BASIC 9

WEEKLY LESSON PLAN – WEEK 9

Strand:	Algebra		**Sub-Strand:**	Patterns and Relations	
Content Standard:	B9.2.1.1 Demonstrate the ability to construct tables of values for pairs of linear relations, graph the relations in a number plane and determine the intersection of the lines to solve simultaneous linear equations.				
Indicator (s)	B9.2.1.1.1 Construct a table of values for two linear relations and graph the relation B9.2.1.1.2 Use graphs of two linear relations to determine subsequent missing elements in ordered pairs of the relation.		**Performance Indicator:** Learners can construct a table of values for linear relations.		
Week Ending	08-11-2024				
Class	B.S.9	**Class Size:**		**Duration:**	
Subject	Mathematics				
Reference	Mathematics Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook.				
Teaching / Learning Resources	Graph, poster, Video		**Core Competencies:**	• Demonstrate behaviour and skills of working towards group goals • Ability to select alternative(s) that adequately meet selected criteria	

DAYS/DATE	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
MONDAY	Show Learners a Poster displaying a table of values for two linear relations.	1. Demonstrate on how to construct a table of values for two linear relations. 2. Assist Learners to complete table of values for relations. 3. Engage Learners in drawing graph for two linear relations. **Graphing linear equations using a table of values** When you've got a blank table of values and a linear equation that you want to graph out, you can take any x value on the x axis of your choosing to start off your table. Let's say you take the number 3. Substitute that into the linear equation to see what you'll get when you solve for y on the y axis. Let's pretend that you get -5. Jot down both of these numbers into your table, with 3 on the column with x values and -5 on the column for y values. Choose another x value you want to work with and solve for y again. Repeat as	Learners brainstorm to draw graph for linear relations. **Exercise;** Graph the following function using a table of values: 1. 2x + 4y = 8 2. y = 3x -1 3. 2x + 4y = 8

		many times as you wish to work out sets of values to put into your table. When you've got an amount you're happy with or that your question asks for, you can then take those x and y values and plot them out as coordinates on a graph to graph points on a linear equation! **Example** **Question 1:** Graph following function using a table of values y = 3x - 1 **Solution:** First, create a table of values for the equation. Use x to solve for y. You may use different values, but your graph will be the same no matter what values you use. Table of values of x For x = -2 y = 3(-2) - 1 y = -6 - 1 y = -7 For x = -1 y = 3(-1) - 1 y = -3 - 1 y = -4 For x = 0 y = 3(0) - 1 y = 0 - 1 y = -1 For x = 1 y = 3(1) - 1 y = 3 - 1	

x	y
-2	
-1	
0	
1	
2	

y = 2

For x = 2

y = 3(2) - 1

y = 6 - 1

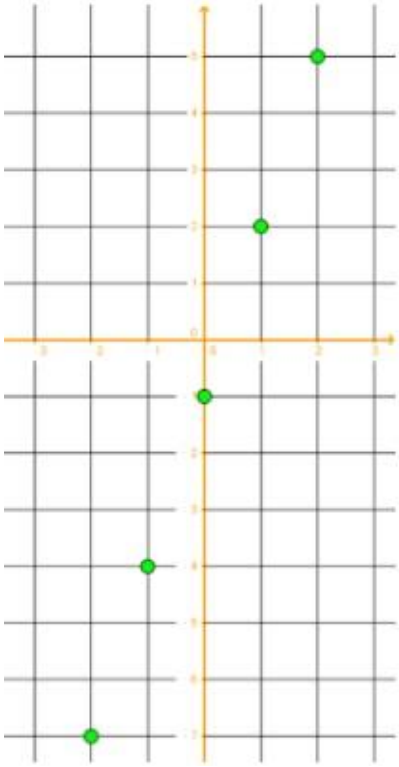
y = 5

Now, we have a complete table of values

x	y
-2	-7
-1	-4
0	-1
1	2
2	5

A completed table of x and y values

We can now plot the ordered pairs onto a grid



Data plotting

Then, connect the points using a straight line, and we are done!

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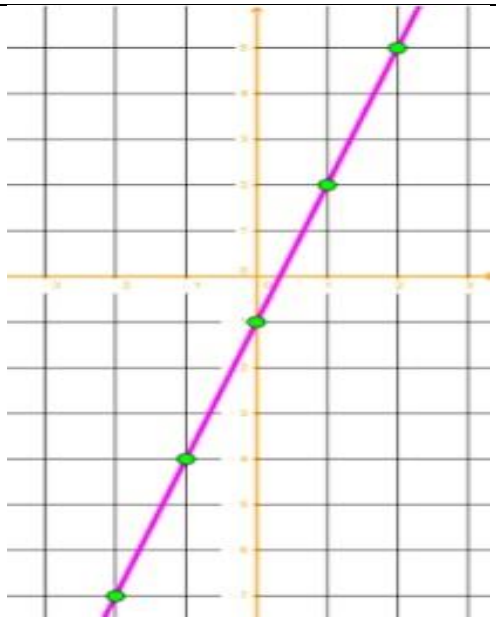
<td>  </td>
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<td>WEDNESDAY</td>
<td>Learners brainstorm to draw a graph for two linear equations.</td>
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Demonstrate on how to find the coordinates for the intersection of the two lines on a graph.
Assist Learners to find coordinates for the intersection of the two lines on a graph.
Learners brainstorm use the graph to find the values for y for the two relations.
Discuss with the Learners about how to find the missing elements of ordered pairs on graphs of two linear relations.

Example

Graft the function y = x + 2

Begin by choosing a couple of values for x e.g. -2, -1, 0, 1 and 2 and calculate the corresponding y values.

<table>
<tr><th>X</th><th>Y = x + 2</th><th>Ordered pair</th></tr>
<tr><td>-2</td><td>-2 + 2 = 0</td><td>(-2, 0)</td></tr>
<tr><td>-1</td><td>-1 + 2 = 1</td><td>(-1, 1)</td></tr>
<tr><td>0</td><td>0 + 2 = 2</td><td>(0, 2)</td></tr>
<tr><td>1</td><td>1 + 2 = 3</td><td>(1, 3)</td></tr>
<tr><td>2</td><td>2 + 2 = 4</td><td>(2, 4)</td></tr>
</table>

Now you can just plot the five ordered pairs in the coordinate plane
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Assist Learners to use graph drawn to find the values of variables used in a relation.

Exercise;

Line A has a gradient of 4 and passes through point (5,6).

Line B passes through points C (0,5) and D (2,0).

Find the coordinates of the point where the two lines intersection.
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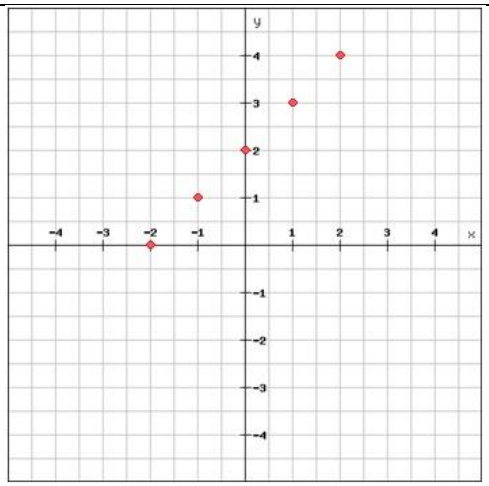
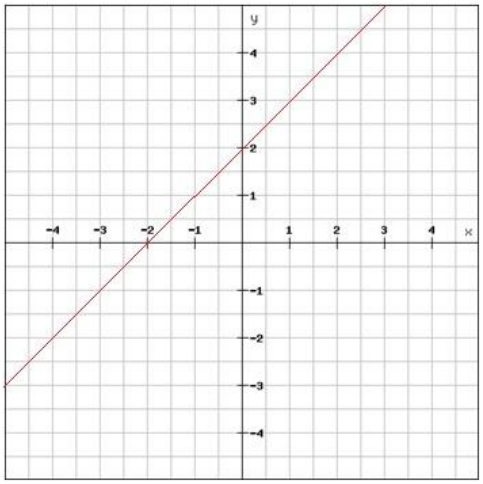
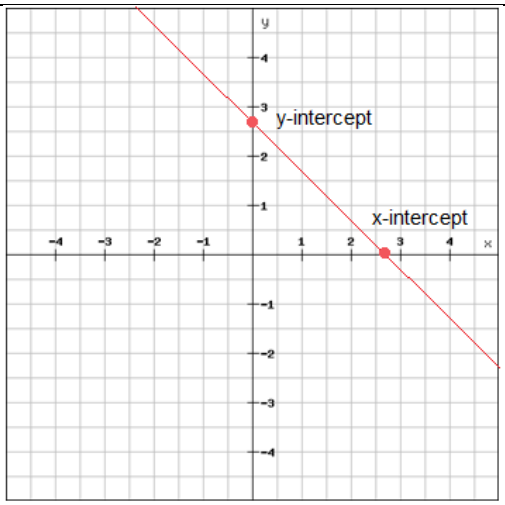


At the moment this is an example of a discrete function. A discrete function consists of isolated points.

By drawing a line through all points and while extending the line in both directions we get the opposite of a discrete function, a continuous function, which has an unbroken graph.



If you only want to use two points to determine your line you can use the two points where the graph crosses the axes. The point in which the graph crosses the x-axis is called the x-intercept and the point in which the graph crosses the y-axis is called the y-intercept. The x-intercept is found by finding the value of x when y = 0, (x, 0), and the y-intercept is found by finding the value of y when x = 0, (0, y).

			
FRIDAY	Through questions and answers, review Learners knowledge on the previous lesson.	1. Assist Learners to identify the formula for finding the standard or general form of linear relation. 2. Learners brainstorm to calculate for the standard form of Linear relations 3. Discuss with the Learners about how to use standard form to find the slope-intercept form of a relation. ***Standard/General Form*** It is another form of the linear function that is effective in understanding scenarios with two inputs (and no outputs) and can be derived as: **Ay + Bx = C** Again, x and y are two variables, whereas A, B, and C are constants in this equation. However, it is possible to arrive at the slope-intercept using the standard form.	Reflect on how to calculate the standard form of linear relations. **Exercise;** 1. Daniel is given an x and y-axis math problem by his teacher, where he has to plot the points (3,2) and (2,3) on a graph and draw a line passing through these points. Can you determine the point where it meets x axis? 2. Plot the points (0,2), (0,4.5), and (0,-3) on a coordinate system. Do all the points lie on a line? Can you name the line? 3. How many quadrants does a x and y graph contain? And which quadrant does (- 3, -5)

		For example, Ay + Bx = C Ay = -Bx + C Y = -Bx/A + C/A, which is essentially in the form of Y = mx + b After putting the values in the above equation, one can make a linear graph using slope-intercept form. **Examples** Linear relationship examples are everywhere, such as converting Celsius to Fahrenheit, determining a budget, and calculating variable rates. Recently, a **Bloomberg Economics study** led by economists established a linear correlation between stringent lockdown measures and economic output across various countries. Moreover, they explained how moderate containment and mild social distancing could boost the economy. A practical example of a linear equation could be cooking a homemade pizza. Here, two variables are the number of people to be served (constant or independent variable) and pizza ingredients (dependent variable). For example, suppose there is a pizza recipe for four, but only two people are there to consume it. To accommodate two people, cutting the number of ingredients to half would half the output. **Linear vs. Nonlinear Relationship** Although linear and non-linear relationships describe the relations between two variables, both differ in their graphical representation and how variables are correlated. ***Graphical Representation*** A linear relationship will always produce a straight line on a graph to depict the relations between two variables. On the other hand, a non-linear relationship may create a curved line on the graph for the	lie in?

		same purpose. ***Change in Variables*** In a linear relationship, a change in the independent variable will change the dependent variable. But this is not the case with a nonlinear relationship, for any changes in either variable will not affect the other. ***Application Areas*** A linear relationship best describes situations where variables are interdependent, such as exercise and weight loss. Here, exercising x times a day will significantly reduce a y amount of weight.	

Name of Teacher: **School:** **District:**