GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

JUNE 2016

GRADE 10

MATHEMATICS
(PAPER 2)

MEMORANDUM

7 pages

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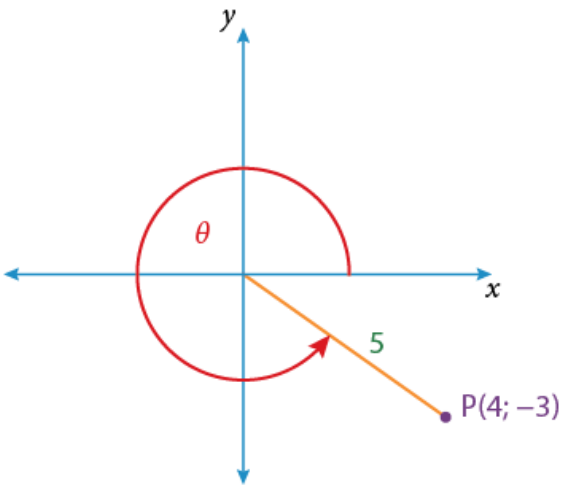
PROVINCIAL EXAMINATION

MATHEMATICS (P2)

MEMORANDUM

	QUESTION 1		
1.1	$\frac{\sin\theta}{\cos\theta} = \frac{y}{r} \div \frac{x}{r}$ $= \frac{y}{r} \times \frac{r}{x}$ $= \frac{y}{x}$	✓$\frac{y}{r}$ ✓$\frac{x}{r}$ ✓simplification (3) Answer only 1/3	
1.2.1	$\sin\theta = \frac{PQ}{PR} = \frac{5}{13}$	✓answer (1)	
1.2.2	$\sec\theta = \frac{PR}{QR} = \frac{13}{12}$	✓answer (1)	
1.2.3	$\tan\theta = \frac{PQ}{QR} = \frac{5}{12}$	✓answer (1)	
			[6]

	QUESTION 2		
2.1		✓correct quadrant	
	$4\tan\theta = -3$ $\therefore \tan\theta = -\frac{3}{4} = \frac{y}{x}$ $r^2 = x^2 + y$ $r^2 = (4)^2 + (-3)^2$ $r = 5$	✓ $r = 5$	
	$5\sin\theta + 3\cot\theta$ $= 5\left(\frac{-3}{5}\right) + 3\left(\frac{4}{-3}\right)$ $= -3 - 4 = -7$	✓$\left(\frac{-3}{5}\right)$ ✓$\left(\frac{4}{-3}\right)$ ✓-7 (5)	
2.2	$25\cos^2\theta$ $= 25\left(\frac{4}{5}\right)^2$ $= 25\left(\frac{16}{25}\right)$ $= 16$	✓substitution ✓answer (2)	
			[7]

	QUESTION 3		
3.1.1	$\sin x + 2\cos 3y$ $= \sin(42°) + 2\cos(3 \times 68°)$ $= \sin(42°) + 2\cos 204°$ $= -1{,}16$	Do not penalise for rounding off ✓✓answer (2)	
3.1.2	$3\tan^2(x + y)$ $= 3\tan^2(42° + 68°)$ $= 3\tan^2 110°$ $= 22{,}65$	Do not penalise for rounding off ✓✓answer (2)	
3.2.1	$2\sin\theta = 1{,}432$ $\therefore \sin\theta = 0{,}716$ $\therefore \theta = 45{,}725°$	Do not penalise for rounding off ✓✓answer (2)	
3.2.2	$\tan 3\theta = 6{,}345$ $3\theta = 81{,}044°$ $\therefore \theta = 27{,}015°$	✓ $\tan^{-1}$ ✓ $\div 3$ ✓answer (3)	
		*penailse once only for rounding off in 3.2	**[9]**

	QUESTION 4		
4.2			
	$\sin^2 45° - \cos 60° + \tan 10°.\cot 10°$ $= \left(\frac{\sqrt{2}}{2}\right)^2 - \frac{1}{2} + 1$ $= \frac{1}{2} - \frac{1}{2} + 1$ $= 1$	✓ $\cos 60° = \frac{1}{2}$ ✓ $\sin^2 45° = \frac{1}{2}$ ✓ $\tan 10°.\cot 10° = 1$ ✓answer = 1 (4)	
			[9]

	QUESTION 5		
5.1	$\hat{P}_1 + \hat{Q} = \hat{R}_2$ (exterior angle = sum of interior opposite angles) $\hat{P}_1 + 30° = 110°$ $\hat{P}_1 = 110° - 30°$ $= 80°$	✓ reason ✓answer (2)	
5.2	$\hat{P}_2 = \hat{S}_1$ ($\angle^S$ opposite equal sides are equal) $\hat{P}_2 + \hat{R}_2 + \hat{S}_1 = 180°$ (Sum of $\angle^s$ of a triangle $= 180°$) $\therefore \hat{P}_2 + 110° + \hat{P}_2 = 180°$ (Given : $\hat{R}_2 = 110°$ and $\hat{P}_2 = \hat{S}_1$) $\therefore 2\hat{P}_2 = 180° - 110°$ $\therefore 2\hat{P}_2 = 70°$ $\therefore \hat{P}_2 = 35°$ **OR** $\hat{P}_2 = \hat{S}_1$ ($\angle^S$ opposite equal sides are equal) $\hat{R}_1 = \hat{P}_2 + \hat{S}_1$ (exterior angle = sum of interior opposite angles) $\therefore \hat{P}_2 = 35°$	✓statement and reason ✓statement and reason ✓simplification (3) **OR** ✓statement and reason ✓statement and reason ✓simplification (3)	
			[5]
	QUESTION 6		
	In ΔABC *and* ΔCDA $\hat{B} = \hat{D}$ (given) AC is common $\hat{C}_1 = \hat{A}_2$ (alternate angles ; AD // BC) $\therefore \Delta ABC \equiv \Delta CDA$ ($\angle; \angle; S$) $\therefore AD = BC$ ($\Delta ABC \equiv \Delta CDA$) $\therefore$ ABCD is a parallelogram (one side = //) **OR** In ΔABC *and* ΔCDA $\hat{B} = \hat{D}$ (given) AC is common $\hat{C}_1 = \hat{A}_2$ (alternate angles ; AD // BC) $\therefore \Delta ABC \equiv \Delta CDA$ ($\angle; \angle; S$) $\therefore AD = BC$ ($\Delta ABC \equiv \Delta CDA$) $\therefore AB = DC$ ($\Delta ABC \equiv \Delta CDA$) $\therefore$ ABCD is a parallelogram (opposite sides =)	✓ $\hat{C}_1 = \hat{A}_2$ ✓Reason (AD // BC) ✓S + R ✓AD = BC ✓reason (one side = //) **OR** ✓Statement ✓Reason (AD // BC) ✓S + R ✓AD = BC ✓reason (opposite sides =)	

			[5]

	QUESTION 7		
7.1	AO + OC = $4xy$ (given – diagonals bisect) OC = $2xy$ BO + OD = $2x^2 - 2y^2$ (given – diagonals bisect) BO = $x^2 - y^2$ If rhombus – diagonals bisect at 90° LHS = BC^2 RHS = $BO^2 + OC^2$ = $(x^2 + y^2)^2$ = $(x^2 - y^2)^2 + (2xy)^2$ **OR** = $x^4 + 2x^2y^2 + y^4$ = $x^4 - 2x^2y^2 + y^4 + 4x^2y^2$ = $x^4 + 2x^2y^2 + y^4$ **OR** = $(x^2 + y^2)^2$ $\therefore \Delta BOC$ is a right angled triangle OR Prove ΔAOD as a right angled triangle $\therefore$ Diagonals bisect each other at 90°/right angles $\therefore$ ABCD is a Rhombus	✓ OA = $2xy$ ✓ BO = $x^2 - y^2$ ✓ LHS ✓RHS ✓conclusion	
		(5)	
7.2	$\hat{R}_1 = 120°$ (opposite angles of a $//^m$) $\hat{R}_2 = 60°$ (angles on a straight line) $\hat{T} = 60°$ (angles opposite equal sides) $\hat{S} = 60°$ (sum of angles of a triangle) $\therefore 4x = 60°$ $x = 15°$	✓ $\hat{R}_1 = 120°$ ✓ $\hat{T} = 60°$ ✓ $\hat{S} = 60°$ ✓ $x = 15°$ (4)	**[9]**

TOTAL: 50