Education and Sport Development

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NATIONAL SENIOR CERTIFICATE

GRADE 10

MEMORANDUM MATHEMATICS PAPER 2

MID-YEAR 2017

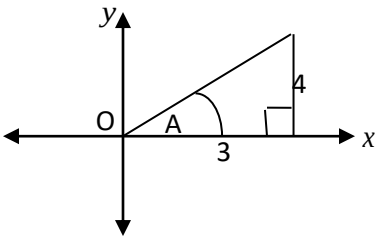
MARKS: 75

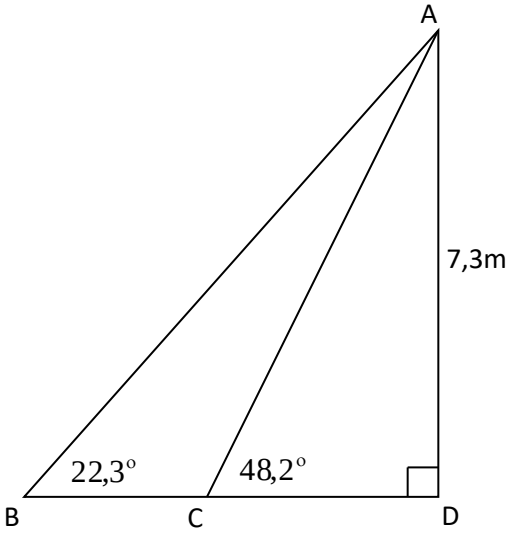
TIME: 1,5 hours

This marking guideline consists of 8 pages

N0.	QUESTION 1 [08]	COMMENTS
1.1	$\dfrac{\sin(K+L+M)}{\cos^2 7K-\dfrac{1}{\sin(L+40^\circ)}}$ $=\dfrac{\sin(30^\circ+50^\circ+70^\circ)}{\cos^2 7(30^\circ)-\dfrac{1}{\sin(50^\circ+40^\circ)}}$ = -2	✓substitution ✓answer **(2)**
1.2	$\sqrt{3}\sin 60^\circ-\sin 45^\circ\cdot\cos 45^\circ$ $=\dfrac{\sqrt{3}}{1}\times\dfrac{\sqrt{3}}{2}-\dfrac{1}{\sqrt{2}}\cdot\dfrac{1}{\sqrt{2}}$ $=\dfrac{3}{2}-\dfrac{1}{2}$ $=1$	✓$\dfrac{\sqrt{3}}{2}$ ✓$\dfrac{1}{\sqrt{2}}$ ✓$\dfrac{1}{\sqrt{2}}$ ✓answer **(4)**
1.3	$\dfrac{4\tan^2 288{,}2^\circ\cos 164{,}6^\circ}{\sin 199{,}4^\circ}$ $=\dfrac{37{,}00330944\times -0.9640954042}{-0{,}3321611319}$ = 107,40	✓Simplification ✓Answer Answer only(full marks) **(2)**
		[08]

NO.	QUESTION 2 [14]	COMMENTS
2.1.1	$\dfrac{\sin(2\theta-40^\circ)}{3}=0{,}175$ $(\times 3):\dfrac{\sin(2\theta-40^\circ)}{3}=0{,}525$ $2\theta-4\theta=31{,}67$ $2\theta=71{,}67$ $\therefore\ \theta=35{,}83$	✓multiplying by 3 ✓ $2\theta-4\theta=31{,}67$ ✓answer **(3)**

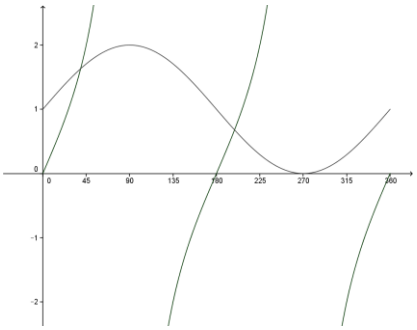
2.2	$x \cdot \sin 60^{o} = \dfrac{\cos 40^{\circ} \cdot \sec 40^{\circ} \cdot \cos 30^{\circ}}{\tan 45^{\circ} \cdot \cos 0^{\circ}}$ $x \cdot \dfrac{\sqrt{3}}{2} = \dfrac{\cos 40^{\circ} \cdot \dfrac{1}{\cos 40^{\circ}} \cdot \dfrac{\sqrt{3}}{2}}{1 \cdot 1}$ $(\times \dfrac{2}{\sqrt{3}}): \quad x = \dfrac{1}{1}$ $\therefore x = 1$	✓ $\dfrac{\sqrt{3}}{2}$ ✓ $\dfrac{1}{\cos 40^{\circ}}$ ✓ $\dfrac{\sqrt{3}}{2}$ ✓ $\tan 45^{o} = 1$ ✓ $\cos 0^{\circ} = 1$ ✓answer **(6)**
2.3	 $3\tan A - 4 = 0$ $\tan A = \dfrac{4}{3}$ $r^2 = x^2 + y^2$ $= 3^2 + 4^2$ $= 9 + 16$ $= 25$ $\therefore r = 5$ $10\sin^2 A + 5\cos^2 A$ $10\left(\dfrac{4}{5}\right)^2 + 5\left(\dfrac{3}{5}\right)^2$ $10\left(\dfrac{16}{25}\right) + 5\left(\dfrac{9}{25}\right)$ $= \dfrac{205}{25}$ $= 8\dfrac{1}{5}$	✓Labeled diagram & correct quadrant ✓ $\tan A = \dfrac{4}{3}$ ✓ $r = 5$ ✓correct subst. into expression ✓answer **(5)**
		[14]

NO.	QUESTION 3 [15]	COMMENTS
3.1.1	$\frac{PR}{PQ} = \sin \hat{Q}$ $\frac{3,2}{PQ} = \frac{\sin 33,45^o}{1}$ $PQ \sin 33,45^o = 3,2$ $PQ = \frac{3,2}{\sin 33,45^o}$ $\therefore PQ = 5,81cm$	✓ $\sin 33,45^o = \frac{3,2}{PQ}$ ✓ $PQ = \frac{3,2}{\sin 33,45^o}$ ✓Answer **(3)**
3.1.2	$\hat{P} = 180^o - 90^o - 33,45^o$ $\therefore \hat{P} = 56,55^o$	✓ $\hat{P} = 180^o - 90^o - 33,45^o$ ✓Answer **(2)**
3.1.3	$\frac{PR}{QR} = \tan \hat{Q}$ $\frac{3,2}{QR} = \frac{\tan 33,45^o}{1}$ $QR \tan 33,45^o = 3,2$ $QR = \frac{3,2}{\tan 33,45^o}$ $\therefore QR = 4,84cm$	✓ $\tan 33,45^o = \frac{3,2}{QR}$ ✓ $QR = \frac{3,2}{\tan 33,45^o}$ ✓Answer **(3)**
3.2.1		

	$In\Delta ACD: \tan 48^{o} = \frac{7,3}{CD}$ $\therefore CD = \frac{7,3}{\tan 48,2^{o}}$ $= 6,5m$ In Δ ABD : $\tan 22,3^{o} = \frac{7,3}{BD}$ $\therefore BD = \frac{7,3}{\tan 22,3^{o}}$ $= 17,8m$ $BC = BD - CD$ $= 17,8 - 6,5$ $= 11,3m$	✓ $CD = \frac{7,3}{\tan 48,2^{o}}$ ✓ $6,5m$ ✓ $BD = \frac{7,3}{\tan 22,3^{o}}$ ✓ $17,8m$ ✓answer **(5)**
3.2.2	$EA // BD$ $\therefore E\hat{A}B = A\hat{B}C$ $(alt.\angle s)$ $\therefore E\hat{A}B = 22,3^{o}$	✓S/R ✓answer **(2)**
		[15]

Question 4 [07]

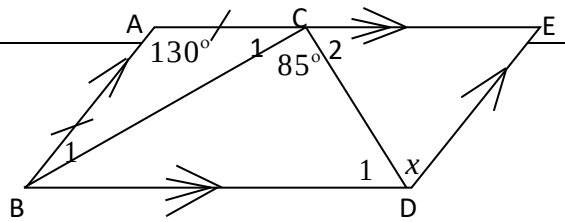
4.1

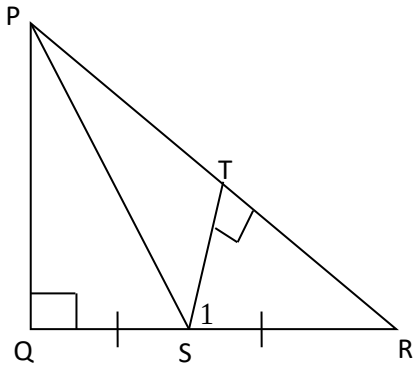


f : ✓domain
✓range
✓Asymptotes

g : ✓ x – intercept
✓ y – intercept
✓ Asymptotes

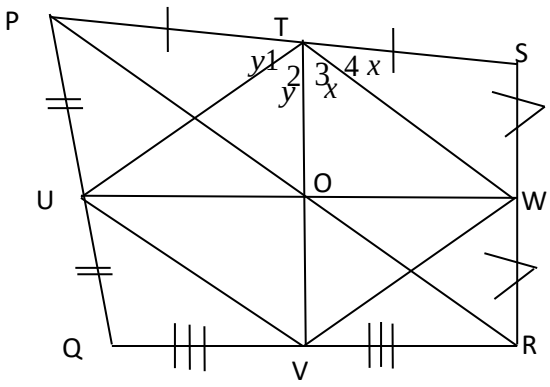
(6)

4.1.1	$y \in [0;2]$	✓Answer **(1)**
		[7]
NO.	**QUESTION**	**COMMENTS**
5.1		

	$\hat{C}_1 = \hat{B}_1$ (opp = sides) $\hat{A} + \hat{B}_1 + \hat{C}_1 = 180^o$ (int. $\angle s$ of Δ) $2\hat{C}_1 = 180^o - 130^o$ $\therefore \hat{C}_1 = 25^o$ $\hat{C}_1 + \hat{C}_2 + 85^o = 180^o (str.line)$ $\hat{C}_2 = 180^o - 85^o - 25^o$ $\therefore \hat{C}_2 = 70^o$ $\therefore D_1 = 70^o (alt.\angle s)$ $\hat{A} = \hat{D}_1 + x = 130^o (opp\angle s.parm)$ $x + \hat{D}_1 = 130^o (opp\angle s.parm)$ $x = 130^o - 70^o$ $\therefore x = 60^o$	✓ S/R ✓ S/R ✓ $\hat{C}_1 = 25^o$ ✓ $\hat{C}_2 = 70^o$ ✓ $D_1 = 70^o$ and reason ✓answer **(6)**
5.2.1	 In $\Delta PTS: PS^2 = TS^2 + PT^2$ (Pyth) $\therefore PT^2 = PS^2 - TS^2 ----(1)$ In $\Delta STR: SR^2 = TS^2 + TR^2 ---(2)$ (1)+(2): $PT^2 + SR^2 = PS^2 + TR^2$ $QS = SR$ (given) $\therefore PT^2 + QS^2 = PS^2 + TR^2$	✓S/R ✓Equa.2 ✓Equa.1+equa.2 ✓ $QS = SR$ and reason **(4)**

5.2.2	In ΔQRP & ΔTRS : $\hat{Q} = \hat{T}_1 (both = 90^o)$ $\hat{R} = \hat{R}$ (common) $\hat{P} = \hat{S}_1$ (3^{rd} <) $\therefore \Delta PQR \text{ ||| } \Delta STR$	✓S/R ✓S/R ✓S/R **(3)**
		[13]

NO. **Question 6 [14]** **COMMENTS**

6.1.1		
	$QV = VR; QU = UP (given)$ $\therefore UV \text{ // } PR (midptthrm)$	✓S/R ✓S/R ✓S/R

	$ST = TP; SW = WR (given)$ $\therefore TW // PR$ (*midptthrm*) $\therefore TW // UV$	✓S/R **(4)**
6.1.2	$\hat{T}_1 + \hat{T}_2 + \hat{T}_3 + \hat{T}_4 = 180^o$ (str. Line) $y + y + x + x = 180^o$ $2y + 2x = 180^o$ $x + y = 90^o$ $\hat{U}_1 + \hat{T}_2 + \hat{T}_3 = 180^o \ \ TW // UV$ $\therefore \hat{U}_1 + 90^o = 180^o$	✓S/R ✓S ✓ $x + y = 90^o$ ✓S/R **(4)**
6.1.3	$TW = \frac{1}{2} PR$ (*midptthrm*) $UV = \frac{1}{2} PR$ (*midptthrm*) $\therefore TW = UV$ $\hat{U}_1 = 90^o; \hat{T}_2 + \hat{T}_3 = 90^o$ (*proven*) $TW // UV$ $\therefore TUVW$ is a rectangle	✓S/R ✓S/R ✓ $TW = UV$ ✓ $TW // UV$ **(4)**
6.2.1	$OB = 2cm$ (diagonals of kite bisect each other)	✓2cm ✓correct reason **(2)**
6.2.2	$A\hat{O}B = 90^o$ (diagonals of kite intersect at right $\angle s$)	✓ 90^o ✓correct reason **(2)**
6.2.3	$B\hat{A}O = 20^o$ (diagonals of kite bisect $\angle s$ of kite) $B\hat{A}D = 20^o + 20^o$ $= 40^o$	✓S/R $B\hat{A}D = 40^o$ **(2)**
		[14]

END OF MEMO