



MATHEMATICS LESSON PLAN
GRADE 9
TERM 2: APRIL – JUNE

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|-----------------|--------|
| PROVINCE: | |
| DISTRICT: | |
| SCHOOL: | |
| TEACHER'S NAME: | |
| DATE: | |
| DURATION: | 1 Hour |

1. **TOPIC: THE THEOREM OF PYTHAGORAS:** Is it a right – angled triangle or not?
(Lesson 2)

2. CONCEPTS & SKILLS TO BE ACHIEVED

By the end of the lesson learners should be able to use the Theorem of Pythagoras to solve problems involving unknown lengths in geometric figures that contain right – angled triangles

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|---|---|
| 3. RESOURCES: | DBE workbook, Sasol-Inzalo book, textbook |
| 4. PRIOR KNOWLEDGE: | <ul style="list-style-type: none"> • surds • squares and square roots • relationship between the lengths of the sides of a right – angled triangle |
| 5. REVIEW AND CORRECTION OF HOMEWORK (suggested time: 10 minutes) | |
| <p>Homework provides an opportunity for teachers to track learners' progress in the mastery of mathematics concepts and to identify the problematic areas which require immediate attention. Therefore, it is recommended that you place more focus on addressing errors from learner responses that may later become misconceptions.</p> | |
| 6. INTRODUCTION (Suggested time: 10 Minutes) | |

Note to the teacher: Present the following problem to the whole class and allow them five minutes to work in pairs to solve the problem. Do the problem on the board after they have shared their answers and briefly discuss how they arrived at the answers. Ensure that learners understand that the theorem of Pythagoras does not apply to all triangles e.g. in $\triangle ACD$ below. The Theorem of Pythagoras applies in two ways if:

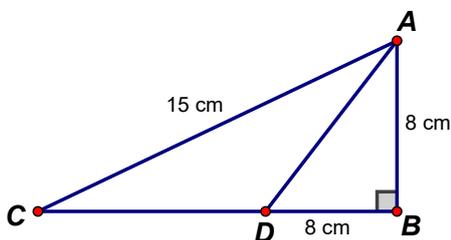
- 1) a triangle is right-angled, the sides will have the following relationship:
 $(\text{Hypotenuse})^2 = (\text{Side 1})^2 + (\text{Side 2})^2$
- 2) the sides have the relationship: $(\text{Longest side})^2 = (\text{Side 1})^2 + (\text{Side 2})^2$, then the triangle is a right-angled triangle.

So, we can test if any triangle is right-angled without using a protractor as it is done in the activity below.

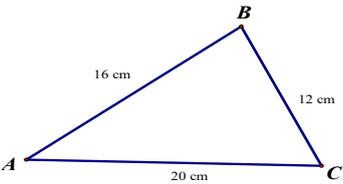
Activity 1

Calculate the following using the figure below:

- a) The length of AD
- b) The length of CD. Leave your answer in a surd form.



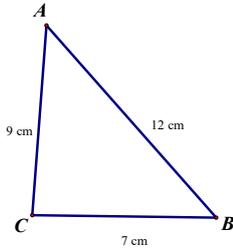
7. LESSON PRESENTATION/DEVELOPMENT (Suggested time: 20 minutes)

| Teaching activities | Learning activities (Learners are expected to :) |
|---|--|
| <p>Note to the teacher: Encourage learners to:</p> <ul style="list-style-type: none">• make a rough sketch of the triangle if not sketched for them so that they may easily understand.• draw in pencil and use rulers so that their work looks neat.• Learners should be guided by the fact that the longest side should be the hypotenuse. <p>Do the following examples on the board.</p> <p>Example: Determine whether or not the following triangles are right-angled:</p> <p>1) 12 cm; 16 cm and 20 cm</p> <p>Solution</p>  <p>(Longest side)² = (20 cm)² = 400 cm² (Side 1)² + (Side 2)² = (16 cm)² + (12 cm)² = 400 cm² (Longest side)² = (Side 1)² + (Side 2)² ∴ The triangle is right-angled.</p> | <ul style="list-style-type: none">• respond to probing questions asked by the teacher. |



2) 9 cm; 7 cm and 12 cm

Solution



$$AB^2 = (12 \text{ cm})^2 = 144 \text{ cm}^2$$

$$\begin{aligned} AC^2 + CB^2 &= (9 \text{ cm})^2 + (7 \text{ cm})^2 \\ &= 81 \text{ cm}^2 + 49 \text{ cm}^2 \\ &= 130 \text{ cm}^2 \end{aligned}$$

$$144 \text{ cm}^2 \neq 130 \text{ cm}^2$$

$\therefore \Delta ABC$ is not a right – angled triangle

3) Which of the angles in the figure above is equal to 90° ?

- copy down the examples onto their exercise books.

8. CLASSWORK (Suggested time: 15 minutes)

The primary purpose of Homework is to give each learner an opportunity to demonstrate mastery of mathematics skills taught in class. Therefore Homework should be purposeful and the principle of 'Less is more' is recommended, i.e. give learners few high quality activities that address variety of skills than many activities that do not enhance learners' conceptual understanding.

Carefully select appropriate activities from the Sasol-Inzalo books, workbooks and/or textbooks for learners' homework. The selected activities should address different cognitive levels.

Sasol-Inzalo book page 240 no 3a) to f)

9. CONSOLIDATION/CONCLUSION & HOMEWORK (Suggested time: 5 minutes)

a) Emphasise that:

- it is used to find the third side in any right – angled triangle
- in any triangle, the largest angle is always opposite the longest side and visa versa
- in a right – angled triangle, the largest angle is 90° . Therefore, the longest side is always opposite the right angle. This side is called the **hypotenuse**.

Commented [DSk1]: What?



b) Homework

Complete the following table. Decide whether each triangle described is right-angled, acute or obtuse.

| a | b | c | $a^2 + b^2$ | c^2 | Fill in =, < or > | Type of triangle |
|-----|-----|-----|---------------------------|------------|-------------------|------------------|
| 3 | 5 | 6 | $3^2 + 5^2 = 9 + 25 = 34$ | $6^2 = 36$ | $a^2 + b^2 < c^2$ | Acute |
| 5 | 7 | 9 | | | | |
| 12 | 5 | 13 | | | | |
| 7 | 9 | 11 | | | | |

Note to the teacher: Emphasise the following points when you review and mark homework the next day:

- if the square of the longest side is less than the sum of the squares of the two shorter sides, the biggest angle is acute.
For example, in 6-8-9 triangle: $6^2 + 8^2 = 100$ and $9^2 = 81$
81 is less than 100 \therefore 6-8-9 triangle is acute.
- if the square of the longest side is more than the sum of the squares of the two shorter sides, the biggest angle is obtuse.
For example, in a 6-8-11 triangle: $6^2 + 8^2 = 100$ and $11^2 = 121$
121 is more than 100 \therefore 6-8-11 triangle is obtuse.

Commented [DSk2]: This should be part of teaching activities. Let's discuss.

