



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

**GAUTENG DEPARTMENT OF EDUCATION
PROVINCIAL EXAMINATION
JUNE 2016
GRADE 10**

**MATHEMATICS
(PAPER 2)**

MEMORANDUM

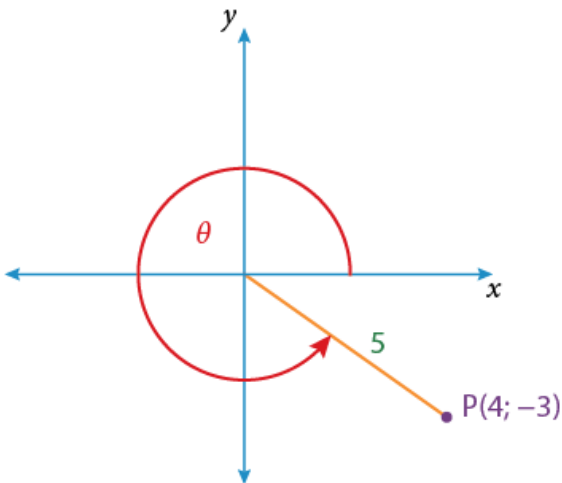
7 pages

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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	
	$4 \tan \theta = -3$ $\therefore \tan \theta = -\frac{3}{4} = \frac{y}{x}$ $r^2 = x^2 + y^2$ $r^2 = (4)^2 + (-3)^2$ $r = 5$	✓ $r = 5$	
	$5 \sin \theta + 3 \cot \theta$ $= 5 \left(\frac{-3}{5} \right) + 3 \left(\frac{4}{-3} \right)$ $= -3 - 4 = -7$	$\checkmark \left(\frac{-3}{5} \right)$ $\checkmark \left(\frac{4}{-3} \right)$ $\checkmark -7$ (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	$\sin x + 2 \cos 3y$ $= \sin(42^\circ) + 2 \cos(3 \times 68^\circ)$ $= \sin(42^\circ) + 2 \cos 204^\circ$ $= -1,16$	Do not penalise for rounding off ✓✓ answer (2)	
3.1.2	$3 \tan^2(x + y)$ $= 3 \tan^2(42^\circ + 68^\circ)$ $= 3 \tan^2 110^\circ$ $= 22,65$	Do not penalise for rounding off ✓✓ answer (2)	
3.2.1	$2 \sin \theta = 1,432$ $\therefore \sin \theta = 0,716$ $\therefore \theta = 45,725^\circ$	Do not penalise for rounding off ✓✓ answer (2)	
3.2.2	$\tan 3\theta = 6,345$ $3\theta = 81,044^\circ$ $\therefore \theta = 27,015^\circ$	✓ $\tan^{-1}$ ✓ $\div 3$ ✓ answer (3)	
		*penalise once only for rounding off in 3.2	[9]

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

	QUESTION 5		
5.1	$\hat{P}_1 + \hat{Q} = \hat{R}_2$ (exterior angle = sum of interior opposite angles) $\hat{P}_1 + 30^\circ = 110^\circ$ $\hat{P}_1 = 110^\circ - 30^\circ$ $= 80^\circ$	✓ reason ✓ answer (2)	
5.2	$\hat{P}_2 = \hat{S}_1$ ($\angle^s$ opposite equal sides are equal) $\hat{P}_2 + \hat{R}_2 + \hat{S}_1 = 180^\circ$ (Sum of $\angle^s$ of a triangle = 180°) $\therefore \hat{P}_2 + 110^\circ + \hat{P}_2 = 180^\circ$ (Given : $\hat{R}_2 = 110^\circ$ and $\hat{P}_2 = \hat{S}_1$) $\therefore 2\hat{P}_2 = 180^\circ - 110^\circ$ $\therefore 2\hat{P}_2 = 70^\circ$ $\therefore \hat{P}_2 = 35^\circ$ 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) $\therefore \hat{P}_2 = 35^\circ$	✓ statement and reason ✓ statement and reason ✓ simplification (3) OR ✓ statement and reason ✓ statement and reason ✓ simplification (3)	
			[5]
	QUESTION 6		
	In $\triangle ABC$ and $\triangle CDA$ $\hat{B} = \hat{D}$ (given) AC is common $\hat{C}_1 = \hat{A}_2$ (alternate angles ; AD // BC) $\therefore \triangle ABC \equiv \triangle CDA$ ($\angle$; $\angle$; S) $\therefore AD = BC$ ($\triangle ABC \equiv \triangle CDA$) $\therefore$ ABCD is a parallelogram (one side = //) OR In $\triangle ABC$ and $\triangle CDA$ $\hat{B} = \hat{D}$ (given) AC is common $\hat{C}_1 = \hat{A}_2$ (alternate angles ; AD // BC) $\therefore \triangle ABC \equiv \triangle CDA$ ($\angle$; $\angle$; S) $\therefore AD = BC$ ($\triangle ABC \equiv \triangle CDA$) $\therefore AB = DC$ ($\triangle ABC \equiv \triangle CDA$) $\therefore$ 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° $LHS = BC^2$ $= (x^2 + y^2)^2$ OR $= x^4 + 2x^2y^2 + y^4$ $RHS = BO^2 + OC^2$ $= (x^2 - y^2)^2 + (2xy)^2$ $= x^4 - 2x^2y^2 + y^4 + 4x^2y^2$ $= x^4 + 2x^2y^2 + y^4$ OR $= (x^2 + y^2)^2$ $\therefore \triangle BOC$ is a right angled triangle OR Prove $\triangle AOD$ as a right angled triangle $\therefore$ Diagonals bisect each other at 90° /right angles $\therefore$ ABCD is a Rhombus	$\checkmark OA = 2xy$ $\checkmark BO = x^2 - y^2$ $\checkmark LHS$ $\checkmark RHS$ $\checkmark$ conclusion	
		(5)	
7.2	$\hat{R}_1 = 120^\circ$ (opposite angles of a // ^m) $\hat{R}_2 = 60^\circ$ (angles on a straight line) $\hat{T} = 60^\circ$ (angles opposite equal sides) $\hat{S} = 60^\circ$ (sum of angles of a triangle) $\therefore 4x = 60^\circ$ $x = 15^\circ$	$\checkmark \hat{R}_1 = 120^\circ$ $\checkmark \hat{T} = 60^\circ$ $\checkmark \hat{S} = 60^\circ$ $\checkmark x = 15^\circ$ (4)	
			[9]

TOTAL: 50