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**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.

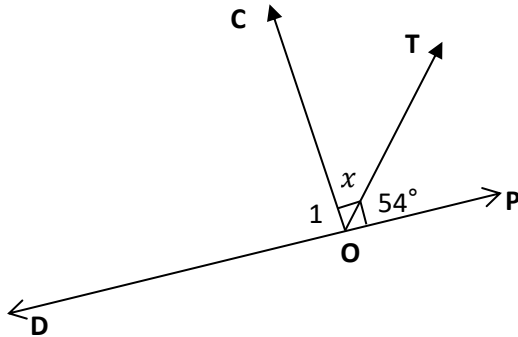
1. Complete: $\hat{A}$ is an obtuse angle, because ...
A $0^\circ < \hat{A} < 90^\circ$
B $180^\circ < \hat{A} < 360^\circ$
☒ C $90^\circ < \hat{A} < 180^\circ$
D $\hat{A} = 180^\circ$

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 $x = \dots$

- A 54°
- B 36°
- C 136°
- D 90°

(1)

1.2 In $\triangle ABC$, $AB = BC$ and $\hat{B} = 97^\circ$
Complete: $\triangle ABC$ is ...

- A an acute angled isosceles triangle.
- B an equilateral triangle.
- C an obtuse angled isosceles triangle.
- D a scalene triangle.

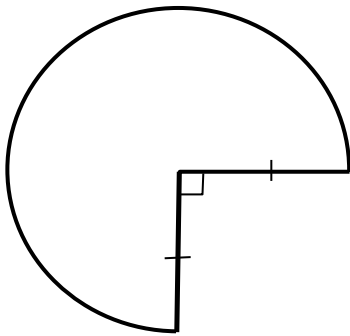
(1)

1.3 Given: $\hat{A} = 36^\circ$ and $\hat{K} = 54^\circ$
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 $\frac{3 \times \pi \times (6 \text{ cm})^2}{4}$
B $\frac{4 \times \pi \times 12 \text{ cm}}{3}$
C $\frac{4 \times \pi \times (6 \text{ cm})^2}{3}$
D $\frac{3 \times \pi \times 12 \text{ cm}}{4}$

(1)

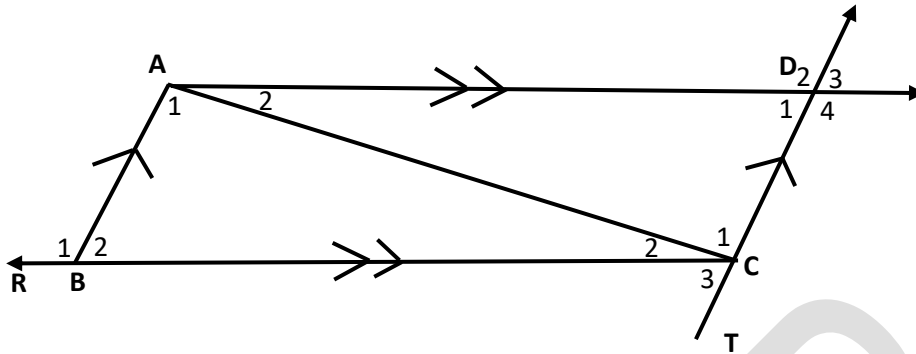
- 1.5 The co-ordinates of the image of A (2 ; -3) under the translation
 $(x ; y) \rightarrow (x ; y - 3)$ is ...

- A (-1 ; 0)
B (2 ; 0)
C (2 ; -6)
D (-1 ; -6)

(1)
[5]

QUESTION 2

2.1

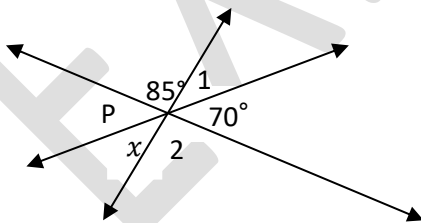


Fill in the missing information to complete the statement or reason.

	Statement	Reason
2.1.1	$\hat{B}_1 = \hat{B}_2$	_____
2.1.2	$\hat{A}_1 + \hat{A}_2 + \hat{B}_2 = \underline{\hspace{2cm}}$	co-int. $\angle$ s and $AD \parallel BC$
2.1.3	$\hat{B}_1 = \underline{\hspace{2cm}}$	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	$\hat{C}_1 + \hat{C}_2 + \hat{C}_3 = 180^\circ$	_____
2.1.8	$\hat{A}_1 + \hat{B}_2 + \hat{C}_2 = \underline{\hspace{2cm}}$	sum int. $\angle$ of Δ
2.1.9	$\hat{D}_2 = \underline{\hspace{2cm}}$	alt. $\angle$ s and $AB \parallel DC$
2.1.10	$\hat{A}_1 = \hat{C}_1$	_____

(10)

2.2



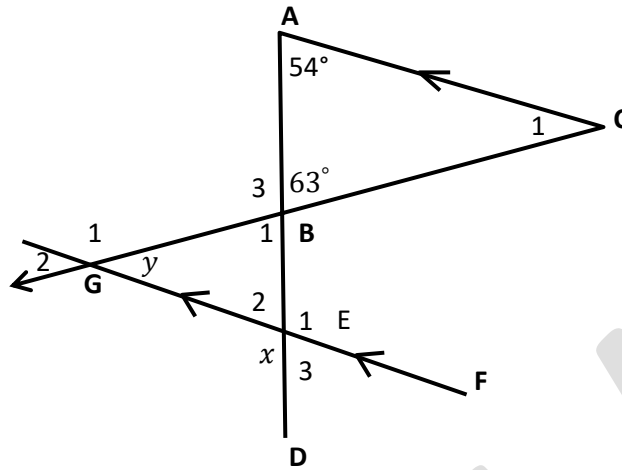
Calculate, with reasons, the size of x .

Statement	Reason

(3)

P.T.O.

- 2.3 $\triangle ABC$ with AB extended to D and CB extended to G, GF intersect AD at E, $\widehat{BAC} = 54^\circ$, $\widehat{ABC} = 63^\circ$, $\widehat{DEF} = x$ and $\widehat{BGE} = y$.



- 2.3.1 Calculate, with reasons, the value of x .

Statement	Reason

(3)

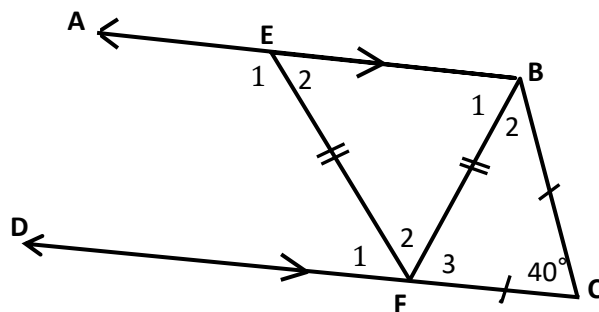
- 2.3.2 Calculate, with reasons, the value of y .

Statement	Reason

(3)
[19]

QUESTION 3

3.1 Given: $AB \parallel DC$, $BC = FC$, $EF = BF$ and $\hat{C} = 40^\circ$



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

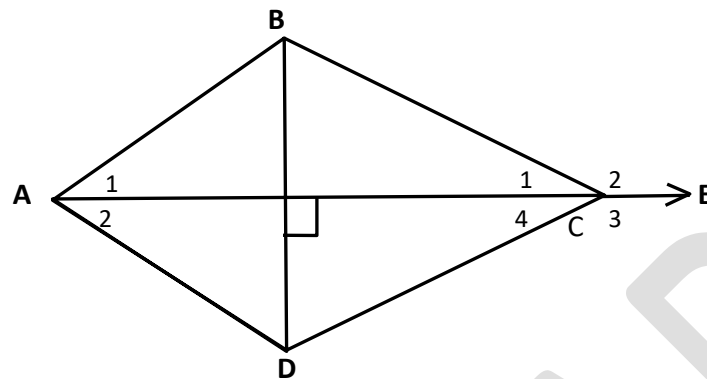
Statement	Reason
$\hat{C} =$ _____	Given
$\hat{B}_2 =$ _____	$\angle$ s opp. equal sides
$2\hat{F}_3 + 40^\circ = 180^\circ$	_____
$2\hat{F}_3 =$ _____	

$\therefore \hat{F}_3 =$ _____	
But $\hat{F}_3 =$ _____	alt. $\angle$ s and $AB \parallel DC$
and $\hat{B}_1 =$ _____	_____
$\hat{F}_2 + \hat{B}_1 + \hat{E}_2 = 180^\circ$	_____

$\therefore \hat{F}_2 =$ _____	

(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 $\triangle ABC \equiv \triangle ADC$.

Statement	Reason
$AB =$ _____	_____
$BC =$ _____	_____
$AC =$ _____	_____
$\therefore \triangle ABC \equiv$ _____	_____

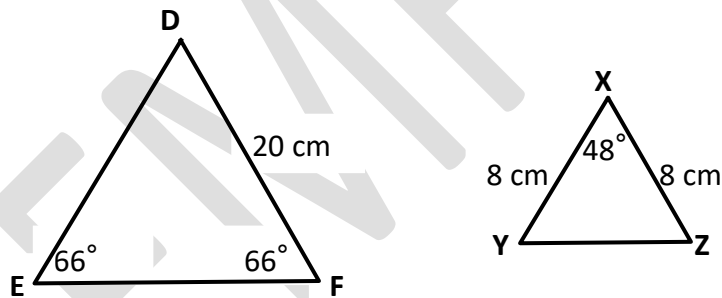
(4)

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

Statement	Reason
$\hat{C}_2 = \underline{\hspace{2cm}}$	ext. $\angle$ of Δ
$\hat{C}_3 = \underline{\hspace{2cm}}$	ext. $\angle$ of Δ
but $\hat{A}_1 = \underline{\hspace{2cm}}$	$\angle s$ of $\equiv \Delta s$
and $\hat{B} = \underline{\hspace{2cm}}$	$\angle s$ of $\equiv \Delta s$
$\therefore \hat{A}_1 + \hat{B} = \underline{\hspace{2cm}}$	
$\therefore \hat{C}_2 = \underline{\hspace{2cm}}$	

(4)

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



3.3.1 Write down TWO conditions for triangles to be similar.

(2)

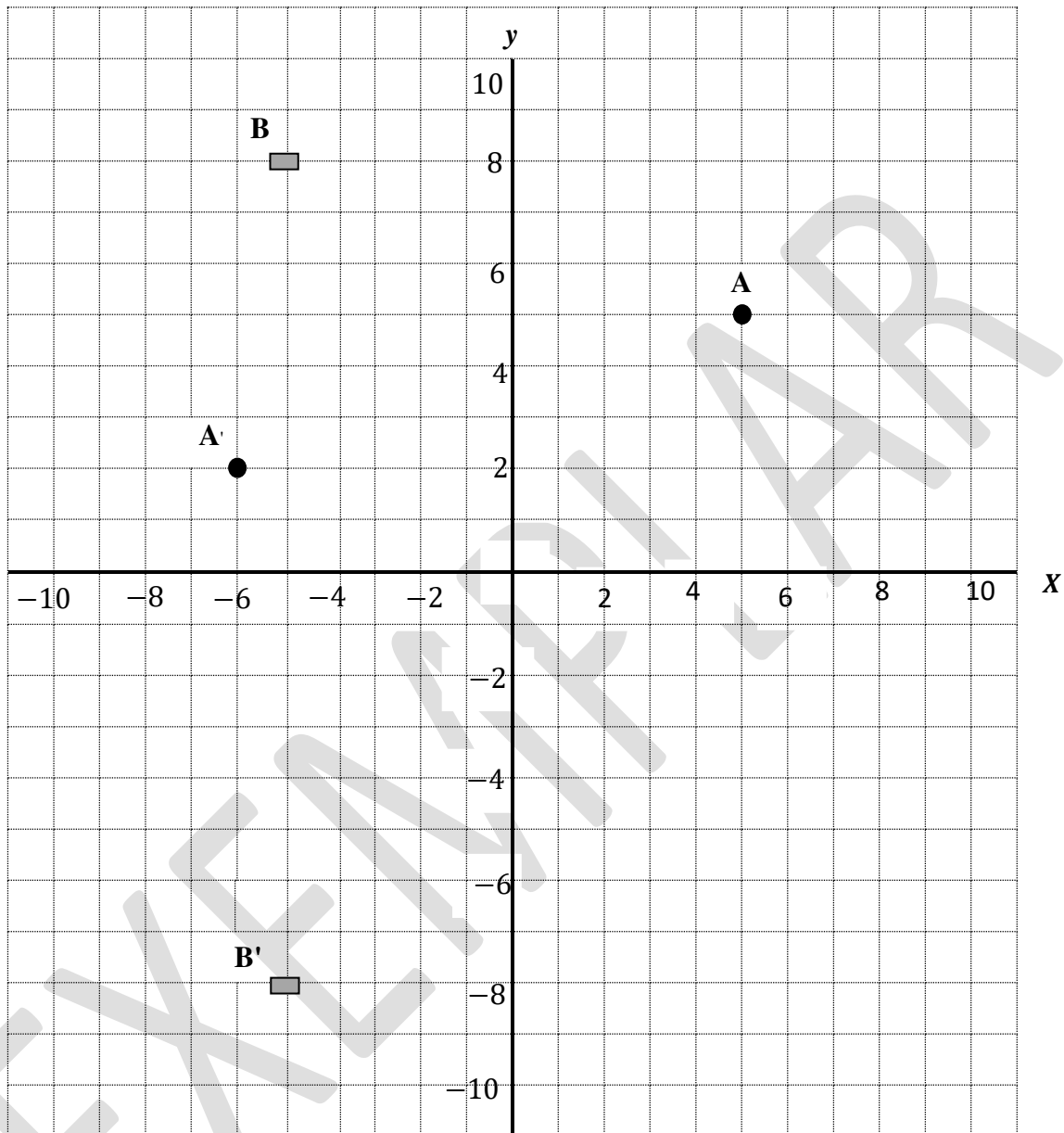
3.3.2 Hence, prove that $\triangle DEF \equiv \triangle XYZ$

Statement	Reason
$\hat{Y} = \underline{\hspace{2cm}}$	$\angle s$ opp. equal sides
$2\hat{Y} = \underline{\hspace{2cm}}$	Sum int. $\angle s$ of Δ
$\underline{\hspace{2cm}}$	
$\therefore \hat{Y} = \underline{\hspace{2cm}}$	
In $\triangle DEF$ and $\triangle XYZ$:	
$\hat{D} = \underline{\hspace{2cm}},$	By calculation
$\hat{E} = \underline{\hspace{2cm}},$	
$\hat{F} = \underline{\hspace{2cm}}$	
$\therefore \triangle DEF \equiv \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}}$

(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**.

$$A(x; y) = (_ ; _) \quad (1)$$

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' .

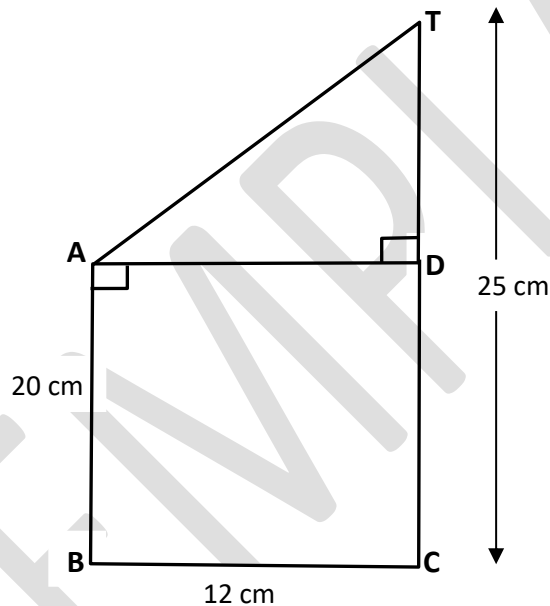
(2)

[6]

QUESTION 5

5.1 $\triangle TAD$ 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 .

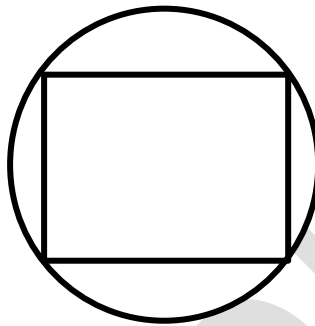
Statement	Reason
In $\triangle TAD$: $AD =$	
$TD =$	
$AT^2 =$	Pythagoras
$AT =$	

(6)

5.1.2 Hence, calculate the perimeter of ABCDT.

(2)

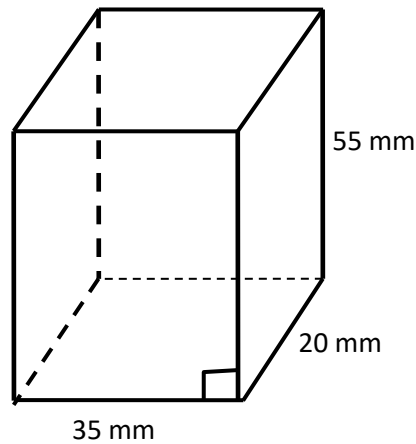
5.2 In the figure below, the square has all its vertices on the circumference of the circle. The area of the square is 400 cm^2 .



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