



<u>FACULTY</u>	: Education
<u>DEPARTMENT</u>	: Science and Technology Education
<u>CAMPUS</u>	: APK
<u>MODULE</u>	: TEACHING METHODOLOGY AND PRACTICUM 3B
<u>SEMESTER</u>	: Second
<u>EXAM</u>	: January 2020

<u>ASSESSOR(S)</u>	: DR V RAMDHANY		
<u>MODERATOR</u>	: DR ED SPANGENBERG		
<u>DURATION</u>	: 2 HOURS	<u>MARKS</u>	: 100

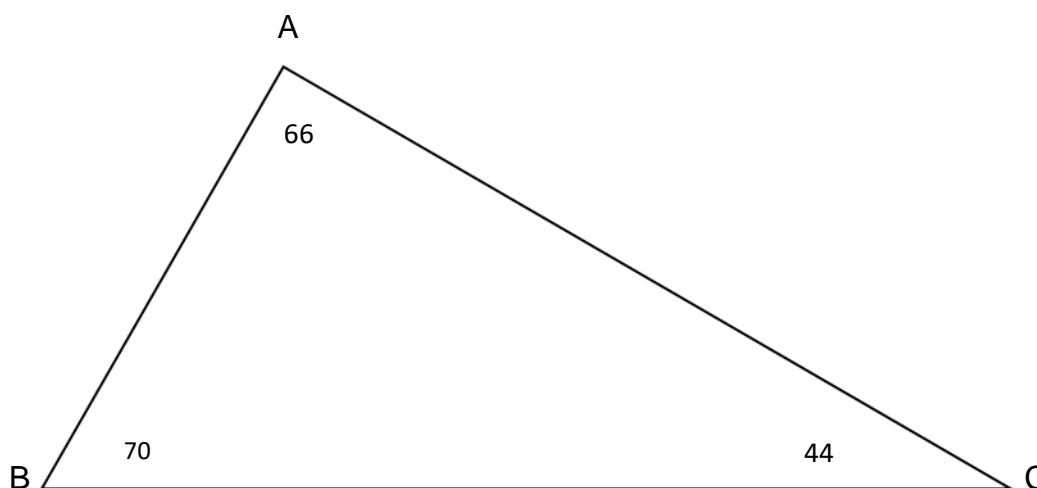
NUMBER OF PAGES: 5 PAGES

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
 2. Number your answers correctly according to the numbering system used in this question paper.
 3. Write legibly and present your work neatly.
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QUESTION 1: Teaching and learning Euclidean Geometry

You have prepared a Grade 10 lesson on congruency. You want your learners to realise when they have sufficient information to guarantee congruency. You draw a triangle with the following measurements: $\hat{A} = 66^\circ$, $\hat{B} = 70^\circ$ and $\hat{C} = 44^\circ$. $AB = 15$ cm, $BC = 20$ cm and $AC = 20.5$ cm.



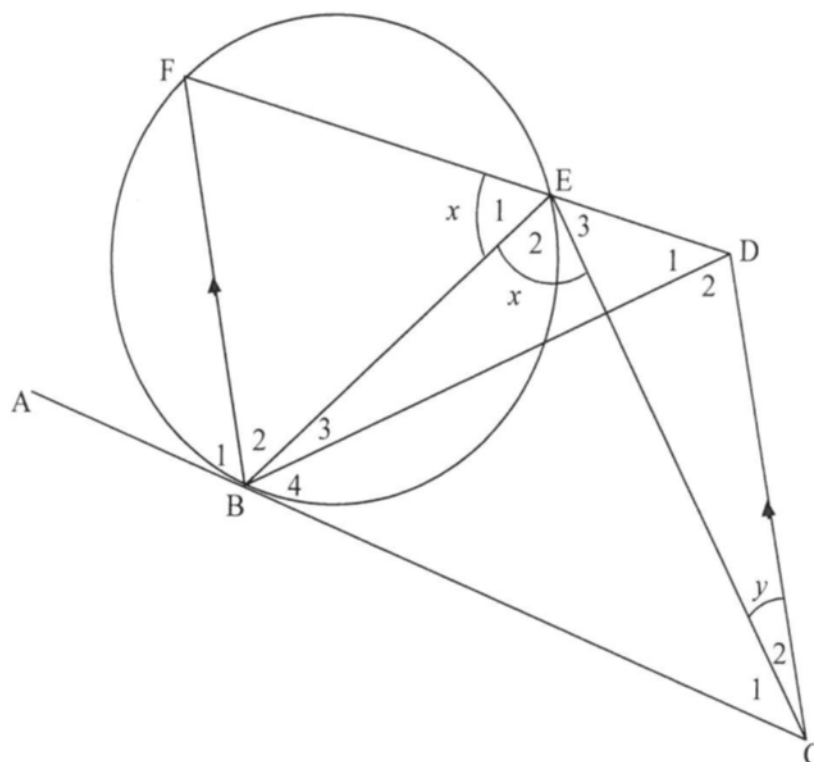
- 1.1 List the five Van Hiele levels. (5)
- 1.2 On which Van Hiele level is this activity? Provide reasons for your answer. (4)
- 1.3 One group of learners claim that a congruent triangle can be constructed if you have the lengths of two sides and the size of an angle not between them. You know that two such triangles will not always be congruent. How will you ensure that learners realise this? (6)
- 1.4 Did your response in 1.2. above change the Van Hiele level? Explain. (5)

[20]

QUESTION 2: Learner errors and misconceptions in mathematics

- 2.1. Explain the difference between a misconception and an error. (4)
- 2.2. Discuss in detail any two (2) causes of learner misconceptions. (8)
- 2.3 Grade 12 learners are given the following diagram, with information, in an assessment.

ABC is a tangent to the circle BFE at B. From C a straight line is drawn parallel to BF to meet FE produced at D. EC and BD are drawn. $\hat{E}_1 = \hat{E}_2 = x$ and $\hat{C}_2 = y$.



- 2.3.1 Lydia says that $\hat{B}_2 = \hat{E}_2 = x$. Suggest a possible reason for this error. (3)
- 2.3.2 Discuss a teaching strategy you would use to help prevent learners from making a similar error to Lydia's (as above). (5)
- [20]

QUESTION 3: Contextual factors in mathematics teaching

Cole and Griffin (1987, p. 16-17) provide the following definition of *context* in educational research:

Context refers to the events preceding, occurring with, and following the cognitive task; context so conceived includes all the factors that might influence the quality of time spent on the task, ranging from the arrangement of a lesson in the curriculum, to the relation of the classroom to the school as a whole, and to the relation of the school to the community of which it is a part.

- 3.1 Using this definition above, provide two (2) examples of contextual factors that influence the teaching and learning of mathematics. (4)
- 3.2 In South African education, an important contextual factor is language.
- 3.2.1 Explain what you understand by the term *multilingualism*. (3)

3.2.2 Many researchers argue that mathematics has a way of communicating with its own language that is universal. Thus, the learners' language/s should not matter. Do you agree with this argument? (1)

3.2.3 Discuss your response to 3.2.2 above by considering the following:

a) The language of learning and teaching in schools (4)

b) The home language/s of the learners; (4)

c) The issue of mathematics as a discipline of knowledge and as a mean of communication (4)

[20]

QUESTION 4: Teaching and learning Analytical Geometry

The following question appeared in a Grade 10 assessment:

P (4; 8), Q (-12; 4), R (-6; 13) and S (a ; b) are vertices of a parallelogram. Calculate the values of a and b .

4.1. List four (4) conditions that are necessary to prove that a quadrilateral is a parallelogram. (8)

4.2.1 When teaching analytical geometry, it is useful to illustrate different methods to solve the same question. Discuss two (2) methods that you can use to solve for a and b . (6)

4.2.2 Which of the two (2) methods (mentioned in 4.2.1) would you choose to impress upon learners? (1)

4.2.3 Discuss your answer in 4.2.2 above by providing a reason. (2)

4.3. Describe how you would obtain your answer by inspection, i.e. by NOT using an analytical method. (3)

[20]

QUESTION 5: Teaching and learning Data Handling

The following represent the points scored by a basketball player:

33	11	27	29	8	19	26	37	21	45	101
41	20	36	47	42	25	27	18	39	30	40

5.1 When introducing data handling to Grade 10 learners, explain why you would want them to organise the data in certain ways (e.g. ascending order). (3)

5.2. Provide a five number summary of the above data. (2)

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- 5.3. Which data would you use to illustrate the term 'outlier' to the learners? (2)
- 5.4. How would you explain the effect that outliers have on this set of data? (3)
- [10]

QUESTION 6: Teaching and learning Trigonometry

When first introducing Trigonometry to learners, two broad approaches are used: the right-angled triangle approach and the co-ordinate approach.

- 6.1 Briefly explain the advantages of the right-angle approach. (3)
- 6.2 Briefly explain the advantages of the right-angle approach. (3)
- 6.3 The ratio $\frac{y}{x}$ can be linked to the gradient of the straight line. How would you (as a teacher) explain to learners that $\frac{y}{x}$ cannot be calculated when the angle is 90° or 270° (without the use of a calculator)? (4)
- [10]

TOTAL: 100