KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P2

COMMON TEST

JUNE 2023

MARKS: 50

TIME: 1hour

This question paper consists of 5 pages and 1 DIAGRAM SHEET

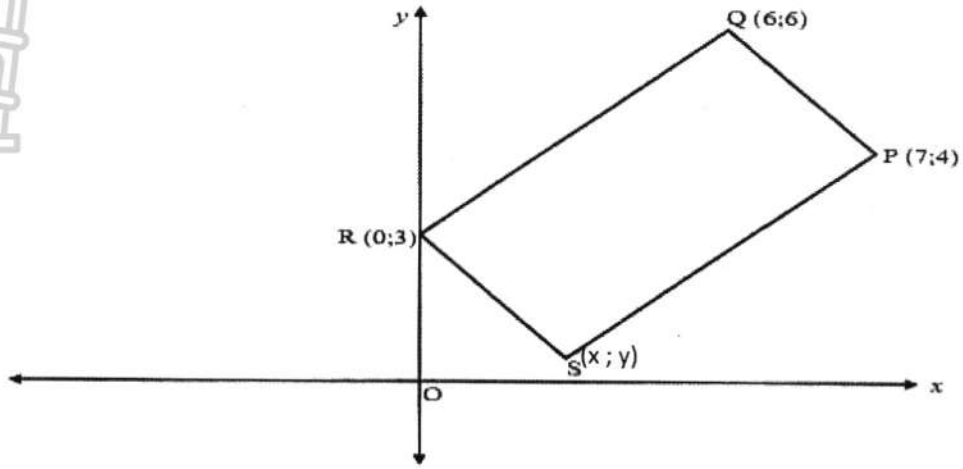
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. A DIAGRAM/ANSWER SHEET for QUESTION 2, QUESTION 3, QUESTION 5.1.1 is attached at the end of this question paper. Detach the DIAGRAM SHEET /ANSWER SHEET hand in together with your ANSWER BOOK.
10. Write neatly and legibly.

QUESTION 1

1.1 In the diagram below $P(7;4)$, $Q(6;6)$, $R(0;3)$ and $S(x;y)$ are vertices of a parallelogram PQRS.



1.1.1 Calculate the length of PQ. (Leave your answer in surd form.) (3)

1.1.2 If $T\left(\frac{7}{2};\frac{7}{2}\right)$ is the mid-point of QS ,determine the coordinates of S. (2)

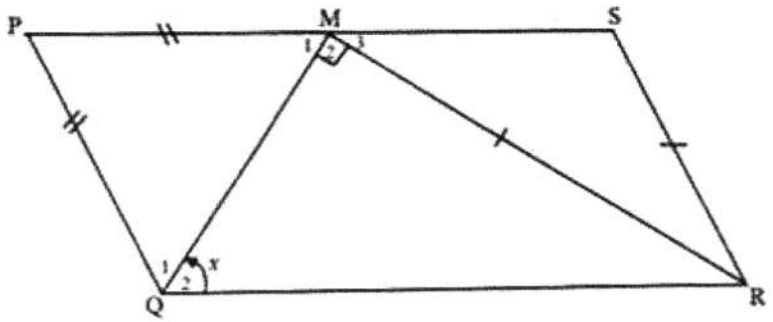
1.1.3 If the coordinates of S are $(1;1)$, show that $QR \perp RS$. (3)

1.1.4 Calculate the size of $R\hat{S}Q$. (3)

[11]

QUESTION 2

2.1 In the diagram below PQRS is a parallelogram with M on PS such that PM=PQ and MR=SR. $Q\hat{M}R = 90°$ and $\hat{Q}_2 = x$.



2.1.1 Determine, with reasons two other angles which are equal to x. (4)

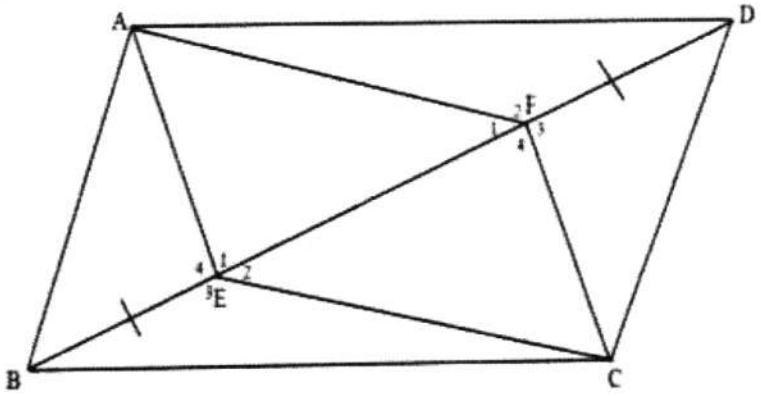
2.1.2 Determine $\hat{M}_3$ in terms of x. (2)

2.1.3 Determine the numerical value of x. (2)

[8]

QUESTION 3

3.1 The diagram represents a parallelogram ABCD with BE=DF.



Prove that:

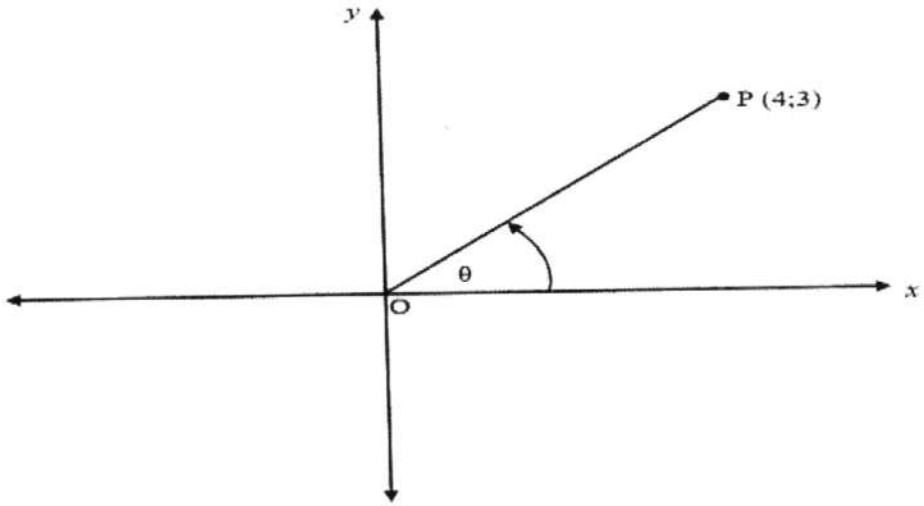
3.1.1 $\Delta AEB \equiv \Delta CFD$ (4)

3.1.2 $AE \ // \ CF$ (4)

[8]

QUESTION 4

4.1 In the diagram below $P(4;3)$ is given and $0° \leq \theta \leq 90°$.



Calculate the following WITHOUT the use of a calculator:

4.1.1 The length of OP (2)

4.1.2 $\cos\theta$ (1)

4.1.3 $1-2\sin^2\theta$ (2)

4.2 Use a calculator to find the values of the following, correct to THREE decimal places:

4.2.1 $3\sin 65,8°$ (1)

4.2.2 $\sec 37,1°$ (2)

4.3 Determine the following, WITHOUT using a calculator:

4.3.1 $\dfrac{\sin 45°}{\cos 45°} - 5\cos ec90° + 4\tan^2 30°$ (5)

4.4 Solve for θ, correct to ONE decimal place, where $0° \le \theta \le 90°$.

4.4.1 $2\sin(2\theta - 25°) = 1$ (3)

[16]

QUESTION 5

5.1 Given: $f(x) = -\tan x$ and $g(x) = \cos x + 1$

5.1.1 Sketch the graphs of $f(x) = -\tan x$ and $g(x) = \cos x + 1$ on the same set of axes for $x \in [0°;180°]$ on the ANSWER SHEET provided. (4)

5.1.2 Write down the amplitude of g. (1)

5.1.3 Determine the range of g. (1)

5.1.4 Determine the period of f. (1)

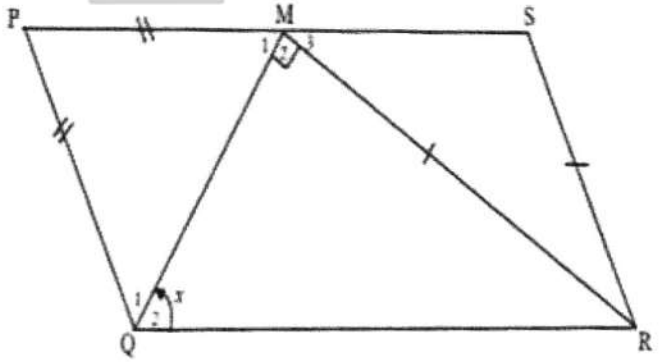
[7]

TOTAL: [50]

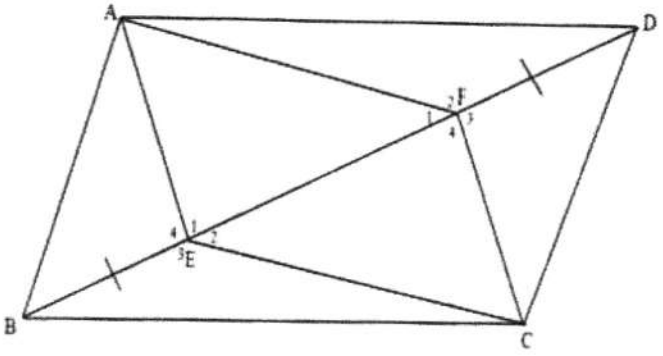
NAME & SURNAME:	

DIAGRAM SHEET

QUESTION 2

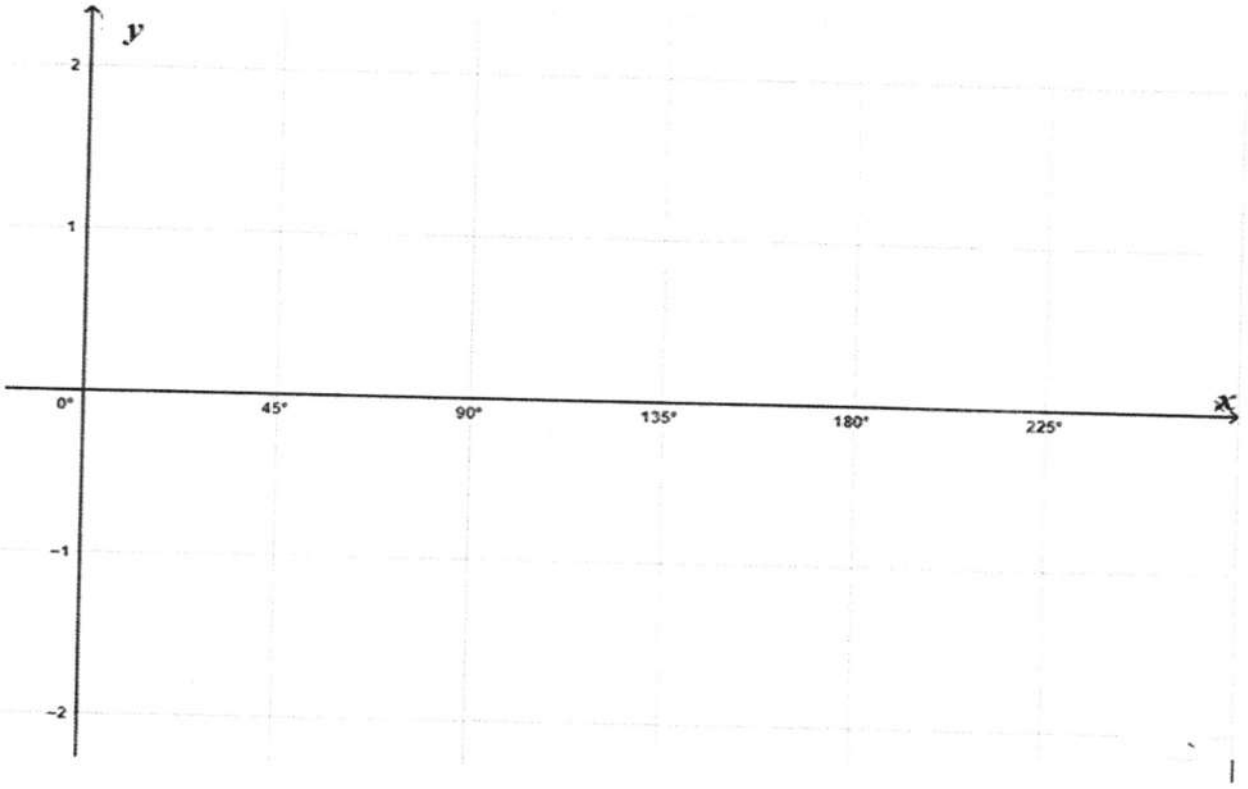


QUESTION 3



ANSWER SHEET

QUESTION 5.1.1



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MARKING GUIDELINE

MARKS: **50**

This marking guideline consists of 4 pages.

QUESTION 1

1.1.1	$PQ=\sqrt{(x_2-x_1)^2+(x_2-x_1)^2}$ $PQ=\sqrt{(7-6)^2+(4-6)^2}$ $PQ=\sqrt{5}$	✓formula ✓substitution ✓answer	(3)
1.1.2	$\frac{x+6}{2}=\frac{7}{2}$; $\frac{x+6}{2}=\frac{7}{2}$ $x=1$ $y=1$ $S(1;1)$	✓ $\frac{x+6}{2}=\frac{7}{2};\frac{x+6}{2}=\frac{7}{2}$ ✓ $S(1;1)$	(2)
1.1.3	$m_{QR}=\frac{1}{2}$ $m_{RS}=-2$ But $m_{QR}\times m_{RS}=\frac{1}{2}\times -2$ $\therefore m_{QR}\times m_{RS}=-1$ $\therefore QR\perp RS$	✓ $m_{QR}=\frac{1}{2}$ ✓ $m_{RS}=-2$ ✓ $m_{QR}\times m_{RS}=\frac{1}{2}\times -2$ ✓ $m_{QR}\times m_{RS}=-1$	(4)
1.1.4	$RS=\sqrt{5}$ $RQ=\sqrt{(6-0)^2+(6-3)^2}$ $RQ=3\sqrt{5}$ $\tan \hat{RSQ}=3$ $R\hat{S}Q=71,57°$	✓ $RQ=3\sqrt{5}$ ✓ $\tan R\hat{S}Q=3$ ✓ $R\hat{S}Q=71,57°$	(3)
			[11]

QUESTION 2

2.1.1	$\hat{M}_1=\hat{Q}_2=x$	[Alternating $\angle$'s ; $PS \parallel QR$]	✓S✓R	(4)
	$\hat{Q}_1=\hat{M}_1=x$	[$\angle$'s opp. = sides ; $PQ=PM$]	✓S✓R	
2.1.2	$\hat{M}_3=90°-\hat{M}_1$ $\therefore \hat{M}_3=90^o-x$	[Adjacent $\angle$'s on a str. line]	✓S✓R	(2)

2.1.3	$\hat{M}_3 = \hat{S} = 2x$ [$\angle$'s opp. = sides ; $MR = SR$] $x + 90° + 2x = 180°$ [Adjacent $\angle$'s on a str. line] $x = 30°$ OR $\hat{M}^3 = 90^o - x$ [Adjacent on a str.line] $2x = 90^o - x$ $3x = 90^o$ $x = 30^o$	✓ $x + 90° + 2x = 180°$ ✓ $x = 30°$ ✓ $\hat{M}^3 = 90^o - x$ ✓ $x = 30°$	(2)
			[8]

QUESTION 3

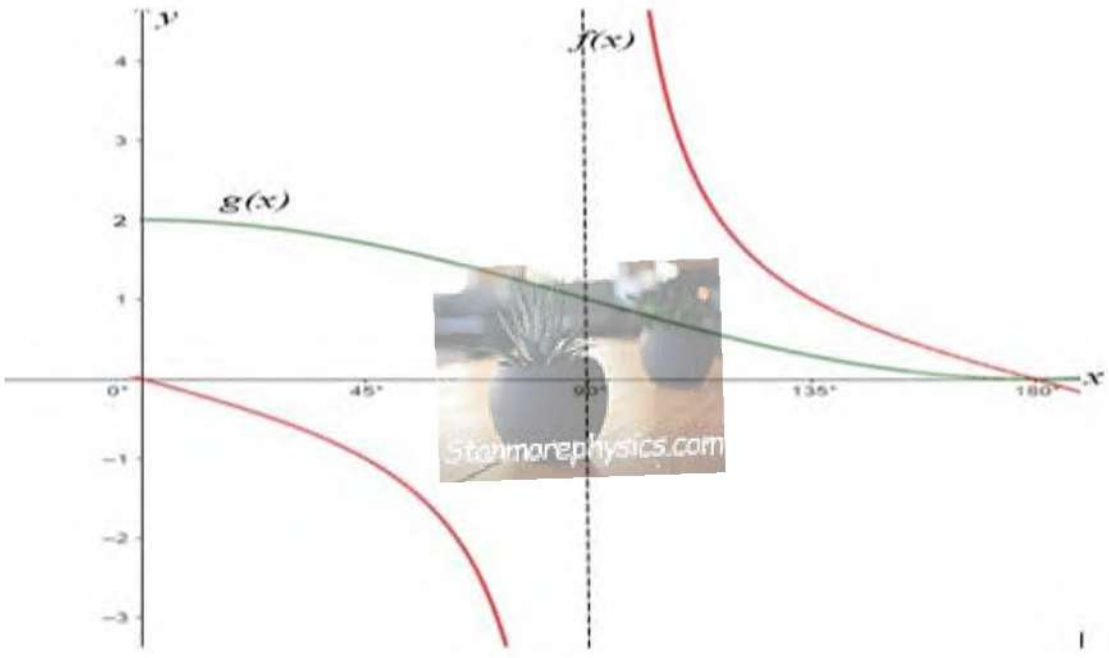
3.1.1	$A\hat{B}E = F\hat{D}C$ [Alternating $\angle$'s ; AB] $AB = DC$ [Opp. sides of parm] $BE = FD$ [given] $\therefore \Delta AEB \equiv \Delta CFD$ [SAS]	✓S/R ✓S/R ✓S/R ✓R	(4)
3.1.2	$B\hat{A}E = F\hat{C}D$ [$\equiv \Delta$'s] $B\hat{A}E + A\hat{B}E = \hat{A}_1$ [exterior $\angle\Delta$] Similarly, $F\hat{D}C + F\hat{C}D = \hat{F}_4$ [exterior $\angle\Delta$] $\therefore \hat{F}_4 = \hat{E}_1$ $AE \parallel CF$ [alternating $\angle$'s =]	✓S/R ✓S/R ✓ $\hat{F}_4 = \hat{E}_1$ ✓R	(4)
			[8]

QUESTION 4

4.1.1	$OP^2 = (4)^2 + (3)^2$ [Pythagoras] OP=5	✓S/R ✓answer	(2)
4.1.2	$\cos\theta = \frac{4}{5}$	✓ $\frac{4}{5}$	(1)
4.1.3	$= 1 - 2\left(\frac{3}{5}\right)^2$ $= \frac{7}{25}$	✓ $\frac{3}{5}$ ✓answer	(2)
4.2.1	2,736	✓answer	(1)

4.2.2	$=\frac{1}{\cos 37,1^\circ}$ $=1,254$	✓ $\frac{1}{\cos 37,1^\circ}$ ✓answer	(2)
4.3.1	$=\tan 45^\circ - 5(1) + 4\left(\frac{1}{\sqrt{3}}\right)^2$ $=1-5+\frac{4}{3}$ $=-4+\frac{4}{3}$ $=-\frac{8}{3}\ /\ -2\frac{2}{3}$	✓ $\tan 45^\circ$ ✓1 ✓ $\frac{\sqrt{3}}{2}$ ✓1 ✓answer	(5)
4.4.1	$\sin(2\theta-25^\circ)=\frac{1}{2}$ $2\theta-25^\circ=30^\circ$ $\theta=27,5^\circ$	✓ $\sin(2\theta-25^\circ)=\frac{1}{2}$ ✓ $2\theta-25^\circ=30^\circ$ ✓answer	(3)
			[16]

QUESTION 5

5.1.1		✓y- inter g ✓x –inter g ✓asympto f ✓ shape f	(4)
5.1.2	Amplitude=1	✓1	(1)
5.1.3	$y\in[0;2]$ or $0\le y\le 2$	✓ $y\in[0;2]$	(1)
5.1.4	180°	✓ 180°	(1)
			[7]
		TOTAL:	**[50]**

