Province of the
EASTERN CAPE
EDUCATION

NASIONALE SENIOR SERTIFIKAAT

GRADE 10

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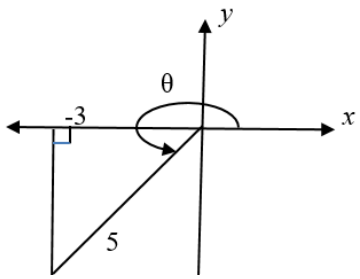
TECHNICAL MATHS P2 MARKING GUIDELINE

PUNTE: 100

This marking guideline consists of 11 pages.

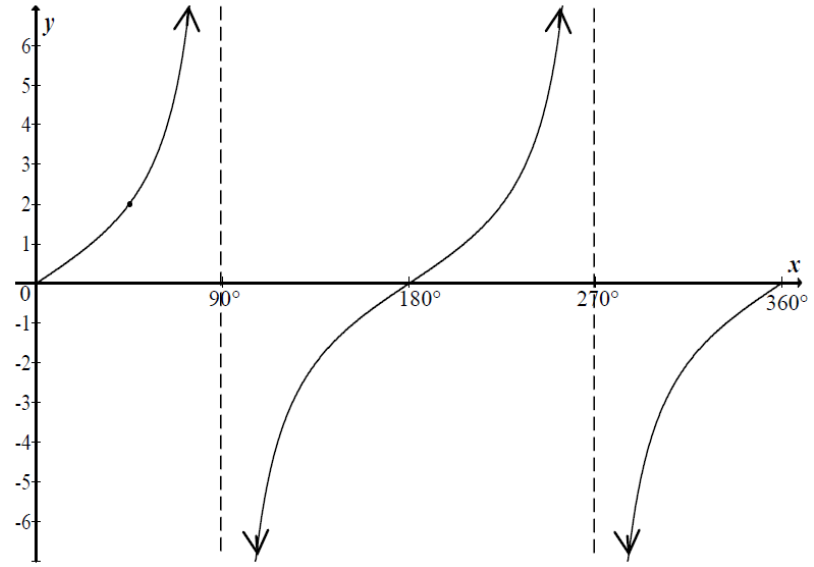
QUESTION 1			
1.1.1	$M\left(\frac{x_1+x_2}{2};\frac{y_1+y_2}{2}\right)$ $\therefore M\left(\frac{2+0}{2};\frac{-4+3}{2}\right)$ $\therefore M\left(1;-\frac{1}{2}\right)$	✓ Substitution ✓ Answer	(2)
1.1.2	$m_{MB}=\frac{y_2-y_1}{x_2-x_1}$ $\therefore m_{MB}=\frac{-\frac{1}{2}-(-1)}{1-(-3)}$ $=\frac{-\frac{1}{2}+1}{1+3}$ $\therefore m_{MB}=\frac{1}{8}$	✓ Substitution ✓ Answer	(2)
1.1.3	$m_{MB}=\frac{1}{8}$ $y=mx+c$ $-1=\frac{1}{8}(-3)+c$ $\therefore c=-\frac{5}{8}$ $\therefore y=\frac{1}{8}x-\frac{5}{8}$ **OR** $y-y_1=m(x-x_1)$ $y-(-1)=\frac{1}{8}(x-(-3))$ $y=\frac{1}{8}x+\frac{3}{8}-1$ $\therefore y=\frac{1}{8}x-\frac{5}{8}$	✓ Substitution ✓ $c=-\frac{5}{8}$ ✓ Equation ✓ Substitution ✓ Simplification ✓ Answer	(3)

1.1.4	$CD^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$ $5^2 = (k-2)^2 + (0-(-4))^2$ $5^2 = (k-2)^2 + (0+4)^2$ $25 = (k-2)^2 + 16$ $k^2 - 4k + 4 - 9 = 0$ $k^2 - 4k - 5 = 0$ $\therefore (k-5)(k+1) = 0$ $k = -1 \text{ or } k = 5$ $\therefore k = 5$	✓ Substitution ✓ Standard form ✓ Factors ✓ Answer	(4)
1.1.5	$BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $\therefore BC = \sqrt{(2-(-3))^2 + (-4-(-1))^2}$ $\therefore BC = \sqrt{34}$ $AD = \sqrt{(5-0)^2 + (0-3)^2}$ $\therefore AD = \sqrt{34}$ $\therefore BC = AD = \sqrt{34}$ $\Rightarrow BC = AD$ $\therefore ABCD$ is a parallelogram (Opp. sides of quad are equal) **OR** $m_{BC} = -\frac{3}{5}$ $m_{AD} = \frac{0-3}{5-0}$ $\therefore m_{AD} = -\frac{3}{5} = m_{BC}$ $\therefore BC // AD$ $m_{AB} = \frac{3+1}{0+3} = \frac{4}{3}$ $m_{DC} = \frac{0+4}{5-2} = \frac{4}{3}$ $m_{AB} = m_{DC} = \frac{4}{3}$ $\therefore AB // DC$ $\therefore ABCD$ is a parallelogram (Opp. sides of quad are parallel)	✓ BC ✓ AD ✓ BC = AD ✓ Conclusion ✓ $m_{AD} = m_{BC} = -\frac{3}{5}$ ✓ $m_{AB} = m_{DC} = \frac{4}{3}$ ✓ AB // DC ✓ Conclusion	(4)
			[14]

QUESTION 2			
2.1.1	$cosecA + \cot B$ $= \frac{1}{\sin A} + \frac{1}{\tan B}$ $= \frac{1}{\sin 57°} + \frac{1}{\tan 39°}$ $= 2.43$	✓ Reciprocals ✓ Substitution ✓ Answer	(3)
2.1.2	$2\cos\frac{3A}{2}$ $= 2\cos\frac{3(57°)}{2}$ $= 0.16$	✓ Substitution ✓ Answer	(2)
2.2.1	$5cos\theta = -3$ $cos\theta = -\frac{3}{5}$  $r^2 = x^2 + y^2$ $5^2 = (-3)^2 + y^2$ $y^2 = 25 - 9$ $= 16$ $\therefore y = -4$ $cos\theta + tan\theta$ $= \frac{-3}{5} + \left(\frac{-4}{-3}\right)$ $= -\frac{3}{5} + \frac{4}{3}$ $= \frac{11}{15}$	✓ Correct Diagram ✓ $y = -4$ ✓ Substitution ✓ Answer	(4)

2.2.2	$\sec\theta=\frac{r}{x}$ $\sec\theta=\frac{5}{-3}$ $\therefore \sec\theta = -\frac{5}{3}$ **OR** $\sec\theta=\frac{1}{\cos\theta}$ $=\frac{1}{-\frac{3}{5}}$ $\therefore\sec\theta=-\frac{5}{3}$	✓ $\sec\theta=\frac{r}{x}$ ✓ Substitution ✓ Answer ✓ Reciprocal ✓ Substitution ✓ Answer	(3)
2.3	$2\tan(2x+12°)-3=1$ $2\tan(2x+12°)=4$ $\tan(2x+12°)=2$ $2x+12°=\tan^{-1}(2)$ $2x+12°=63{,}43°$ $2x=63{,}43°-12°$ $2x=51{,}43$ $x=25{,}72$	✓ Transposing 3 ✓ $\tan(2x+12°)=2$ ✓ $\tan^{-1}(2)$ ✓ $2x = 51{,}43°$ ✓ Answer	(5)
			[18]

QUESTION 3			
3.1	$A\hat{B}C = 90°$ $(AB \perp AD)$	✓ Statement ✓ Reason	(2)
3.2	$D\hat{A}C + B\hat{A}C = 90°$ $(AB \perp AD)$ $\therefore B\hat{A}C = 49°$ $\therefore A\hat{C}B = 41°$ $(\angle Sum\ of\ \Delta ABC)$ $\tan A\hat{C}B = \frac{AB}{BC}$ $\therefore AB = 45\tan 41°$ $\therefore AB = 39.12m$ $\therefore AB = 3912cm$	✓ $B\hat{A}C = 49°$ ✓ Statement & Reason ✓ Subst. into tan ratio ✓ Answer	(4)
3.3	$\tan E\hat{A}D = \frac{ED}{AD}$ $\tan 73° = \frac{ED}{45}$ $\therefore ED = 45\tan 73°$ $\therefore ED = 147.19m$ $\therefore ED = 14719cm$	✓ Substitution ✓ Simplification ✓ Answer	(3)
3.4	$EC = CD + ED$ $CD = 45\tan 41°$ $\therefore CD = 39.12m$ $\therefore CD = 3912cm$ $\Rightarrow EC = 3912cm + 14719\,cm$ $\therefore EC = 18631cm$	✓ *CD = 3912 cm* ✓ $3912\,cm + 14719\,cm$ ✓ Answer	(3)
			[12]

QUESTION 4			
4.1.1		✓ x-intercepts ✓ y-intercepts ✓ asymptotes ✓ shape	(4)
4.1.2	Period is 180°	✓✓ 180°	(2)
4.1.3	$y = -3tanx$	✓ Answer	(1)
4.2.1	$g(x) = a\ sinx$ $3 = a\cos 0°$ $3 = a(1)$ $a = 3$ Answer Only: full marks	✓ Substitution ✓Answer	(2)
4.2.2	Range is $-1 \leq y \leq 5$	✓ - 1 ✓ 5	(2)
			[11

QUESTION 5			
5.1.1	$P\hat{R}S = 30°$ $(Alt.\angle's;\ PQ//RS)$	✓ Statement ✓ Reason	(2)
5.1.2	$ET\hat{R}S = 40°$ (Corr. $\angle s;\ PQ//RS$)	✓ Statement ✓ Reason	(2)
5.1.3	$\hat{P} + \hat{Q} + P\hat{R}Q = 180°$ $(\angle sum\ \Delta)$ $30°+40° + P\hat{R}Q = 180°$ $P\hat{R}Q = 180° - 30° - 40°$ $= 110°$	✓ statement and reason. ✓Answer	(2)
5.1.4	$P\hat{R}T = P\hat{R}S + S\hat{R}T(Same\angle)$ $P\hat{R}T = 30^0 + 40^0 = 70^0$ **OR** $P\hat{R}T = \hat{Q} + \hat{P}$ $(Ext.\angle of\ \Delta = Sum of\ 2\ opp.\text{int}.\angle)$ $\therefore P\hat{R}T = 40° + 30°$ $\therefore P\hat{R}T = 70\ \therefore$	✓ statement and Reason ✓ Answer	(2)
5.1.5	$\hat{P} + \hat{Q} = P\hat{R}T$ (ext. $\angle = sum$ of 2 opp. Int. angles) **OR** $P\hat{R}T$ is an interior angle of triangle PQR, therefore $P\hat{R}T$ is the sum of $\hat{Q}$ and $\hat{P}$ (two opposite interior angles)	✓ Reason ✓ Reason	(1)
			[9]

QUESTION 6			
6.1	ABDE is an Isosceles trapezium. Given one pair of sides to be equal and another parallel	✓ Trapezium ✓ Equal pair ✓ Parallel pair	(3)
6.2.1	$B\hat{A}E + E\hat{D}B = 180°$ (Opp ∠s of isosceles Trapezium) $2x + E\hat{D}B = 180°$ $\therefore E\hat{D}B = 180° - 2x$	✓ Statement and reason ✓ Answer	(2)
6.2.2	$B\hat{A}E = A\hat{E}D(base<'sIsoscelestrapezium)$ $A\hat{E}D = 2x$	✓ Statement and reason ✓ Answer	(2)
6.3	$180° - 2x = x$ (opp. ∠s of parm.) $3x = 180°$ $\therefore x = 60°$	✓ $180° - 2x = x$ ✓ $x = 60°$	(2)
6.4	$A\hat{C}B = C\hat{A}B$ $(Alt.angles$ AE//BD) Therefore, triangle ABC is isosceles Therefore, ABCE is a Rhombus (adjacent sides are equal, AB=BC)	✓ Statement & reason ✓ Isosceles ✓ Conclusion ✓ Reason	(4)
			[13]

QUESTION 7			
7.1.1	Proof: In $\Delta PQO \text{ and } MNO$ $\hat{O}$ *is common* $O\hat{P}Q = O\hat{M}N$ ($corr.angles\ PQ$//MN) $O\hat{Q}P = O\hat{N}M$ ($corr.angles\ PQ$//MN) ΔPQO///Δ MNO (AAA)	✓ $\hat{O}$ *is common* ✓ Statement & Reason ✓ Statement & Reason ΔPQO///Δ MNO (AAA)	(3)
7.1.2	$\frac{PQ}{MN} = \frac{QO}{NO} = \frac{PO}{MO}$	✓ Answer	(1)
7.2.1	$\frac{OQ}{OM} = \frac{PQ}{MN}$ (ΔPQO///Δ MNO) $\frac{OQ}{12} = \frac{6}{9}$ $OQ = \frac{6}{9} \times 12$ $OQ = 8$ units	✓ Statement and reason ✓ Simplification ✓ Answer	(3)
7.2.2	$\frac{PM}{OP} = \frac{MN}{PQ}$ $\frac{PM}{19} = \frac{9}{6}$ PM$= \frac{9}{6} \times 19 = \frac{57}{2} \approx 28{,}50\ units$	✓ $\frac{PM}{19} = \frac{9}{6}$ ✓ Simplification ✓ Answer	(3)
			[10]

QUESTION 8			
8.1.1	$107.5° = 107° + 0.5\times60$ $= 107 + 30$ $= 107°30'00"$	✓ Multiply by 60 ✓ 30' ✓ 00"	(3)
8.1.2	$69°64'89" = 69° + \frac{64}{60} + \frac{89}{60\times60}$ $= 69.1°$	✓ ✓ Divide by 60 and 3600 ✓ Answer	(3)
8.2	$\theta = s/r$ $= \frac{35}{7}\times\frac{180}{\pi}$ $= 286.48°$	✓ $\theta = s/r$ ✓ $\frac{35}{7}$ ✓ Multiply by $\frac{180}{\pi}$ ✓ 286.48	(4)
8.3	$2\pi - \frac{\pi}{9} - 120°$ $= \frac{17}{9}\pi - 120°$ $= \frac{17}{9}\pi\times\frac{180}{\pi} - 120°$ $= 340° - 120°$ $= 220°$	✓ $\frac{17}{9}\pi$ ✓ Multiply by $\frac{180}{\pi}$ ✓ Answer	(3)
			[13]
		TOTAL:	**100**