education

Department of Education
FREE STATE PROVINCE

GRADE 8

MATHEMATICS PAPER 2

2025 NOVEMBER

MOCK PAPER

MARKS: 60

TIME: 1 HOUR 30 MINUTES

This question paper consists of 10 pages including cover page.

INSTRUCTIONS AND INFORMATION

- Read the all the instructions carefully before answering the questions.
- This question paper consists of 6 questions.
- Write legibly and present your work neatly.
- Answer ALL the questions.
- Clearly show ALL steps that you have used in determining your answers.
- Answers only will not necessarily be awarded full marks.
- Diagrams are not drawn to scale.
- You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
- Number the answers correctly according to the numbering system used in this question paper.

QUESTION 1

Choose the correct option by circling only the letter for the correct answer **ON THE ANSWER SHEET** provided. If the correct answer in 1.1 is D, you should only circle D, on the multiple-choice answer sheet provided **(ANNEXURE A)**. If you realize that you chose the wrong option, put the cross over the wrong option and re-circle, the correct option.

1.1 Sum of angles in a quadrilateral equal to …. (1)

A $90°$

B $180°$

C $270°$

D $360°$

1.2 The value of x in the parallelogram below is…. (1)

A $45°$

B $120°$

C $135°$

D $150°$

1.3 An obtuse angle is... (1)

A greater than $\mathbf{0}°$ but less than $\mathbf{90}°$

B greater than $\mathbf{90}°$ but less than $\mathbf{180}°$

C greater than $\mathbf{180}°$ but less than $\mathbf{270}°$

D greater than $\mathbf{180}°$ but less than $\mathbf{360}°$

1.4 A quadrilateral with one pair of opposite sides parallel.

Which type of quadrilateral is exactly described? (1)

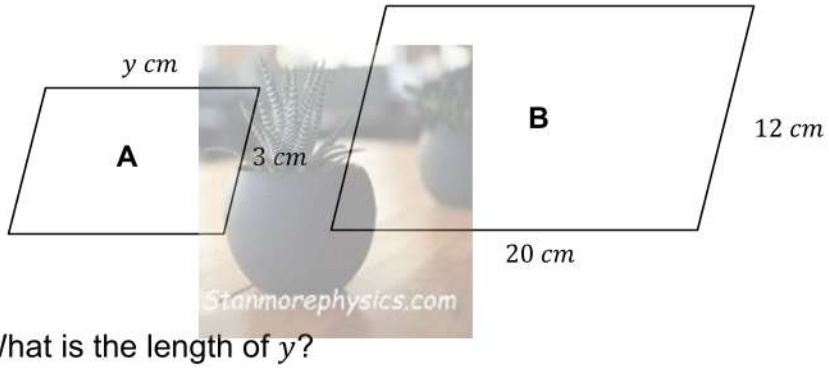
A Kite

B Trapezium

C Rectangle

D Parallelogram

1.5 The parallelograms marked A and B are similar. (1)



What is the length of y?

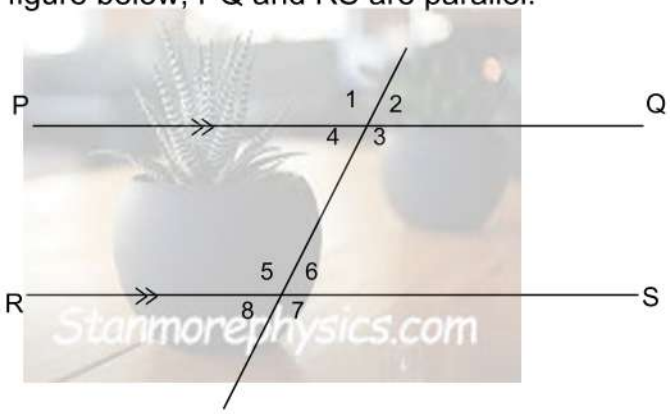
A $y = 1{,}7$ cm

B $y = 6{,}7$ cm

C $y = 4$ cm

D $y = 5$ cm

1.6 In the figure below, PQ and RS are parallel. (1)



Which pair of angles has a sum of 180°?

A ∠6 and ∠8

B ∠3 and ∠7

C ∠4 and ∠5

D ∠4 and ∠6

1.7 Theorem of Pythagoras is applied only with… (1)

A Right-angled triangles

B Obtuse-angled triangles

C Equilateral triangles

D Acute-angled triangles

1.8 Which statement best describe the theorem of Pythagoras? (1)

A In any triangle the square of the longest side will be equal to the sum of the squares on the other two sides.

B In any acute-angled triangle, the square of the longest side will be equal to the sum of the squares on the other two sides.

C In any obtuse-angled triangle, the square of the longest side will be equal to the sum of the squares on the other two sides.

D In any right-angled triangle, the square of the hypotenuse will be equal to the sum of the squares on the other two sides.

1.9 The formular that is used to calculate the area of a circle is… (1)

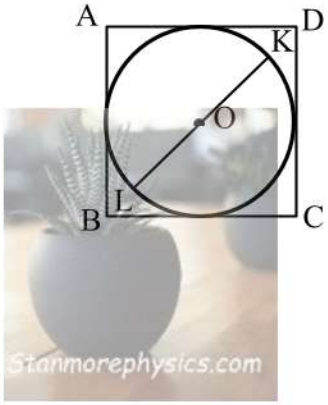
A πr

B πd

C πr^2

D $2\pi r$

1.10 In the figure below, the circle with centre O is within the square ABCD of area 64 cm^2. What is the length of the diameter KL? (1)



A 4 cm

B 8 cm

C 12 cm

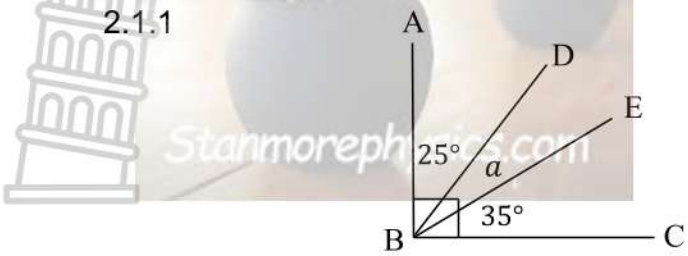
D 16 cm

[10]

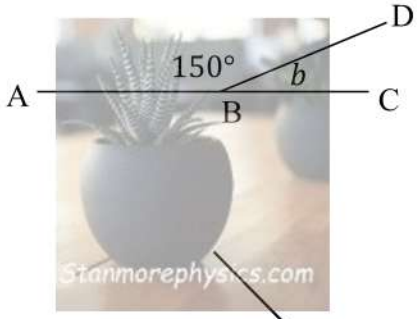
QUESTION 2

2.1 Write down with reasons the values of the angles marked a and b.

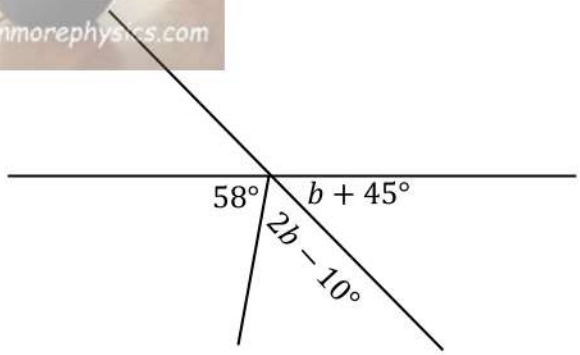
2.1.1 (2)



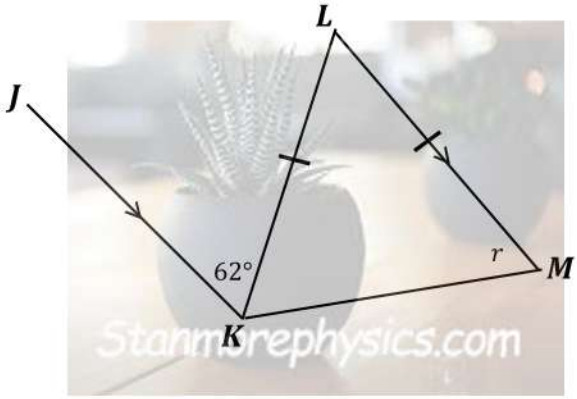
2.1.2 (2)



2.1.3 (4)



2.2 In the diagram below, $JK \parallel LM$ and $KL = LM$. Determine the size of y. (5)



[13]

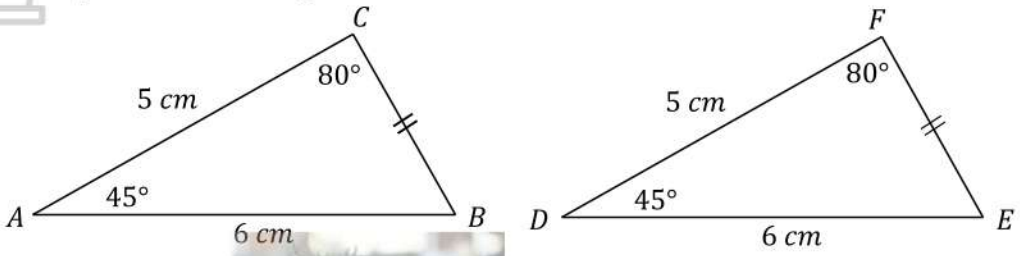
QUESTION 3

3.1 Write down symbol used to represent:

3.1.1 Similarity (1)

3.1.2 Congruency (1)

3.2 Complete the missing information below: (3)

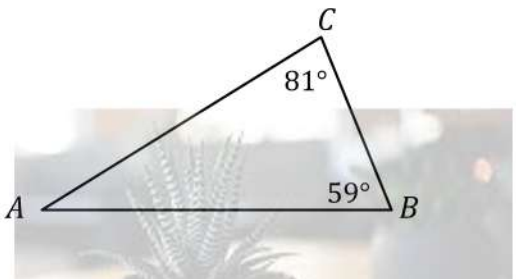


In ΔABC and ΔDEF:

3.2.1 _____	given
$\hat{C} = \hat{F} = 80°$	given
$\hat{B} = \hat{E}$	3.2.2 _____
AB = DE = 6 cm	given
BC = EF	given
AC = DF = 5 cm	given
ΔABC ≡ ΔDEF	3.2.3 _____

3.3 Determine with reasons the size of angle A in each shape below

3.3.1 (2)

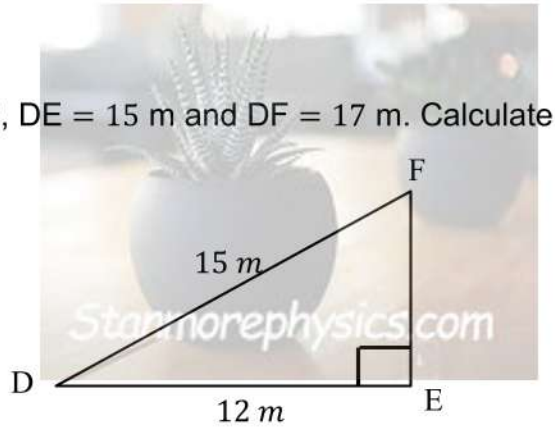


3.3.2 (3)

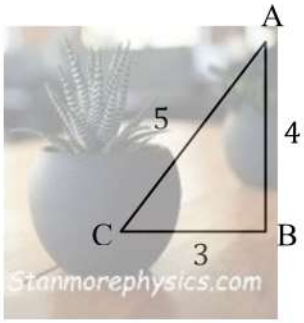
[10]

QUESTION 4

4.1 In ΔDEF, $\hat{E} = 90°$, DE = 15 m and DF = 17 m. Calculate the length of EF. (4)



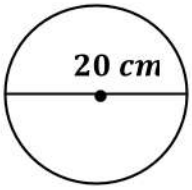
4.2 In ΔABC, $AB = 24$ units, $BC = 7$ units and $AC = 25$ units. Show that the triangle is right-angled. (3)



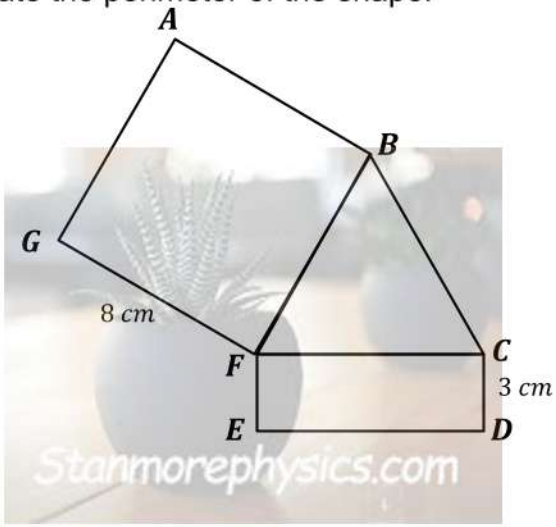
[7]

QUESTION 5

5.1 Calculate the area of the circle below. (4)



5.2 The given shape is made up of a rectangle, a square and an equilateral triangle. Calculate the perimeter of the shape. (6)

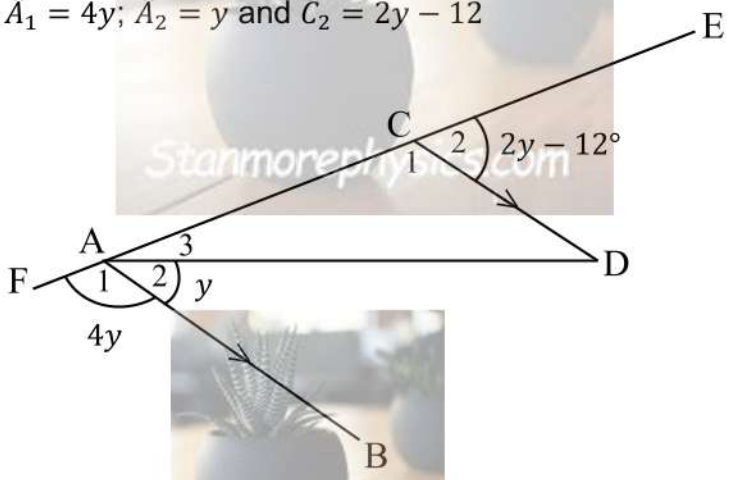


[10]

QUESTION 6

6.1 In the diagram below:

- FACE a straight line
- $AB \parallel CD$
- $\hat{A}_1 = 4y$; $\hat{A}_2 = y$ and $\hat{C}_2 = 2y - 12$

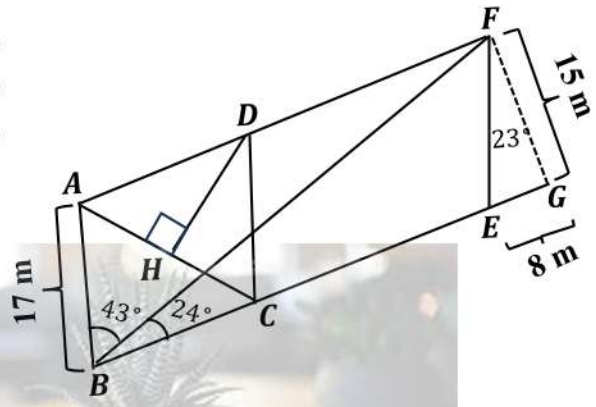


6.1.1 Why is $\hat{A}_3 = y - 12$? (1)

6.1.2 Show that the value of $y = 34°$. (4)

6.2 Study the diagram below and answer the following questions:

- Rhombus ABCD.
- Parallelogram ABEF.
- AB = 17 m
- FG = 15 m
- EG = 8 m
- $A\hat{B}F = 43°$
- $F\hat{B}C = 24°$
- $E\hat{F}G = 23°$



6.2.1 Why is FE = 17 cm (1)

6.2.2 Hence or otherwise, show with clear calculations and reasons that $\hat{G} = 90°$. (4)

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2025 NOVEMBER MOCK EXAMINATION

MARKING GUIDELINES

This question paper consists of 12 pages including cover page.

GENERAL MARKING NOTE:

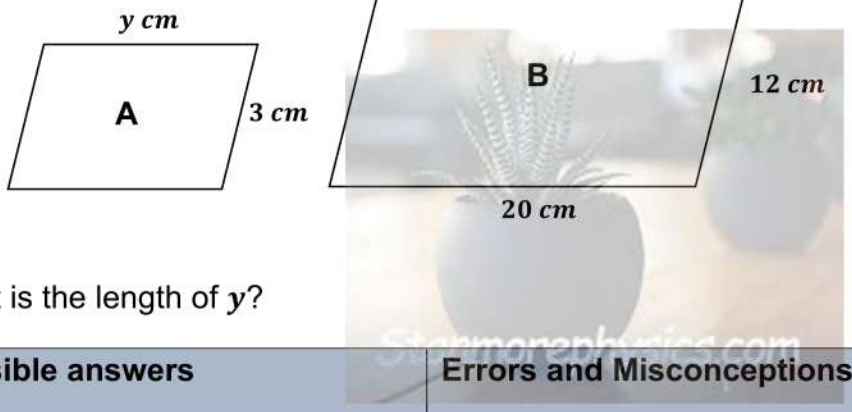
1. **Give full marks for answers only, unless otherwise stated.**

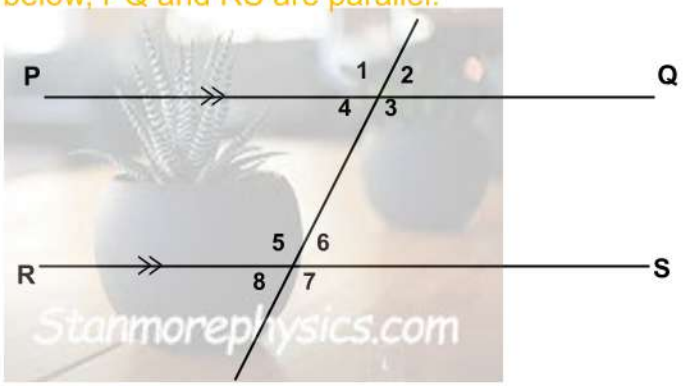
2. **Accept any alternative correct solution that is not included in the memorandum.**

3.

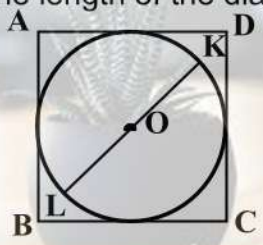
SYMBOL	KEY
M	Method mark
CA	Consistency Accuracy Mark
A	Accuracy Marking

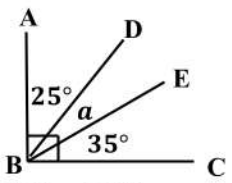
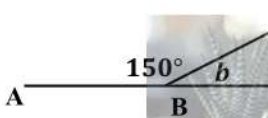
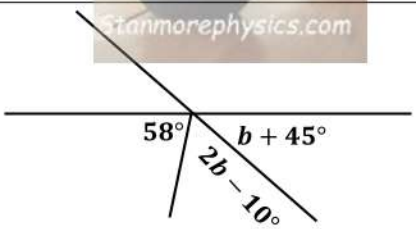
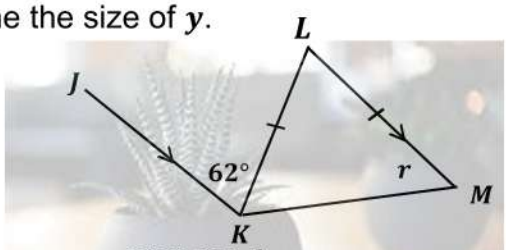
QUESTION 1		
1.1	Sum of angles in a triangle equal to …. (1)	
Option	**Possible answers**	**Errors and Misconceptions**
A	$90°$	Not knowledgeable about the concept.
B	$180°$	It might be confused with sum of interior angles of a triangle.
C	$270°$	Not knowledgeable about the concept.
D	**$360°$ A**	✓ **Correct response**
1.2	The value of x in the parallelogram below is…. (1) 	
Option	**Possible answers**	**Errors and Misconceptions**
A	**$45°$ A**	✓ **Correct response**
B	$120°$	Not knowledgeable about the concept.
C	$135°$	Related the value with co-interior angle
D	$150°$	Not knowledgeable about the concept.
1.3	An obtuse angle is... (1)	
Option	**Possible answers**	**Errors and Misconceptions**
A	greater than $0°$ but less than $90°$	Not knowledgeable about the concept.
B	**greater than $90°$ but less than $180°$ A**	✓ **Correct response**
C	greater than $180°$ but less than $270°$	Not knowledgeable about the concept.
D	greater than $180°$ but less than $360°$	Not knowledgeable about the concept.

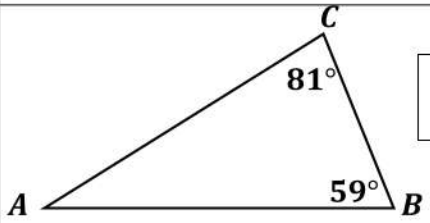
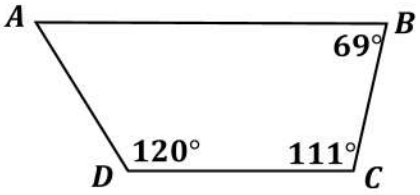
1.4	A quadrilateral has the following properties: (1) • Two pairs of adjacent sides are equal. • One pair of opposite angles is equal. Which type of quadrilateral is exactly described?	
Option	**Possible answers**	**Errors and Misconceptions**
A	Kite	Not knowledgeable about the concept.
B	**Trapezium A**	✓ **Correct response**
C	Rectangle	Not knowledgeable about the concept.
D	Parallelogram	Not knowledgeable about the concept.
1.5	The parallelograms marked A and B are similar. (1)  What is the length of y?	
Option	**Possible answers**	**Errors and Misconceptions**
A	$y = 1,7$ cm	Divided 20 with 12
B	$y = 6,7$ cm	Divided 20 with 3
C	$y = 4$ cm	**Divided 12 with3**
D	$y = 5$ **cm A**	✓**Correct response**

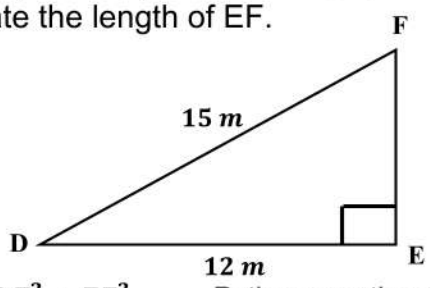
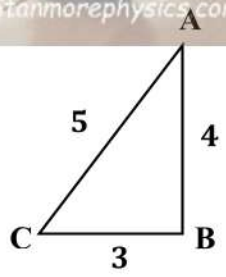
1.6	In the figure below, PQ and RS are parallel. (1)  Which pair of angles has a sum of 180°?	
Option	**Possible answers**	**Errors and Misconceptions**
A	$\angle 6$ and $\angle 8$	Not knowledgeable about the concept.
B	**$\angle 3$ and $\angle 7$ A**	✓ **Correct response**
C	$\angle 4$ and $\angle 5$	Not knowledgeable about the concept.
D	$\angle 4$ and $\angle 6$	Not knowledgeable about the concept.
1.7	Theorem of Pythagoras is applied only with… (1)	
Option	**Possible answers**	**Option**
A	Right-angled triangles	**Not knowledgeable about the concept.**
B	Obtuse-angled triangles	Not knowledgeable about the concept.
C	Equilateral triangles	Not knowledgeable about the concept.
D	**Acute-angled triangles A**	✓ **Correct response**

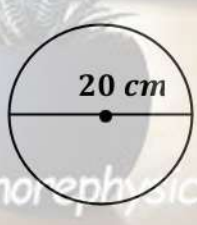
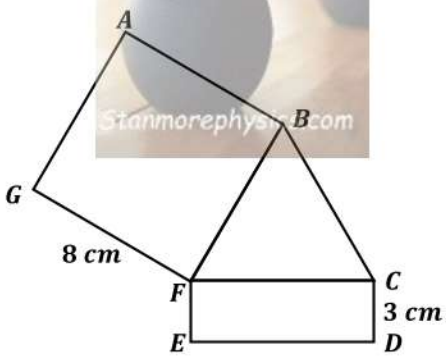
1.8	Which statement best describe the theorem of Pythagoras? (1)	
Option	**Possible answers**	**Errors and Misconceptions**
A	In any triangle the square of the longest side will be equal to the sum of the squares on the other two sides.	Not knowledgeable about the concept.
B	In any acute-angled triangle the square of the longest side will be equal to the sum of the squares on the other two sides.	Not knowledgeable about the concept.
C	In any obtuse-angled triangle the square of the longest side will be equal to the sum of the squares on the other two sides.	Not knowledgeable about the concept.
D	**In any right-angled triangle the square of the longest side will be equal to the sum of the squares on the other two sides. A**	✓ **Correct response**
1.9	The formular that is used to calculate the area of a circle is… (1)	
Option	**Possible answers**	**Option**
A	πr	Not knowledgeable about the concept.
B	πd	Not knowledgeable about the concept.
C	πr^2 **A**	✓ **Correct response**
D	$2\pi r$	Not knowledgeable about the concept.

1.10	In the figure below, the circle with centre O is within the square ABCD of area 64 cm^2. What is the length of the diameter KL? (1) 	
Option	**Possible answers**	**Option**
A	4 cm	Got the value of 8 and divided it by 2.
B	**8 cm A**	✓ **Correct response**
C	12 cm	Not knowledgeable about the concept.
D	$4\sqrt{2}$ cm	Use Pythagoras to calculate KL

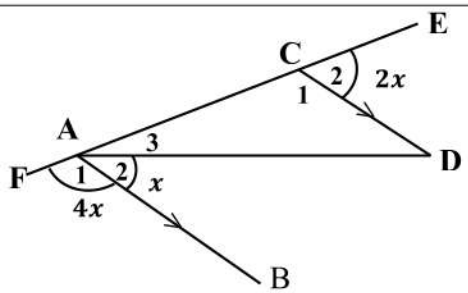
QUESTION 2		
2.1	Write down with reasons the values of the angles marked $\boldsymbol{a}$ and $\boldsymbol{b}$.	
2.1.1	 **answer only with reason, full marks** $\boldsymbol{a + 25° + 35° = 90°}$ comp ∠s $\boldsymbol{a = 30°}$ **CA**	✓S/R ✓$\boldsymbol{30°}$ (2)
2.1.2	 **answer only with reason, full marks** $\boldsymbol{b + 150° = 180°}$ ∠s on a str. line $\boldsymbol{b = 30°}$ **A**	✓S/R ✓$\boldsymbol{30°}$ (2)
2.1.3	 $\boldsymbol{b + 45° + 2b - 10° + 58° = 180°}$ ∠s on a str. line **A** $\boldsymbol{3b + 93° = 180°}$ $\boldsymbol{3b = 87°}$ **CA** $\boldsymbol{b = 29°}$ **A**	✓S/R ✓$\boldsymbol{3b + 93° = 180°}$ ✓ $\boldsymbol{3b = 87°}$ ✓$\boldsymbol{29°}$ (4)
2.2	In the diagram below, $\boldsymbol{JK \parallel LM}$ and $\boldsymbol{KL = LM}$. Determine the size of $\boldsymbol{y}$.  $\boldsymbol{\hat{L} = 62°}$ corr. ∠s, $\boldsymbol{JK \parallel LM}$ **A** $\boldsymbol{\hat{M} = r = L\hat{K}M}$ ∠s opp. = sides **A** $\boldsymbol{62° + 2r = 180°}$ sum ∠s in a Δ **A** $\boldsymbol{2r = 118°}$ **M** $\boldsymbol{r = 59°}$ **CA**	✓S/R ✓S/R ✓S/R ✓$\boldsymbol{2r = 118°}$ ✓ $\boldsymbol{59°}$ (5)
		[13]

QUESTION 3			
3.1	Write down symbol used to represent:		
3.1.1	/// **A**	✓answer	(1)
3.1.2	≡ **A**	✓answer	(1)
3.2	Complete the missing information below:		
			
3.2.1	$\hat{A} = \hat{D} = 55°$ **A**	✓answer	(1)
3.2.2	sum ∠s in a Δ **A**	✓answer	(1)
3.2.3	$\Delta ABC \equiv \Delta DEF$ corr. ∠s and sides are = **A**	✓answer	(1)
3.1	Determine with reasons the size of angle A in each shape below		
3.1.1	 **answer only with reason, full marks** $\hat{A} + 140 = 180°$ sum of ∠s in a Δ **A** $\hat{A} = 40°$ **CA**	✓S/R ✓ $40°$	(2)
3.1.2	 $\hat{A} + 69° + 111° + 120° = 360°$ sum of ∠s in a quad **A** $\hat{A} + 300° = 360°$ **M** $\hat{A} = 60°$ **CA** **answer only with reason, full marks**	✓S/R ✓ $300°$ ✓ $60°$	(3)
			[10]

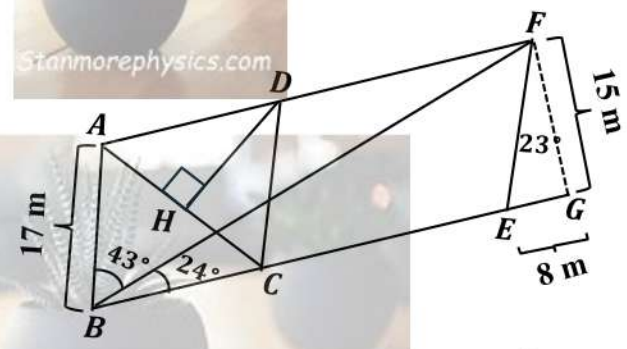
QUESTION 4		
4.1	In ΔDEF, $\hat{E} = 90°$, DE = 12 m and DF = 15 m. Calculate the length of EF.  $DF^2 = DE^2 + EF^2$ Pythagoras theorem $15^2 = 12^2 + EF^2$ **M** $225 = 144 + EF^2$ **A** $EF^2 = 81$ **CA** $EF = 9$ m **A**	✓$17^2 = 15^2 + EF^2$ ✓$225 = 144 + EF^2$ ✓81 ✓$EF = 9$ m (4)
4.2	In ΔABC, $AB = 24$ units, $BC = 7$ units and $AC = 25$ units. Show that the triangle is right-angled.  $5^2 = 25$ **A** $3^2 + 4^2 = 9 + 16 = 25$ **A** $\therefore AC^2 = BC^2 + AB^2$ **A**	✓$25^2 = 625$ ✓$49 + 576 = 625$ ✓$AC^2 = BC^2 + AB^2$ (3)
		[7]

QUESTION 5		
5.1	Calculate the area of the circle below.  $A = \pi r^2$ **A** $A = \pi(10)^2$ **CA** $A = 314,16$ cm^2 **A**	✓$A = \pi r^2$ ✓$\pi(10)^2$ ✓10 ✓$314,16$ cm^2 (4)
5.2	The given shape is made up of a rectangle, a square and an equilateral triangle. Calculate the perimeter of the shape.  $P = FG + GA + AB + BC + CD + ED + EF$ $P = 8 + 8 + 8 + 8 + 3 + 8 + 3$ **A** $P = 46$ cm **CA**	✓GA ✓AB ✓BC ✓ED ✓EF ✓46 cm (6)
		[10]

QUESTION 6



6.1.1	Why is $\hat{C}_1 = 4x$? Why is $\hat{A}_3 = y - 12$? corr. ∠s, $AB \parallel CD$ **A**	✓R (1)
6.1.2	Show that the value of $y = 34°$. $\therefore 4y + 2y - 12 = 180°$ ∠ on a str. line **A** $6y = 192°$ **CA** $y = 34°$ **A**	✓S ✓R ✓ $6y = 192°$ ✓ $34°$ (4)



6.2.1	Why is FE = 17 cm? opp. sides of a parm. **A**	✓R (1)
6.2.2	Hence or otherwise, show with clear calculations and reasons that $\hat{G} = 90°$. $EG^2 + FG^2 = 8^2 + 15^2$ **A** $= 64 + 225$ **A** $= 289$ m² **A** $EF^2 = 17^2$ $= 289$ m² **A** $\therefore \hat{G} = 90°$ converse Pyt. OR $F\hat{E}G = A\hat{B}F + F\hat{B}E$ corr. ∠s, $AB \parallel FB$ **A** $= 43° + 24°$ **A** $= 67°$ $F\hat{E}G + E\hat{F}G = 90°$ **A** $\therefore \hat{G} = 90°$	✓ $8^2 + 15^2$ ✓ $64 + 225$ ✓ 289 m² ✓ 289 m² (4) ✓S ✓R ✓ $43° + 24°$ ✓ $F\hat{E}G + E\hat{F}G = 90°$ (4)
		[10]