



FACULTY : Education
DEPARTMENT : CHILDHOOD EDUCATION
CAMPUS : SWC
MODULE : MATINB3
SEMESTER : Second
EXAM : NOVEMBER 2019

DATE : 23 November 2019 **SESSION** 1
ASSESSOR(S) : Mr E LIBUSHA
MODERATOR : Dr Lawan Abdulhamid (University of Witwatersrand)
DURATION : 2 HOURS **MARKS** : 100

INSTRUCTIONS

Read the following instructions carefully before answering the questions.

1. You are allowed to use a calculator.
2. Answer all questions correctly.
3. Write neat and legibly.

Question 1 [quadrilaterals]

- 1.1 Give four (4) special conditions for a quadrilateral to be a square. 4
- 1.2 Compare three (3) differences between a parallelogram and a rhombus 3
- 1.3 Answer true or false
- 1.3.1 A quadrilateral with all sides equal is a square 1
- 1.3.2 If diagonals of a quadrilateral are equal, then the shape is a square 1
- 1.3.3 A quadrilateral with perpendicular diagonals is a kite 1
- 1.3.4 When diagonals of a quadrilateral bisect each other, then the shape is a parallelogram 1
- 1.3.5 If one pair of sides of a quadrilateral is parallel and equal, then the shape is a parallelogram 1
- 1.4 What is the name of a quadrilateral that has perpendicular diagonals that bisect each other, which does not excludes other quadrilateral with the same property 1
- 1.5 Give a brief description on how a Kite can be formed using triangles through transformation. Use a definition of a Kite to justify your reasoning for transformation. 5
- 1.6 Read the following dialogue and answer the question below:
- Mr Hadebe was teaching quadrilaterals to the grade 6 learners, the following conversation was heard as he was teaching:
- Teacher: A rectangle is a quadrilateral with all angles equal
Learner: But sir, a square also has all angles equal
Teacher: Yes, you are right. A square is also a rectangle
Learner: Sir, can I say "a square is a quadrilateral with all angles equal"?
Teacher: No. This is not sufficient for a definition of a square
Learner: But why sir? You said the square is a rectangle. Why can't I use the same definition? I am confused
- If you were the teacher in this classroom, how will you help a learner understand why you cannot use "A square is a quadrilateral with all angles equal" as a definition for a square? 4
- 1.7 Govender and De Villiers (2004) discuss the manner in which definitions can be obtained in Geometry. In order to differentiate between correct, incorrect and incomplete definitions. They use the terms like:
- necessary and sufficient conditions,
 - economical and uneconomical definition

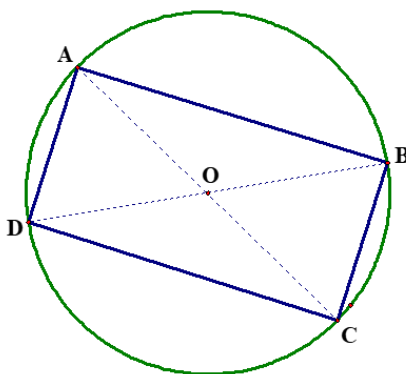
1.7.1	Explain what is meant by necessary and sufficient condition and give an example	4
1.7.2	Give an example of an incorrect and incomplete definition when defining a rhombus?	2
		[28]

Question 2 [Polygons]

2.1	What is an irregular polygon	2
2.2	Explain why a semi-circle cannot be regarded as a polygon	2
2.3	Name a triangle and a quadrilateral that can be classified as a regular polygon	2
2.4	What is the name of a polygon with 9 sides?	1
2.5	Calculate the number of sides of a regular polygon whose total sum of angles is 1440° .	5
2.6	Explain why the statement below is false and rectify the statement "A polygon is any closed figure with straight lines".	3
		[15]

Question 3 [constructions]

- 3.1 Two diameters in a circle with centre O were drawn. A quadrilateral was then formed by joining the four ends of the diameters at the circumference as shown on the diagram below.



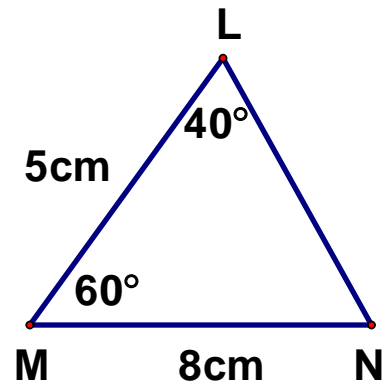
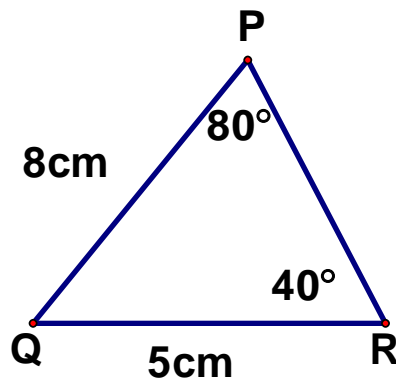
3.1.1	What type of quadrilateral will always be formed?	2
3.1.2	Give a reason why, the quadrilateral in question 3.1.1 will always be constructed using this method of construction.	3
3.2	Explain why it is impossible to construct triangle ABC with $AB=100\text{cm}$, $BC=40\text{cm}$ and $AC=50\text{cm}$	2
		[7]

Question 4 [triangles]

- 4.1 Without focusing on the size of the following triangles, mention if the triangles below are congruent or not. If they are congruent, give the condition for congruency and if they are not congruent, explain why they are not congruent

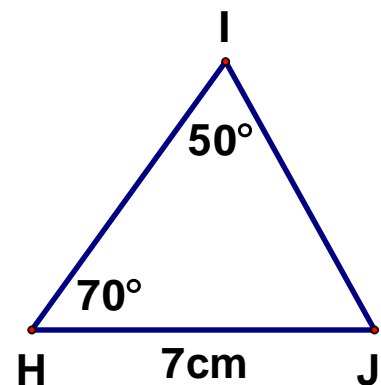
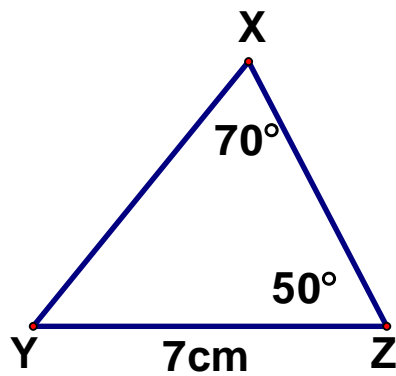
4.1.1

2



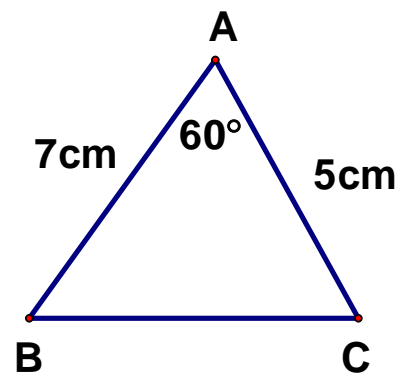
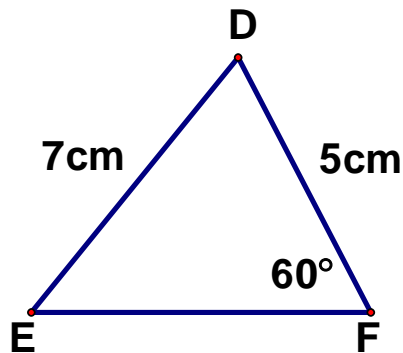
4.1.2

2



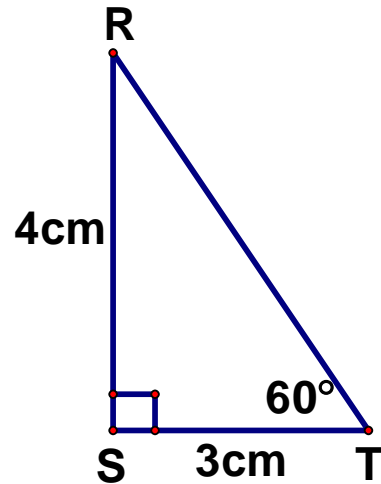
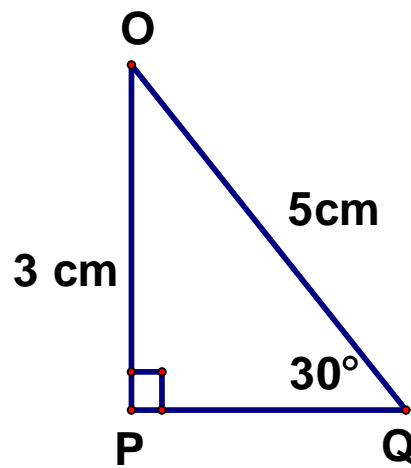
4.1.3

2



4.1.4

2

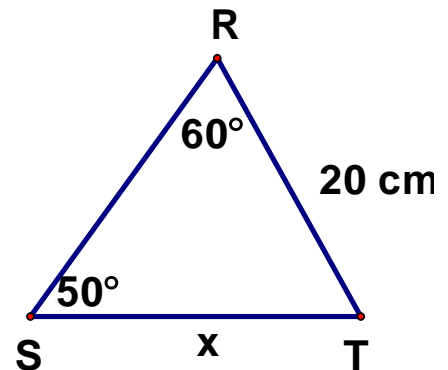
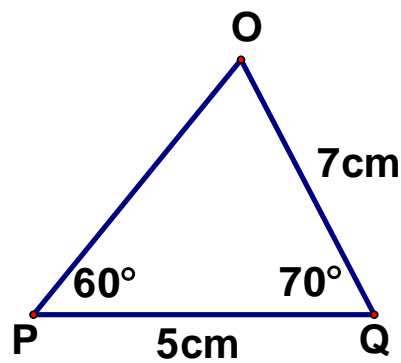


4.2 Name 5 properties possessed by all triangles

5

4.4 If triangle $\triangle OPQ \sim \triangle RST$ below, determine the value of x

3



4.5 If $\triangle OPQ$ was a reduction of $\triangle RST$ in question 4.4, what is the reduction factor?

1

4.6 “If the two triangles are similar, both the triangles must have sides that are in proportion and angles that are equal”
Rectify the statement above to make it true

2

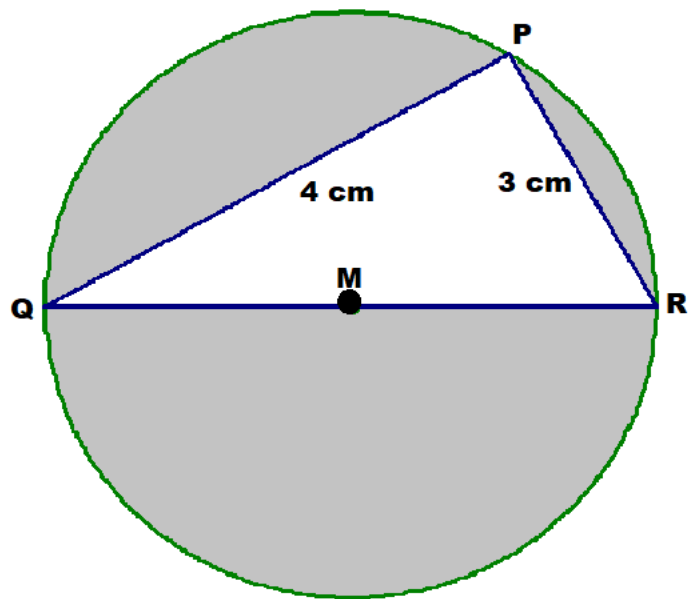
[19]

Question 5 [measurements]

5.1 On the diagram below QR is a diameter, $PQ = 4\text{ cm}$, $PR = 3\text{ cm}$ and point P lies on the circumference.

5.1.1 Calculate the length of the diameter of the circle 3

5.1.2 Calculate the area of the shaded region 4



[7]

Question 6 [solids]

6.1 Name one similarity and one difference between a cylinder and a prism. 4

6.2 Maria said that “a cube and a rectangular prism are the same”. On the other hand, Neo does not agree.

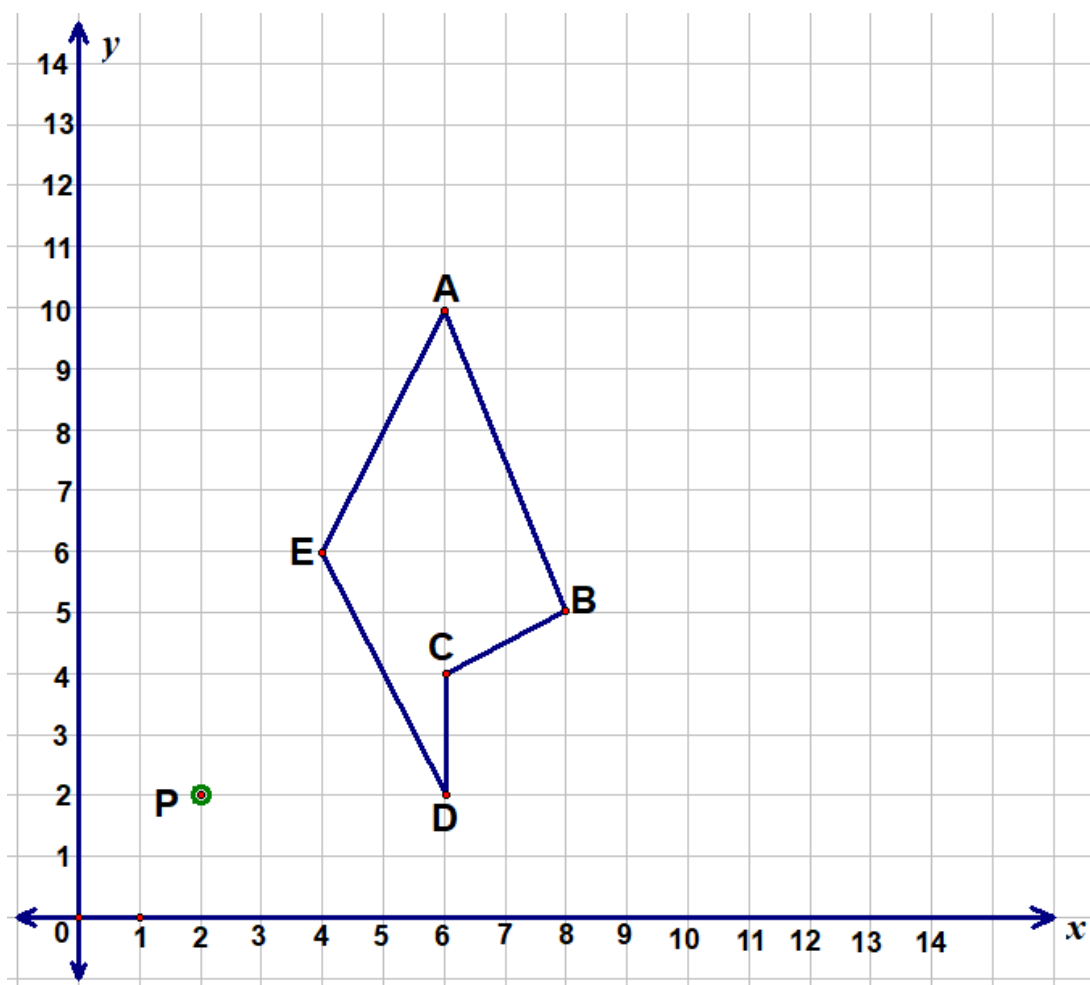
6.2.1 Who is right, Maria or Neo? Justify your answer 3

6.3 Name three (3) properties of a Pentagonal pyramid 3

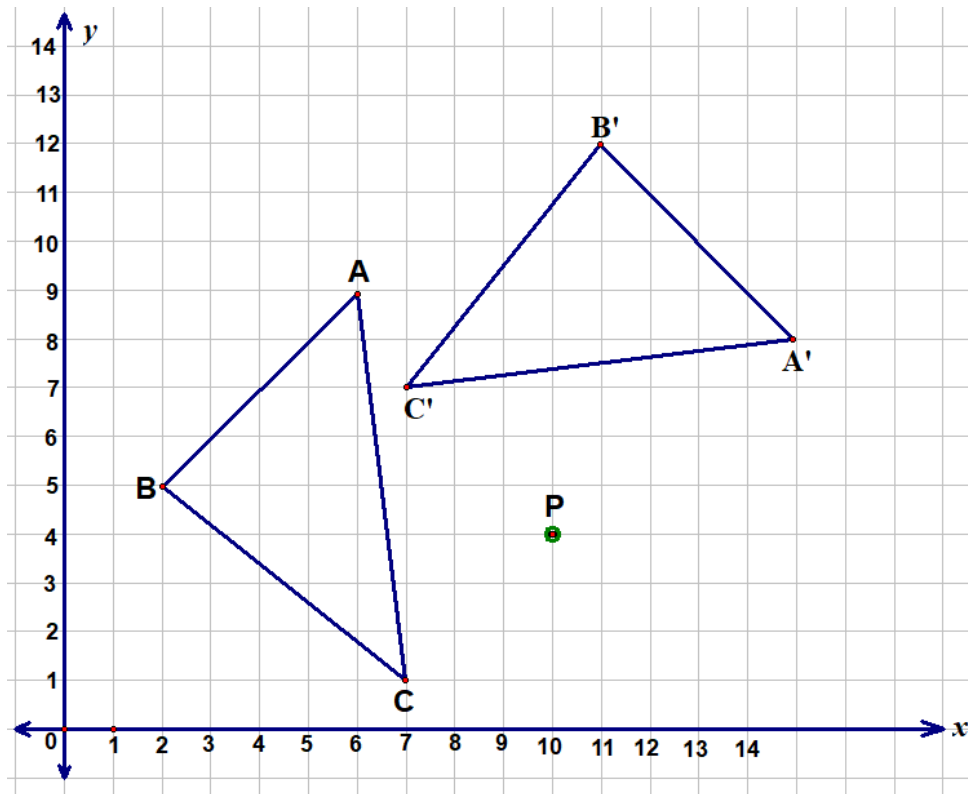
[10]

Question 7 (Transformation geometry)

- 7.1 The diagram below represent enlargement (transformation). Study the diagram and answer the questions below



- 7.1.1 If Figure ABCDE is enlarged by the enlargement factor of 1.5 using point P and the enlargement point, determine the coordinates of point A'B'C'D'E' 5
- 7.3 The diagram below represent Rotation (transformation) whereby $\triangle ABC$ is rotated about point P. Study the diagram and answer the questions below



- | | | |
|-------|--|------|
| 7.3.1 | Determine the angle and direction of rotation | 2 |
| 7.3.2 | Name 4 properties of Rotational transformation | 4 |
| 7.3.3 | If $\triangle ABC$ is rotated 180° clockwise, determine the coordinates of $\triangle A'B'C'$ | 3 |
| | | [14] |

Total: 100