**UNIVERSITY OF LIVINGSTONIA**

*LAWS CAMPUS*

**FACULTY OF EDUCATION**

**DEPARTMENT OF EDUCATION IN ICT**

**TO**

MR K. PHIRI

**FROM**

LEONARD PONJE MLUNGU

**REG. NUMBER**

ICT/01/25/22

**COURSE TITLE**

MATHEMATICS METHODS

**COURSE CODE**

MAM 3601

**LEVEL**

THREE

**SEMESTER**

SIX

**TASK**

LESSON PLAN

**DUE DATE**

28TH FEBRUARY, 2025

lesson plan

School: Mlare Secondary School

Subject: Mathematics Class: Form 3

Core element: Space, shape and measurement Date: 28/02/25

Topic: Circle geometry (Angle properties) Time: 7:00 – 7:40 am

Lesson topic: Angle properties Number of students: 30

Rationale: Students can effectively apply their knowledge in constructing stable

arches, positioning satellites for optimal functionality, and accurately

constructing roundabouts .

Success criteria :

By the end of this lesson, students must be able to:

* **Identify** angle properties of a circle.
* **Explain**  angle properties using labelled diagrams .
* **Prove** theorems involving angle properties.

Prerequisite knowledge

* Students have knowledge on fundamental circle concepts, such as part of the circle e.g the **chord, radius, sector, segment, diameter, arc and chord properties**. This foundation will help them connect chord properties to **angle theorems**, making it easier to understand.

Teaching, learning, and assessment resources

* Textbooks
* Mathematical instruments
* **Chalkboard mathematical tools**
* **labelled diagrams**

Teaching, learning, and assessment methods

* Demonstration
* Explanation
* Questions and answers

References Lesson presentation

* Target in senior secondary mathematics 3
* https://www.cuemath.com/geometry/arcs-and-subtended-angles
* https://thirdspacelearning.com/gcse-maths/geometry-and-measure/angle-at-the-centre-is-twice-the-angle-at-the-circumference

Lesson presentation

|  |  |  |
| --- | --- | --- |
| Teacher activity | Learner activity | Learning points |
| Introduction (5 minutes)   * Ask students what they learned about circle concepts (parts of a circle and chord properties) and they should think about how it can be applied in different areas in mathematics or everyday life. | * Thinking * Responding | * Parts of the circle such as chord, radius, sector, segment, diameter, arc * Theorems on chord properties of a circle:   *1. The perpendicular to a chord from the centre bisects the chord and its converse*  *2. equal chords of the circle are equidistant from the centre and its converse* |
| Developmental stage  Step 1 (5mins)   * Ask students to i**dentify** angle properties of a circle. * Review the concept of angle properties of a circle.   Step 2 (5 mins)   * **Explaining** angle properties using labelled diagrams | * Analysing the labelled diagrams * Labelling Angles * Identifying Angle Relationships * Taking down short notes * Taking down short notes * Asking questions if there are any. | * Angle at the Centre(The angle at the centre of a circle is twice the angle at the circumference) * Angle at the Circumference (The angle at the circumference of a circle is half the angle at the centre). * Angles subtended by the same arc are equal * Angle at the Centre   - Angle at the centre = 2 × angle at the circumference  - ∠AOC = 2 × ∠ABC   * Angles Subtended by the Same Arc   - Angles subtended by the same arc are equal  - ∠ABC = ∠DEF |
| Step 3(15 mins)   * Demonstrate how to p**rove** theorems involving angle properties  1. Angle at the Centre 2. Angles subtended by the same arc are equal | * Writing /copying down the notes * try proving theorems involving angle properties * Asking questions if there are any. | **A) Angle at the Centre**  **Step1:**    A, B, and D are points on the circumference and C is the centre  of the circle. BC and CD are radii. AB and AD are chords.  **Step2:**    Connect the points AC so that you have two triangles (ACD and ABC).  **Step3:**    We know that AC and CD are radii and so this is an isosceles triangle. We can therefore state the angles at A and D are equal, so we have labelled them x.  As angles in a triangle add up 180, the angle at C will be 180 degrees minus the sum of the other two angles. This is expressed as  180−2x.  **Step4:**    We do the same to triangle ACB but here we label it with y.  **Step5:**    Now we have the diagram with all the angles filled in. We still need to prove that the external angle to BCD is equal to twice the angle at A but for now, let us simplify each angle within ABCD.  **Step6:**    The angle at A is now x+y and the  angle at C is the sum of  180−2x and 180−2y (or 180−2x+ 180−2y). As we need to know  the angle on the other side of BCD, we can use the fact that angles around a point total 360 degrees.   * 360−(360−2x−2y)=360−360+2x+2y=2x+2y   We now have the external angle BCD  equalling 2x+2y.  **Step7:**  If we factorise this expression, we get our angle BCD as 2(x+y).  **Step8:**  So as angle BAD =x+y and angle BCD =2(x+y), the angle at the centre is twice the angle at the circumference.  **B)Angles subtended by the same arc are equal**    Consider the following figure, which shows an arc AB subtending angles ACB and ADB at two arbitrary points C and D on the circumference. O is the centre of the circle.  We need to prove that ∠ACB= ∠ADB.  **Solution**  Using theorem of angle at the circumference = 1/2 × angle at the centre, we have that :  ∠ACB= 1/2× ∠AOB ⋯ (1)  ∠ADB= 1/2× ∠AOB ⋯ (2)  From equations (1) and (2), we get ∠ACB= ∠ADB. |
| Conclusion (5 mins)   * Ask students to mention one thing they have learned about angle properties and ask questions if they have any. * consolidate * Giving students a Homework | * Mentioning * Asking questions if there are any. * copying homework | Target in senior secondary mathematics 3  Exercise 1  page 93  Qe |

Lesson evaluation

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