GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

NOVEMBER 2023

GRADE 9

MATHEMATICS

PAPER 2

TIME: 1½ hours

MARKS: 75

15 pages

NAME OF LEARNER: _____

GRADE/CLASS: _____

EXEMPLAR

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 6 questions.
2. Answer ALL the questions on the question paper.
3. A non-programmable calculator may be used unless otherwise stated.
4. Clearly show all calculations, diagrams, and graphs that you have used in determining your answers. Answers only will not necessarily be awarded full marks.
5. If necessary, round-off your answers to 2 decimal places, unless otherwise stated.
6. Diagrams are not necessarily drawn to scale.
7. Answer QUESTION 1 by circling the letter next to the correct answer.
8. Answer QUESTIONS 2 to 6 in SECTION B in the spaces provided.
9. Write neatly and legibly.

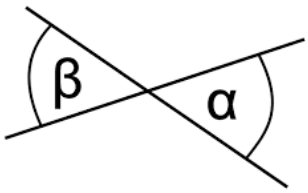
EXEMPLAR

SECTION A

QUESTION 1

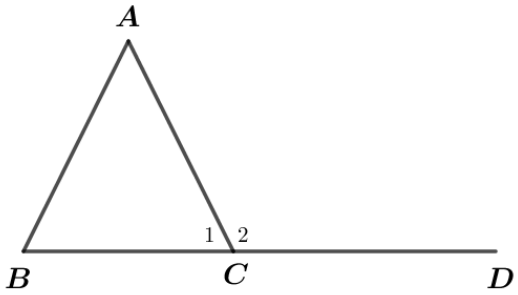
Answer the following questions by choosing the correct answer. Circle the letter next to the correct answer.

1.1 Angles β and α are created by two intersecting straight lines. What are these angles called?



A Supplementary angles
B Complementary angles
C Vertically opposite angles
D Adjacent supplementary angles (1)

1.2 BCD is a straight line. Study the diagram below and decide which of the statements given below is TRUE.



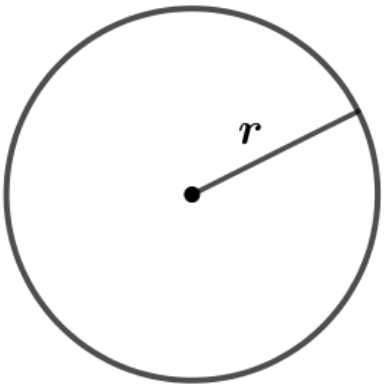
A $\hat{C}_2 = \hat{A} + \hat{C}_1$
B $\hat{C}_2 = \hat{A} - \hat{C}_1$
C $\hat{C}_2 = \hat{A} + \hat{B}$
D $\hat{C}_2 = \hat{A} - \hat{B}$ (1)

1.3 Describe the transformation $(x; y) \rightarrow (-x; y)$.

A The x-coordinate shifted or translated left.
B Reflection about the y-axis.
C Reflection about the x-axis.
D The x-coordinate shifted or translated right. (1)

EXEMPLAR

1.4 Identify the correct formula for the area of the shape.



A πr^2
B $2\pi r$
C $l \times b$
D $\frac{1}{2} bh$

(1)

1.5 A bucket contains 3,5 ℓ of water. Determine the volume of the water in cm^3.

A 0,0035 cm^3
B 3,5 cm^3
C 35 cm^3
D 3 500 cm^3

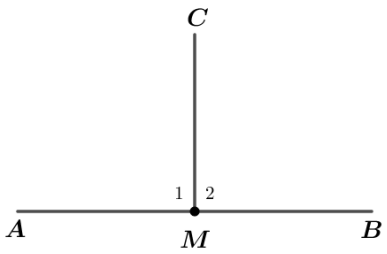
(1)
[5]

EXEMPLAR

SECTION B

QUESTION 2

2.1 Straight lines AB and CM intersect at M such that $\hat{M}_1 = \hat{M}_2$.



2.1.1 What is the size of $\hat{M}_1$?

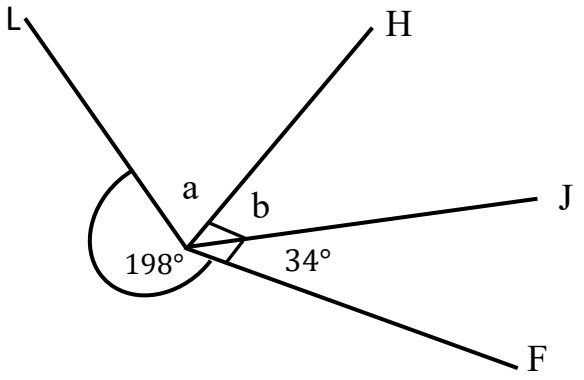
$\hat{M}_1 =$ _____ ° (1)

2.1.2 Consider your response in QUESTION 2.1.1 and complete the following statement.

Line AB is _____ to line CM. (1)

2.2 Study the diagram in QUESTION 2.2.1 below and complete the statements and/or reasons in the table provided.

2.2.1 Determine the values of a and b.

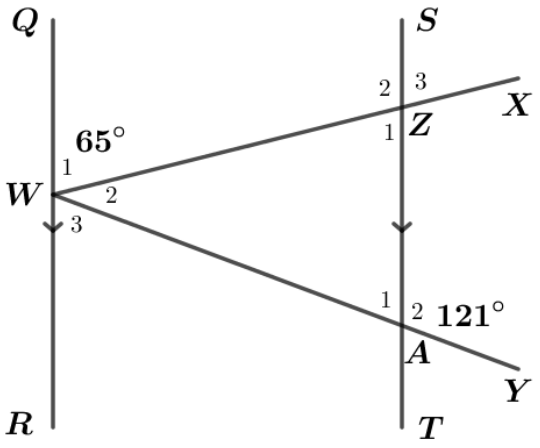


STATEMENT	REASON
$a + 90° + 198° =$ _____	_____
$\therefore a =$ _____°	
$b =$ _____°	Complementary $\angle s$

(3)

EXEMPLAR

2.2.2 Given: QWR ∥ SZAT, WX and WY intersect ST at Z and A respectively; $\hat{W}_1 = 65°$ and $\hat{A}_2 = 121°$. Complete the statements and/or reasons in the table below to calculate the sizes of $\hat{A}_1$, $\hat{W}_3$, $\hat{Z}_2$ and $\hat{Z}_3$.



STATEMENT	REASON
$\hat{A}_1 + \hat{A}_2 =$ _____	_____
$\hat{A}_2 = 121°$	Given
$\therefore \hat{A}_1 =$ _____	
$\hat{W}_3 =$ _____	$alt \angle s; QR \parallel ST$
$\hat{W}_1 + \hat{Z}_2 =$ _____	_____
$\hat{W}_1 = 65°$	Given
$\therefore \hat{Z}_2 =$ _____	
$\hat{Z}_3 =$ _____	_____

(6)

2.3 Complete the following statements.

2.3.1 If GU ∥ LE and QR ∥ LE, then GU and QR are _____. (1)

2.3.2 If ST ⊥ UV and JK ⊥ UV, then ST and JK are _____. (1)

[13]

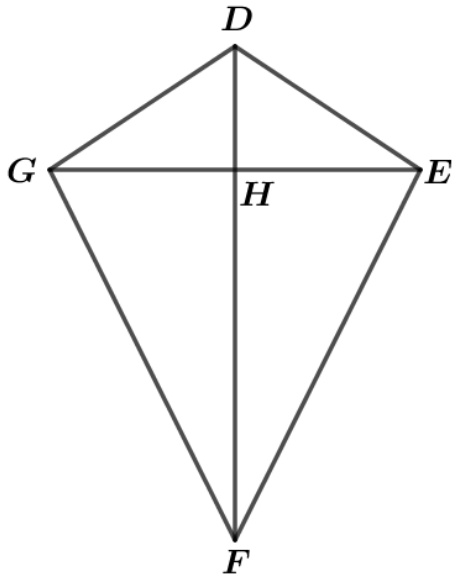
EXEMPLAR

QUESTION 3

3.1 Complete:

The exterior angle of a triangle is equal to the _____ of the interior _____ angles. (2)

3.2 DEFG below is a kite. Diagonals DF and GE intersect at H. Mark all the known properties of a kite related to sides and diagonals on the diagram below. Use appropriate geometric symbols.



(2)

3.3 In ΔEFG, $\hat{E} : \hat{F} : \hat{G} = 4 : 3 : 4$. Determine the size of $\hat{F}$ to the nearest degree.

STATEMENT	REASON

(3)

EXEMPLAR

3.4 In the diagram below TV ∥ SW and TV = SW.

3.4.1 What type of quadrilateral is TVWS? Give a reason for your answer.

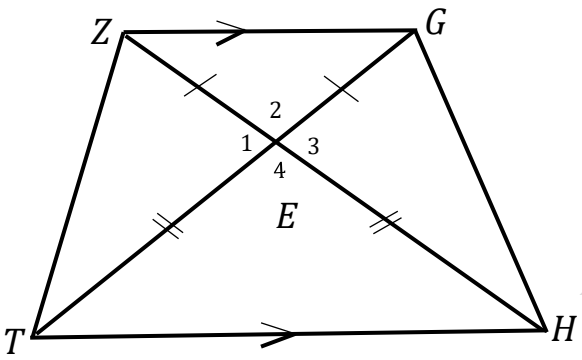
(2)

3.4.2 What type of quadrilateral is TVWX? Give a reason for your answer.

(2)

EXEMPLAR

3.5 In the following diagram ZGHT is a quadrilateral as such that, ZG ∥ TH, ZE = GE and ET = EH. Diagonals ZH and GT intersect at E.



3.5.1 Prove that TZ = HG.

STATEMENT	REASON

(5)

3.5.2 Using the diagram in QUESTION 3.5 above, it is further given that ΔZGE ||| ΔTHE such that ZE = GE = 4 cm, ET = HE = 6 cm and ZG = 6 cm. Use this information to complete the statement or the reason in the table below and hence calculate the length of HT, if HT = x.

STATEMENT	REASON
$\frac{HE}{ZE} = \frac{HT}{ZG}$	_____
$\frac{6}{\quad} = \frac{\quad}{6}$	

(4)
[20]

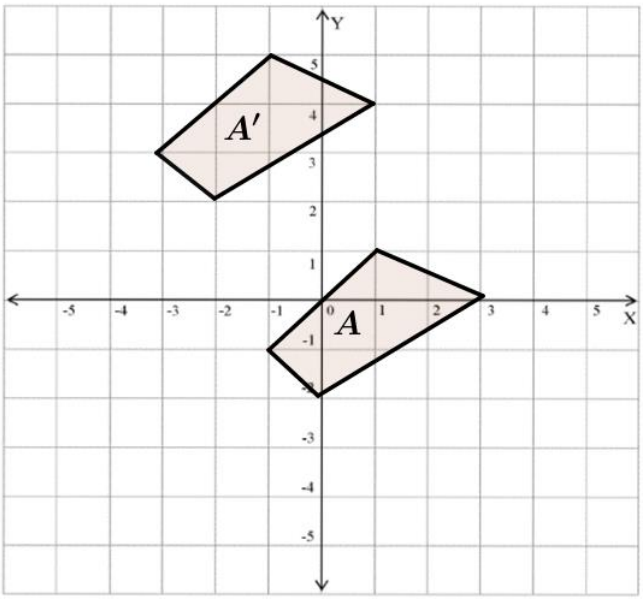
EXEMPLAR

QUESTION 4

4.1 Match the transformation in COLUMN A with its description in COLUMN B. Write only the letter of the correct answer in the ANSWER column.

COLUMN A		COLUMN B		ANSWER
Number	**Transformation**	**Letter**	**Description**	
4.1.1	Reflection	A	Slide	4.1.1 _____ (1)
		B	Turn	
4.1.2	Translation	C	Rotate	4.1.2 _____ (1)
		D	Flip	

4.2 Shape A on the Cartesian plane below has undergone a transformation into A'.



Name the transformation that took place and describe in detail how A was transformed into A'.

_____

_____

_____

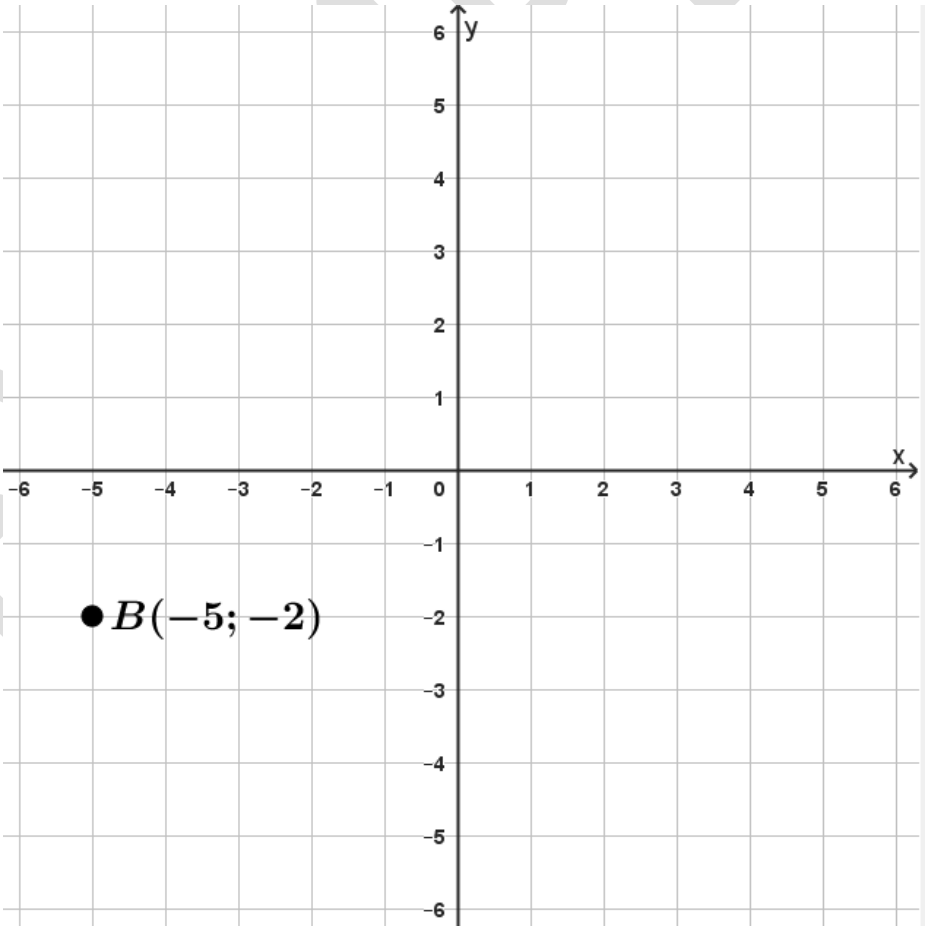
_____ (3)

4.3 The table below shows the coordinates of the vertices for a shape BEFORE and AFTER reflection. Determine the coordinates of the original or reflected shape if it is reflected about the *x*-axis $(y = 0)$ by completing the table below.

ORIGINAL SHAPE VERTEX	REFLECTED SHAPE VERTEX
Q(5; 4)	Q'(____; ____)
R(____; ____)	R'(–2; –1)
S(____; ____)	S'(5; 0)
T(7; 2)	T'(____; ____)

(4)

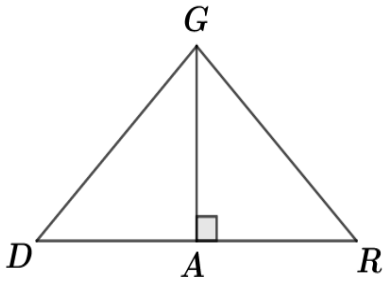
4.4 On the same set of axes, reflect point B(–5; –2) in the line $y = x$. Plot image B' on the set of axes below and write down its coordinates.



(2)
[11]

QUESTION 5

5.1 In ΔGRD, DA = AR, height GA = 8 cm and base DR = 12 cm.



5.1.1 Calculate the area (A) of ΔGRD. Given: $A = \frac{1}{2} \times b \times h$.

(2)

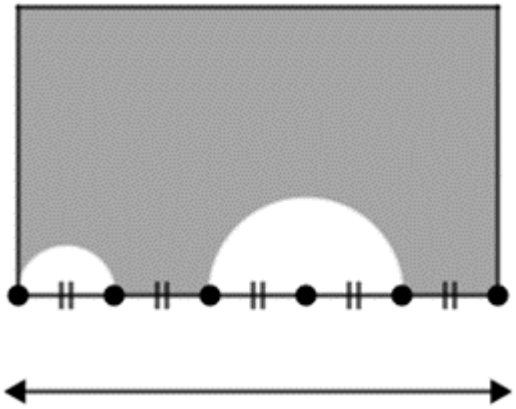
5.1.2 Calculate the perimeter of ΔGRA.

(5)

EXEMPLAR

5.2 The length of one side of the rectangle is 125 mm and that length was divided into 5 equal parts as shown in the picture below. The breadth of the rectangle is $\frac{3}{5}$ of its length. Calculate the perimeter of the shaded part correct to two decimal places.

Hint: The unshaded parts are semicircles. Use $\pi = 3{,}14$.



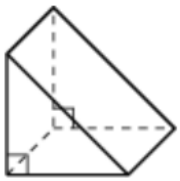
(6)
[13]

EXEMPLAR

QUESTION 6

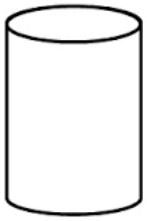
6.1 Name the objects shown below.

6.1.1



_____ (1)

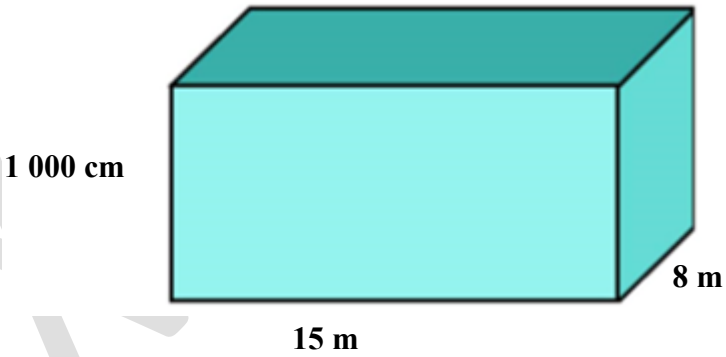
6.1.2



_____ (1)

6.2 Given: A rectangular prism below with the following dimensions:

height = 1 000 cm; length = 15 m and breadth = 8 m.



Calculate the total surface area of the prism in m^2.

_____

_____

_____

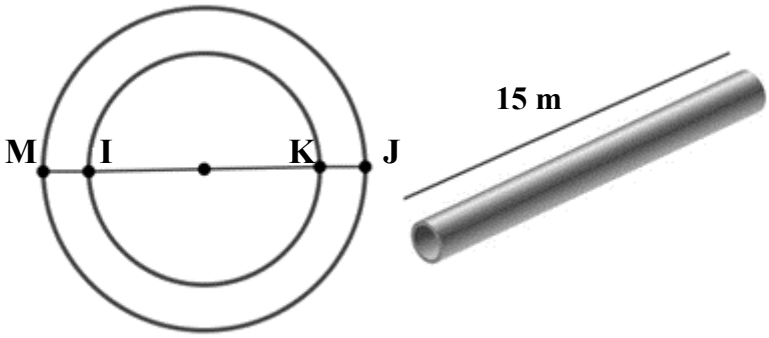
_____

_____

_____ (5)

EXEMPLAR

6.3 Calculate the volume of the material used to produce a 15 m pipe if the internal diameter IK is 0,2 m (IK = 0,2 m), and external diameter MJ is 0,35 m (MJ = 0,35 m).
Use π = 3,14.



(6)
[13]

TOTAL: 75

EXEMPLAR

END