SAMPLE LESSON: MATHEMATICS

Class: Form 2

Title of Module 2: Introduction to Plane Geometry	**Title of Chapter: Distances**
Title of Lesson: Distance between two points	**Duration of Lesson:** 60mins

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Name of School: **TTP COP**: **Class**: Form 2: **Enrolment**: Boys: ________ ; Girls: ______;Total: _____ ; **Duration of lesson**: 1hr 30min

Module 02: Introduction to Plane Geometry

Topic: Distances

Lesson Title: Distance between two points

Lesson Objectives: By the end of this lesson, leaners should be able

- To calculate the distance between two given points
- To determine the coordinate of midpoint of a line segment

Key Questions: Do my learners know that distance is a scalar quantity?

Pre-requisite Knowledge: Students can:

- Draw lines of specific measurement.
- Plot and linked points
- Carry out simple algebraic operations
- Determine the number of unit between points that are either horizontally or vertically

Rational/ Motivation: Many real life situations require us to determine distances between two points. It could be in sporting activities, construction, surveying, engineering or other real life situations.

Didactic Materials: Activity sheet and graph papers (or graph books), graph board

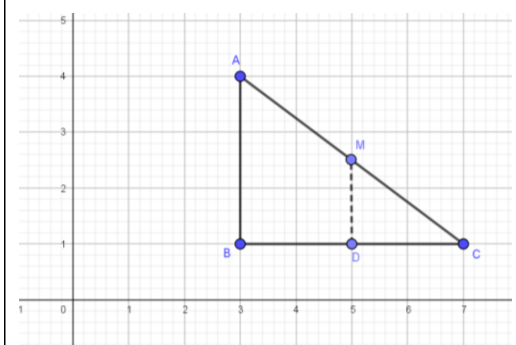
References:

- August 2014 Mathematics teaching syllabus form 1 and 2. Ministry of secondary education, Cameroon.
- Karen E. Lyonga (2018) Presbook secondary Mathematics for Cameroon schools form 2. Presbook Plc
- Mr Barton maths.com, the maths e-books of notes and examples
- Charles Branch-Boyd PRENTICE HALL NATHEMATICS volume 1 chapter1.6

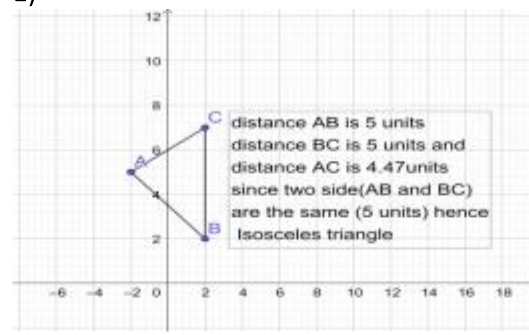
Preparation. Draw a Cartesian plane on the cardboard paper and take to class, if there is graph board in school, ensure its availability before lesson.

Prepare worksheet for the activity, print and photocopy according to the number of students in class.

Stages/Duration	Teaching/Learning Activities	Teacher's Activities	Learners' Activities	Teaching/Learning Points
Introduction **(15 Mins)**	**A/- Verification of Pre-requisite knowledge** **Exercise** 1)Using your ruler draw a horizontal line of 3cm 2)Plot the following points on the same Cartesian plane; $A(1,2), B(-4,2), C(-4,-2) and\ D(1,-2)$ 3)Link the points from A to B, from B to C, from C to A and from D to A. 4)How many units are there from point A to point B? 5) Evaluate $a) -4-1 =$ $b)$ 2 – 2 = $c)$ 1 – (– 4) =	✓Put up the cardboard with the Cartesian plane on it or put up the graph board ✓Reads out the questions and calls up students to answer on either the cardboard or the graph board ✓Reads out the problem situation to the students and notes the students' proposals.	✓Volunteer to go to the graph board or cardboard to answer the question ✓Listen attentively ✓Discuss the problem with group/table members and propose solutions by show of hand if they can	Mastery in use of Instruments Plotting and Identification of points on the coordinate plane Spaces and Distances
	B**/- Problem Situation** Just before the lockdown period due to COVID-19, you won a contract to build sidewalks along the 2 diagonals of a public park. You cannot go there to measure the lengths of the diagonals, nor measure the sides of the park. You have only the information on the map to use. The problem is: ***How long is each diagonal***? The Map of the park gives the coordinates of the four corners of the park as A(10, 10); B(90, 10); C(20, 40) and D (100, 40). Can this help in getting the distances of the diagonals? How?			
Lesson Development (30 Mins)	**ACTIVITY** 1. Using the graph paper in the group, draw a horizontal line segment AB of length 4cm. 2. From the point B, draw a vertical line BC measured 3cm. 3. Link point C to point A and name the figure form. 4. Use your ruler to measure the length from	✓Teacher groups the students into heterogeneous groups ✓Supervises the activities of the	✓The students carry out the instructions, answering the questions on the activity sheet	**Answer to 1, 2 and 3**

	point C to point A. 5. On the other side of the graph paper plot the following points ; $A(3, 4), B(3, 1)\ and\ C(7,1)$. 6. Link the points and name the plane figure formed. 7. Determined the number of unit from point A to point B. Find the square of this value. 8.Determined the number of unit from point B to point C. Square this value. 9. Sum the squares of the units in 7) and 8). 10. Find the square root of the value in (9) above which represent the length of AC. 11. Divide the value of the length BC by two (2). 12. Draw a straight line from D to meet AC. Call this point of intersection M. Find the coordinates of point M. 13. Add the x-components of point B and C and divide by two, 14. Add the y-components of point B and C and divide by two. 15. Write the values obtained in 13) and 14) as the coordinates of M. 16) Compare the coordinates of M obtained in 12) and that obtained in 15). **Definitions and concepts** Generally given the points $P(x_1, y_1) and\ Q(x_2, y_2)$ the distance between the points is denoted by d_{PQ} define by	students and guides them on what to do ✓Support students without giving to them the answers. ✓Request some groups to read out their results and compare their answers. ✓Give explanations along the way as students present their group results ✓Copies definitions and concepts on the board	✓Group representatives read out their results to the whole class ✓ ✓Copy summary notes in their notebooks	 3.A right triangle with the right angle at B **4. AC = 5cm** **5.**  6. A Right angled triangle with the right angle at B. 7) 3units and $3^2 =\ 9$ 8) 4units, and $4^2 = 16$. 9) 9units + 16units = 25units 10) $\sqrt{25} = 5$ 11) The half of BC is the point D. 12) See figure above for point M (5, 2.5) 13) Sum of abscissa $\frac{3+7}{2} = 5$

	d_{PQ} = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ NB. ✓ The distance PQ is the same as the distance QP ✓ All points on a vertical straight line has a constant *x*-component. ✓ All points on a horizontal straight line has a constant *y*-component ✓ If M denotes the midpoint of PQ, the coordinate of M is given by $M(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$			14) sum of ordinates: $\frac{4+1}{2} = 2.5$ **15)** Coordinate of M (5, 2.5) **16)** They are the same **Definitions and concepts** Generally given the points $P(x_1, y_1) and\ Q(x_2, y_2)$ the distance between the points is denoted by d_{PQ} define by **d_{PQ}** = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ NB. ✓ The distance PQ is the same as the distance QP ✓ All points on a vertical straight line has a constant *x*-component. ✓ All points on a horizontal straight line has a constant *y*-component ✓ If M denotes the midpoint of PQ, the coordinate of M is given by $M(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$
Exercise for Application	**Exercise** 1) Determine the distance between the following pair of points a) $A(4,6) and\ \ B(1,2)$ b) $P(-1,2) and\ Q(2,-4)$ c) $P(-1,2) and\ Q(2,-4)$ 2) Find the coordinate of the midpoint of the line joining the following pairs of points; a) $A(5,2) and\ B(-3,4)$ b) $P(0,0)\ and\ Q(1,3)$ c) $C(0,4) and\ D(4,0)$ d) $E(2,1) and\ F(-2,5)$	✓Copies exercises on the board ✓Corrects the exercises with the students ✓Go to the problem situation and answer the stated problem.	Copy exercises in their individual exercise books	**Solution to exercise** 1) a) $d_{AB} = \sqrt{(1-4)^2+(2-6)^2}$ $= \sqrt{(-3)^2+(-4)^2}$ $= \sqrt{9+16} = \sqrt{25} = 5units$ b) $d_{PQ} = \sqrt{(2--1)^2+(-4-2)^2}$ $= \sqrt{(3)^2+(-6)^2}$ $= \sqrt{9+36} = \sqrt{45}\ Units$ 2) a) $M\left(\frac{5-3}{2}, \frac{2+4}{2}\right) = M(1,3)$ b) $M\left(\frac{0+1}{2}, \frac{0+3}{2}\right) = M\left(\frac{1}{2}, \frac{3}{2}\right)$ c) $M\left(\frac{0+4}{2}, \frac{4+0}{2}\right) = M(2,2)$

				d) $M\left(\frac{2-2}{2},\frac{1+5}{2}\right)=M(0,3)$
Conclusion	**Homework** 1) A triangle has vertices A, B and C with coordinate $A(-2,5), B(2,2) and\ C(2,7)$. Find the length of the sides of the triangle and hence prove that the triangle is an isosceles triangle. 2) Find the coordinates of the midpoints of the line joining the point a) $A(6,1) and\ B(8,-2)$ b) $C(-1,-6) and\ D(1,1)$	Write homework on the board	Copy down homework	ASSIGNMENT 1)  2) $M\left(\frac{6+8}{2},\frac{1-2}{2}\right)=M\left(\frac{14}{2},\frac{-1}{2}\right)=M\left(7,\frac{-1}{2}\right)$ $M\left(\frac{-1+1}{2},\frac{-6+1}{2}\right)=M\left(\frac{0}{2},\frac{-5}{2}\right)=M\left(0,\frac{-5}{2}\right)$