task 5	
Learning Task 6		Learning Task 6		Learning Task 6		Learning Task 6	
Learning Task 7		Learning Task 7		Learning Task 7		Learning Task 7	
Learning Task 8		Learning Task 8		Learning Task 8		Learning Task 8	

Week 5	**LP**	**Week 6**	**LP**	**Week 7**	**LP**	**Week 8**	**LP**
Learning Task 1		Learning Task 1		Learning Task 1		Learning Task 1	
Learning Task 2		Learning Task 2		Learning Task 2		Learning Task 2	
Learning Task 3		Learning Task 3		Learning Task 3		Learning Task 3	
Learning Task 4		Learning Task 4		Learning Task 4		Learning Task 4	
Learning Task 5		Learning Task 5		Learning Task 5		Learning Task 5	
Learning Task 6		Learning Task 6		Learning Task 6		Learning Task 6	
Learning Task 7		Learning Task 7		Learning Task 7		Learning Task 7	
Learning Task 8		Learning Task 8		Learning Task 8		Learning Task 8	

Note: If the lesson is designed for two or more weeks as shown in the eartag, just copy your personal evaluation indicated in the first Level of Performance in the second column up to the succeeding columns, i.e. if the lesson is designed for weeks 4-6, just copy your personal evaluation indicated in the LP column for week 4, week 5 and week 6.

For inquiries or feedback, please write or call:

Department of Education Region 4A CALABARZON

Office Address: Gate 2, Karangalan Village, Cainta, Rizal

Landline: 02-8682-5773, locals 420/421

Email Address: lrmd.calabarzon@deped.gov.ph