GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

NOVEMBER 2021

GRADE 9

MATHEMATICS
(PAPER 2)

NAME OF LEARNER: _____

GRADE: _____

TIME: 1½ hours

MARKS: 75

14 pages

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions in the spaces provided on the question paper.
2. Question 1 consists of 5 multiple choice questions. Circle the letter next to the correct answer.
3. Answer questions 2 to 5 in the spaces provided.
4. Clearly show all calculations, diagrams and graphs that have been used in determining your answers. Answers only will not necessarily be awarded full marks.
5. Diagrams are not necessarily drawn to scale. Reasons MUST always be given for statements made when answering geometry questions.
6. The teacher will lead you through the practice question before you start the test.
7. An approved scientific calculator (non-programmable and non-graphical) may be used, unless otherwise stated.
8. Write neatly and legibly.

PRACTICE QUESTION

Circle the letter next to the correct answer.

1. Complete: $\hat{A}$ is an obtuse angle, because …

   A $0° < \hat{A} < 90°$

   B $180° < \hat{A} < 360°$

   C $90° < \hat{A} < 180°$

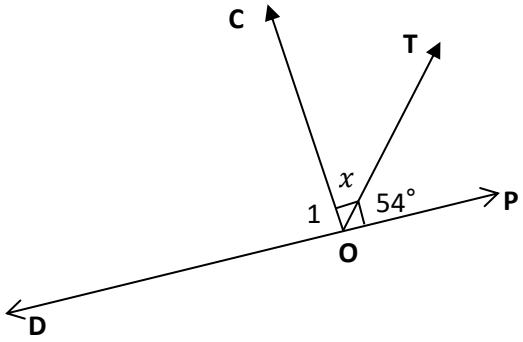
   D $\hat{A} = 180°$

   You have done it correctly if you circled **C.**

QUESTION 1

Circle the letter next to the correct answer.

1.1



Complete: The size of $x =$ ...

A 54°

B 36°

C 136°

D 90° (1)

1.2 In ΔABC, AB = BC and $\hat{B}$ = 97°
Complete: ΔABC is …

A an acute angled isosceles triangle.

B an equilateral triangle.

C an obtuse angled isosceles triangle.

D a scalene triangle. (1)

1.3 Given: $\hat{A}$ = 36° and $\hat{K}$ = 54°
Complete: $\hat{K}$ is …

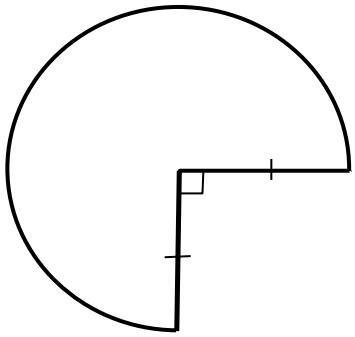
A the supplement of $\hat{A}$.

B a corresponding angle of $\hat{A}$.

C the complement of $\hat{A}$.

D a co-interior angle of $\hat{A}$. (1)

1.4 Given: Three quarters of a circle with radius of 6 cm.



The circumference of the circle is …

A $\frac{3 \times \pi \times (6\ cm)^2}{4}$

B $\frac{4 \times \pi \times 12\ cm}{3}$

C $\frac{4 \times \pi \times (6\ cm)^2}{3}$

D $\frac{3 \times \pi \times 12\ cm}{4}$ (1)

1.5 The co-ordinates of the image of A $(2\ ;-3)$ under the translation $(x\ ;y) \rightarrow (x\ ;\ y-3)$ is …

A $(-1\ ;\ 0)$

B $(\ 2\ ;\ 0)$

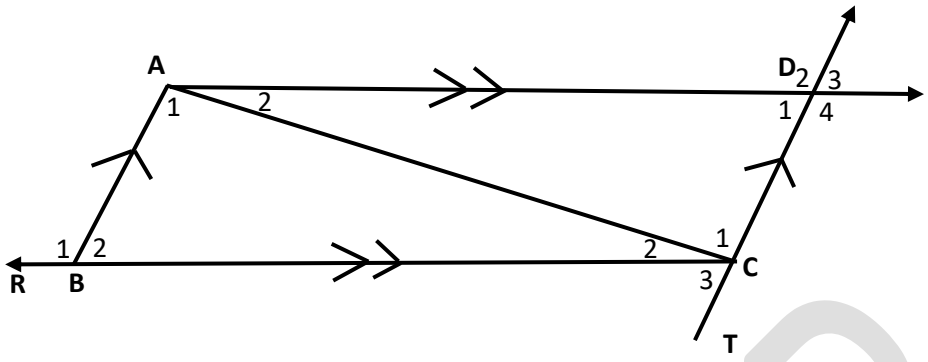
C $(\ 2\ ;-6)$

D $(-1\ ;-6)$ (1)

[5]

QUESTION 2

2.1

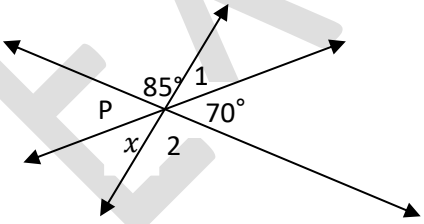


Fill in the missing information to complete the statement or reason.

	Statement	Reason
2.1.1	$\hat{B}_1 = B\hat{C}D$	_____
2.1.2	$\hat{A}_1 + \hat{A}_2 + \hat{B}_2 =$ _____	co-int. $\angle s$ and AD ll BC
2.1.3	$\hat{B}_1 =$ _____	ext. $\angle$ of Δ
2.1.4	$\hat{A}_2 = \hat{C}_2$	_____
2.1.5	$\hat{D}_2 = \hat{D}_4$	_____
2.1.6	$\hat{D}_2 = \hat{C}_1 + \hat{C}_2$	_____
2.1.7	$\hat{C}_1 + \hat{C}_2 + \hat{C}_3 = 180°$	_____
2.1.8	$\hat{A}_1 + \hat{B}_2 + \hat{C}_2 =$ _____	sum int. $\angle$ of Δ
2.1.9	$\hat{D}_2 =$ _____	alt. $\angle s$ and AB ll DC
2.1.10	$\hat{A}_1 = \hat{C}_1$	_____

(10)

2.2

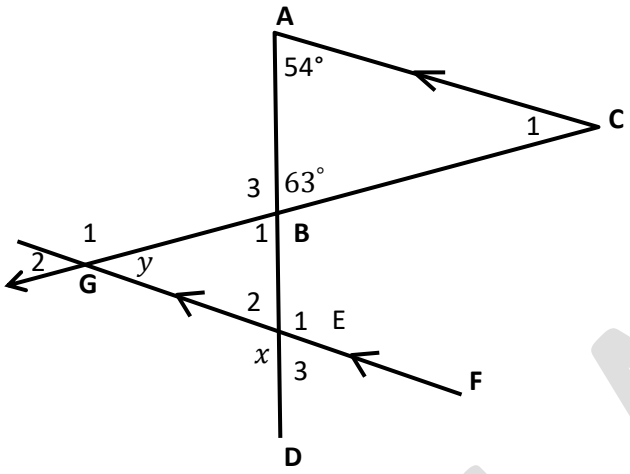


Calculate, with reasons, the size of x.

Statement	Reason

(3)

2.3 ΔABC with AB extended to D and CB extended to G, GF intersect AD at E, $B\widehat{A}C = 54°$, $A\widehat{B}C = 63°$, $D\widehat{E}F = x$ and $B\widehat{G}E = y$.



2.3.1 Calculate, with reasons, the value of x.

Statement	Reason

(3)

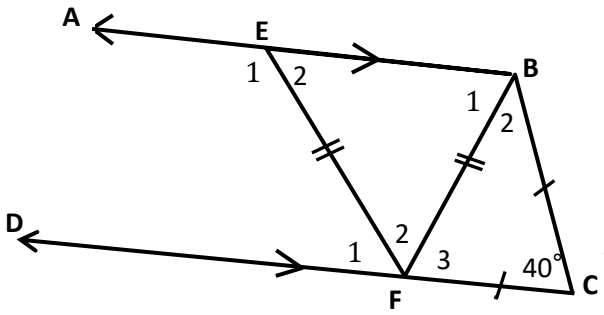
2.3.2 Calculate, with reasons, the value of y.

Statement	Reason

(3)
[19]

QUESTION 3

3.1 Given: AB∥DC, BC = FC, EF = BF and $\hat{C} = 40°$

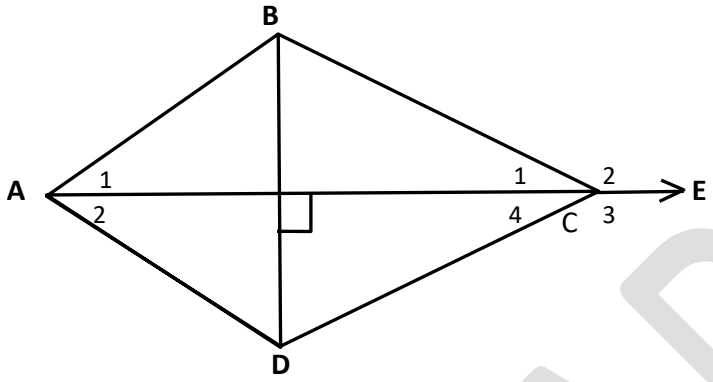


Complete this table in order to calculate, with reasons the size of $\hat{F}_2$

Statement	Reason
$\hat{C}$ =_____	Given
$\hat{B}_2$ =_____	∠s opp. equal sides
$2\hat{F}_3 + 40° = 180°$	_____
$2\hat{F}_3$ = _____	
_____	
∴ $\hat{F}_3$ = _____	
But $\hat{F}_3$ =_____	alt. ∠s and AB∥DC
and $\hat{B}_1$ =_____	_____
$\hat{F}_2 + \hat{B}_1 + \hat{E}_2 = 180°$	_____
_____	
_____	
∴ $\hat{F}_2$ = _____	

(8)

3.2 Given AB = AD and BC = DC.



3.2.1 What kind of quadrilateral is ABCD? Name one property to justify your answer.

_____

_____ (2)

3.2.2 Prove that ΔABC ≡ ΔADC.

Statement	Reason
AB = _____	_____
BC = _____	_____
AC = _____	_____
∴ ΔABC ≡ _____	_____

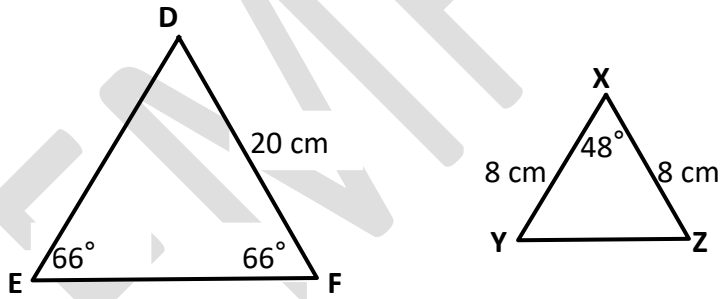
(4)

3.2.3 Hence prove that $\hat{C}_2 = \hat{C}_3$.

Statement	Reason
$\hat{C}_2 =$ _____	ext. ∠ of Δ
$\hat{C}_3 =$ _____	ext. ∠ of Δ
but $\hat{A}_1 =$_____	$\angle s$ of $\equiv \Delta s$
and $\hat{B} =$_____	$\angle s$ of $\equiv \Delta s$
$\therefore \hat{A}_1 + \hat{B} =$ _____	
$\therefore \hat{C}_2 =$ _____	

(4)

3.3 Given: ΔDEF with DE = DF = 20 cm, $\hat{E} = \hat{F} = 66°$and ΔXYZ with XY = XZ = 8 cm and $\hat{X} = 48°$



3.3.1 Write down TWO conditions for triangles to be similar.

_____

_____

(2)

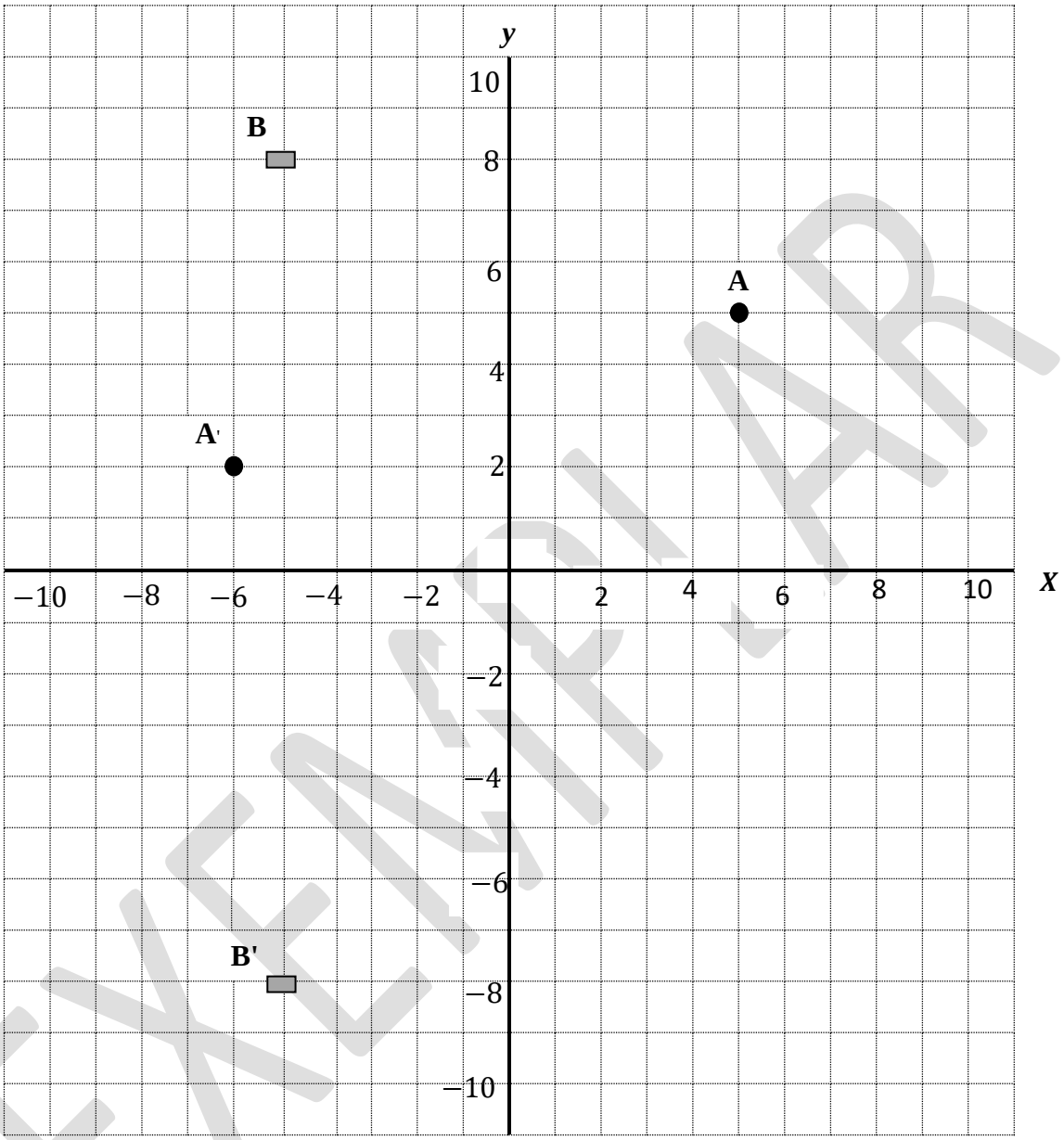
3.3.2 Hence, prove that ΔDEF ||| ΔXYZ

Statement	Reason
$\hat{Y}$ =_____	$\angle s$ opp. equal sides
$2\hat{Y}$ =_____	Sum int. $\angle s$ of Δ
_____	
∴ $\hat{Y}$ =_____	
In ΔDEF and ΔXYZ:	
$\hat{D}$ =_____, $\hat{E}$ =_____, $\hat{F}$ =_____	By calculation
∴ ΔDEF ||| _____	_____

(5)
[25]

QUESTION 4

4.1 The diagram below shows the translation of objects **A** and **B** in the Cartesian plane.



4.1.1 Write down the co-ordinates of object ***A***.

$\boldsymbol{A}(x\,;y) = (\_\_\,;\_\_)$ (1)

4.1.2 Describe, in your own words, the translation of object ***A*** to its image A'.

_____

_____ (2)

4.1.3 Write down the co-ordinates of the image of **B**.

B' (__ ; __) (1)

4.1.4 Describe in your own words, the transformation of **B** to its image B'.

_____

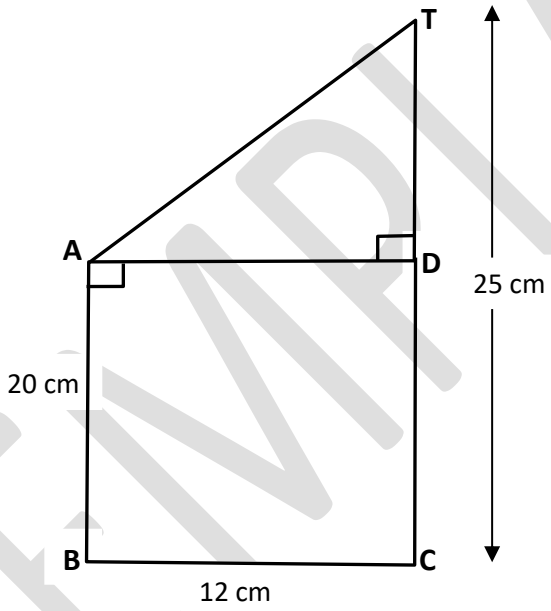
_____ (2)

[6]

QUESTION 5

5.1 ΔTAD is a right-angled triangle attached to rectangle ABCD.

AB = 20 cm, BC = 12 cm and TC = 25 cm.



5.1.1 Complete the table below in order to calculate the length of AT.

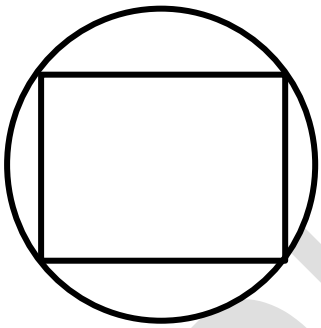
Statement	Reason
In ΔTAD: AD =	
TD =	
AT^2 =	Pythagoras
AT =	

(6)

5.1.2 Hence, calculate the perimeter of ABCDT.

(2)

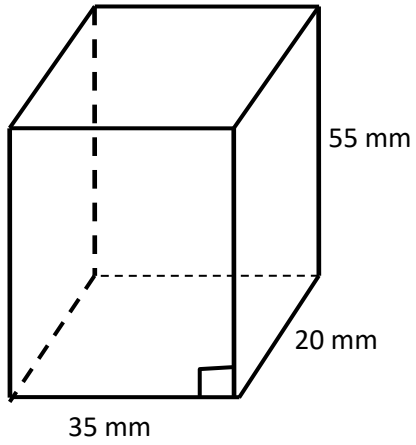
5.2 In the figure below, the square has all its vertices on the circumference of the circle. The area of the square is 400 cm².



Calculate is the area of the circle. Use $\pi = 3,14$.

(6)

5.3 Below is a rectangular prism with length 35 mm, breadth 20 mm and height 55 mm.



Calculate the total surface area of the rectangular prism.

(3)

5.4 Calculate the volume, correct to 1 decimal place, of a cube with sides 13,5 cm.

(3)

[20]

TOTAL: 75

END