Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjhabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS P2

JUNE EXAMINATION 2025

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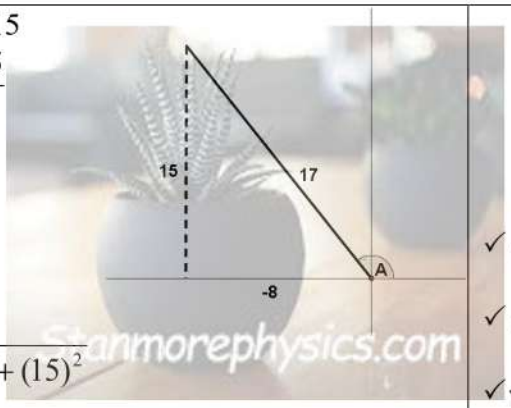
MARKING GUIDELINE

MARKS : 100

This Marking Guideline consists of 7 pages

QUESTION1		
1.1	$N\left(\frac{5-1}{2};\frac{4-6}{2}\right)$ $=(2;-1)$	✓ x – coordinate ✓ y – coordinate (2)
1.2	$m_{ML}=\frac{-6+2}{-1+5}$ $=-1$	✓ subst. in corr. orm ✓ answer (2)
1.3	$m_{NP}=m_{ML}$ (NP// ML) $=-1$ $y=-x+c$ $-1=-(2)+c$ $c=1$ $y=-x+1$	✓ $m_{NP}=-1$ ✓ subst. ✓ answer (3)
1.4	$\tan\theta=-1$ $\theta=135^{\circ}$	✓ $\tan\theta=-1$ ✓ answer (2)
1.5	$LK=\sqrt{(5+5)^2+(4+2)^2}$ $=2\sqrt{34}$ $MK=\sqrt{(5+1)^2+(4+6)^2}$ $=2\sqrt{34}$ $\therefore LK=MK$ $\angle KLM=\angle KML$ (L's opp. = sides)	✓ subst. in corr. Form ✓ LK value ✓ subst. in corr. Form ✓ MK value ✓ $\therefore LK=MK$ (5)
1.6	$LM=\sqrt{(-5+1)^2+(-2+6)^2}$ $=4\sqrt{2}$ But $P\left(\frac{5-5}{2};\frac{4-2}{2}\right)$ (mid-point theorem, PN//ML) $p(0;1)$ $\therefore PN=\sqrt{(2-0)^2+(-1-1)^2}$ $=2\sqrt{2}$ $\therefore LM=2PN$	✓ subst in corr. Form. ✓LM value ✓ Reason ✓ P coordinates ✓subst. in corr. form. ✓ PN value (6)
		[20]

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QUESTION 2		
2.1	$8\tan A = -15$ $\tan A = -\frac{15}{8}$  $r = \sqrt{(-8)^2 + (15)^2}$ $= 17$ $\cos A = -\frac{8}{17}$	✓ dividing by 8 ✓ r – value ✓✓ diagram ✓ $\cos A$ - value (5)
2.2.1	$\sin 54^\circ = p$ $x = \sqrt{1-p^2}$ $\sin(-126^\circ)$ $= -\sin 126$ $= -\sin 54^\circ$ $= -p$	✓ x – value ✓ $-\sin 126$ ✓ $-\sin 54^\circ$ ✓ answer (4)
2.2.2	$\tan 234^\circ$ $= \tan 54^\circ$ $= \frac{p}{\sqrt{1-p^2}}$	✓ $\tan 54^\circ$ ✓ answer (2)
2.3.1	$\frac{\cos(180^\circ - x).\tan(-x).\sin^2(90^\circ - x)}{\sin(180^\circ - x)} + \sin^2 x$ $= \frac{(-\cos x).(-\tan x).\cos^2 x}{\sin x} + \sin^2 x$ $= \frac{-\cos x.-\frac{\sin x}{\cos x}.\cos^2 x}{\sin x} + \sin^2 x$ $= \cos^2 x + \sin^2 x$ $= 1$	✓ $-\cos x$ ✓ $-\tan x$ ✓ $\cos^2 x$ ✓ $\sin x$ ✓ $-\frac{\sin x}{\cos x}$ ✓ simplification ✓ 1 (7)
2.3.2	$\sin^2 23^\circ + \sin^2 67^\circ$ $= \sin^2 23^\circ + \cos^2 23^\circ$ $= 1$	✓ $\cos^2 23^\circ$ ✓ 1 (2)
		[20]

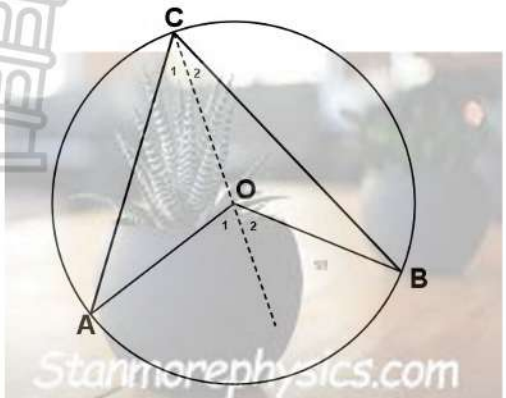
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QUESTION 3

3.1	$2\sin(x+15^\circ)=\cos 203{,}5^\circ$ $2\sin(x+15^\circ)=-0.92$ $\sin(x+15^\circ)=-0.46 \quad RA=27.39^\circ$ $x+15^\circ=180^\circ+27.39^\circ+k.360^\circ$ or $x+15^\circ=360^\circ-27.39^\circ+k.360^\circ \quad k\in Z$ $x=192.39^\circ+k.360^\circ$ or $x=317.61^\circ+k.360^\circ$ $k\in Z$ **OR** $2\sin(x+15^\circ)=\cos 203{,}5^\circ$ $2\sin(x+15^\circ)=-0.92$ $\sin(x+15^\circ)=-0.46$ $x+15^\circ=\sin^{-1}(-0.46)+k.360^\circ$ or $x+15^\circ=180^\circ-\sin^{-1}(-0.46)+k.360^\circ$ $x=-42.39^\circ+k.360^\circ$ or $x=192.39^\circ+k.360^\circ$ $k\in Z$	✓ -0.92 ✓ -0.46 ✓ $x=192.39^\circ+k.360^\circ$ ✓ $x=317.61^\circ+k.360^\circ$ ✓ $k\in Z$ (5) **OR** ✓ -0.92 ✓ -0.46 ✓ $x=-42.39^\circ+k.360^\circ$ ✓ $x=192.39^\circ+k.360^\circ$ ✓ $k\in Z$ (5)
3.2	$\cos(2x-10^\circ)=\sin(x+40^\circ)$ $\cos(2x-10^\circ)=\cos[90^\circ-(x+40^\circ)]$ $\cos(2x-10^\circ)=\cos(50^\circ-x)$ $2x-10^\circ=50^\circ-x+k,360^\circ$ or $2x-10^\circ=-50^\circ+x+k,360^\circ \quad k\in Z$ $3x=60^\circ+k,360^\circ$ or $x=-40^\circ+k.360^\circ \quad k\in Z$ $x=20^\circ+k.120^\circ$ $x=-100^\circ;-40^\circ,20^\circ;140^\circ$	✓ $\cos[90^\circ-(x+40^\circ)]$ ✓ $2x-10^\circ=50^\circ-x+k,360^\circ$ ✓ $2x-10^\circ=-50^\circ+x+k,360^\circ$ ✓ simplification ✓ $x=-100^\circ$ ✓ $x=20^\circ$ ✓ $x=-40^\circ$ (7)
3.3.1	$L.H.S=\dfrac{1+2\sin\theta.\cos\theta}{\sin\theta+\cos\theta}$ $=\dfrac{\sin^2\theta+\cos^2\theta+2\sin\theta.\cos\theta}{\sin\theta+\cos\theta}$ $=\dfrac{(\sin\theta+\cos\theta)(\sin\theta+\cos\theta)}{\sin\theta+\cos\theta}$ $=\sin\theta+\cos\theta \quad = RHS$	✓ identity ✓ ✓ factorizing ✓ answer (4)
3.3.2	$\sin\theta+\cos\theta=0$ $\sin\theta=-\cos\theta$ $\dfrac{\sin\theta}{\cos\theta}=-1$ $\tan\theta=-1$ $\theta=\tan^{-1}(-1)+180^\circ.k$ $\theta=-45^\circ,135^\circ,$	✓ transposing ✓ dividing by cos ✓ identity ✓ -45° ✓ 135° (5)
		[21]

QUESTION 4

4.1



Construction : join C to O and produced ✓ construction

In ΔAOC

$\hat{C}_1 = \hat{A}$ ($OC = OA$, *radii*) ✓ S/R

$\hat{O}_1 = \hat{C}_1 + \hat{A}$ (*ext.* $\angle$ *of a* Δ) ✓ S/R

$\therefore \hat{O}_1 = 2\hat{C}_1$

In ΔBOC

$\hat{C}_2 = \hat{B}$ ($OC = OB$, *radii*) ✓ S/R

$\hat{O}_2 = \hat{C}_2 + \hat{B}$ (*ext.* $\angle$ *of a* Δ) ✓ S/R

$\therefore \hat{O}_2 = 2\hat{C}_2$

$\therefore \hat{O}_1 + \hat{O}_2 = 2\hat{C}_1 + 2\hat{C}_2$

$\therefore \hat{O} = 2\hat{C}$ ✓S

$A\hat{O}B = 2\hat{C}$ (6)

4.2

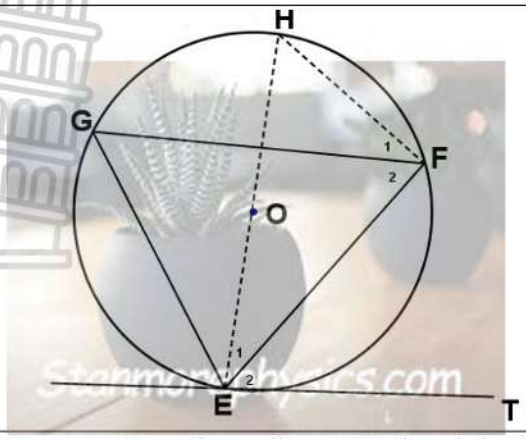
$\hat{O}_1 = 106^\circ$ ($\angle$ at centre = 2 × L at circum.) ✓ S ✓ R

$\therefore \hat{O}_2 = 74^\circ$ ($\angle$'s on a str, line) ✓ S ✓ R (4)

OR

$\hat{M}_2 = 37^\circ$ ($\angle$ subt. by diameter) ✓ S ✓ R

$\therefore \hat{O}_2 = 74^\circ$ ($\angle$ at centre = 2 × $\angle$ at circum.) ✓ S ✓ R (4)

4.3		
	Construction : draw diam. EH then join H to F $\hat{F}_1 + \hat{F}_2 = 90^\circ$ ($\angle$ subt. by diam.) $\hat{E}_1 + \hat{H}_2 = 90^\circ$ (sum of L's in a Δ) Also $\hat{E}_1 + \hat{E}_2 = 90^\circ$ (tan $\perp$ radius) $\hat{E}_1 + \hat{H}_2 = \hat{E}_1 + \hat{E}_2$ $\hat{E}_2 = \hat{H}_2$ but $\hat{G} = \hat{H}_2$ ($\angle$'s on the same segm.) $F\hat{E}T = \hat{G}$	✓ constr. ✓ S/R ✓ S/R ✓ S/R ✓ S ✓ S ✓R (7)
4.4.1	$W\hat{R}S = 90^\circ$ (tan $\perp$ radius)	✓S/R (1)
4.4.2	$\hat{T}_1 = 90^\circ$ ($\angle$ subt. by diam.) $\hat{W} + \hat{R}_1 = \hat{T}_1$ (ext. $\angle$ of Δ) $\hat{W} = 90^\circ - 55^\circ$ $= 35^\circ$	✓ S/R ✓ answer (2)
4.4.3	$\hat{P}_1 = \hat{R}_2$ ($\angle$'s a the same segm.) $\hat{R}_2 = 90^\circ - 55^\circ$ $= 35^\circ$ $\therefore \hat{P}_1 = 35^\circ$	✓ S/R ✓ S ✓ S (3)
4.4.4	$\hat{P}_1 = W = \hat{35}^\circ$ (proved) $\therefore PVWT$ is a cyclic quad. (conv., ext $\angle$ = int. opp. $\angle$) $\hat{V}_1 = P\hat{T}S$ (ext. L of a cyclic quad.)	✓ S ✓ S ✓R ✓ R (4)
		[27]

QUESTION 5			
5.1	$\hat{B}_2 = x$	(tan – chord Theorem)	✓ S ✓ R (2)
5.2	$BT = CT$ $\hat{C}_4 = x$	(tang. from same point) (∠'s opp. = sides)	✓ S ✓ R ✓ S/R (3)
5.3	$\hat{T} = 180^\circ - \hat{B}_2 - \hat{C}_4$ $\therefore \hat{T} = 180^\circ - 2x$	(sum of ∠'s of a Δ)	✓ S ✓ R ✓ S (3)
5.4	$\hat{A} = 180^\circ - y$	(opp. ∠'s of a cyclic quad.)	✓ S ✓ R (2)
5.5	$\hat{B}_1 = 180^\circ - y$ **OR** $\hat{B}_1 = 180^\circ - y$	(opp. ∠'s of a cyclic quad.) (∠ on the same segment)	✓ S ✓ R (2) **OR** ✓ S ✓ R (2)
			[12]

TOTAL: 100 MARKS

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