JOHANNESBURG EAST DISTRICT
PLC COMMON PAPER

Grade 11

MARKING GUIDELINE

MATHEMATICS

PAPER 2

JUNE 2026

Stanmorephysics.com

DURATION : 2 HOURS
MARKS : 100

This marking guidelines consists of 7 pages including cover page.

NOTE:

- If a canditate answers a quaestion TWICE, mark only the FIRST attempt
- If a candidate has crossed-out an attempt of a question and has not redone the question, mark the crossed-out version.
- Consistent accuracy applied in ALL aspects of the marking guidelines, stop marking at the second calculation error.
- Assuming answer/ value in order to solve a problem is NOT acceptable.

Geometry

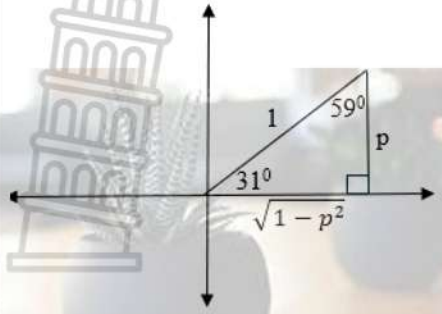
S – Statement

R – Reason

S/R Statement and Reason

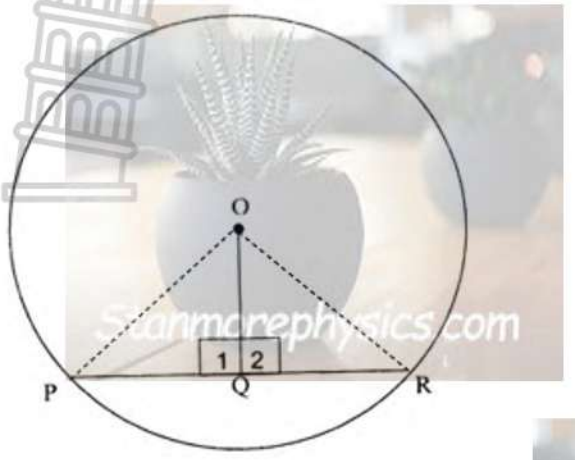
	QUESTION 1	
1.1	$M_{BC} = \frac{8-0}{4-5}$ $= -8$	✓Substitution into gradient formula ✓answer (2)
1.2	$AB = \sqrt{65} = \sqrt{(-3-4)^2 + (k-8)^2}$ $65 = 49 + k^2 - 16k + 64$ $k^2 - 16k + 48 = 0$ $(k-4)(k-12) = 0$ $k = 4 \text{ or } k \neq 12$ OR $AB = \sqrt{65} = \sqrt{(-3-4)^2 + (k-8)^2}$ $65 = 49 + (k-8)^2$ $(k-8)^2 = 16$ $k - 8 = \pm 4$ $k = 4 \quad k \neq 12$	✓ correct substitution into distance formula ✓ equating with $\sqrt{65}$ ✓ Standard form ✓ factors OR ✓ correct substitution into distance formula ✓ equating with $\sqrt{65}$ ✓ $(k-8)^2 = 16$ ✓ $k - 8 = \pm 4$ (4)
1.3	$M_{BD} = \frac{8-(-4)}{4-(-2)}$ $M_{BD} = 2$ $M_{AC} = \frac{4-0}{-3-5}$ $= \frac{-1}{2}$ $M_{BD} \times M_{AC} = 2 \times \frac{-1}{2}$ $= -1$ $BD \perp AC$	✓ $M_{BD} = 2$ ✓ $M_{AC} = -\frac{1}{2}$ ✓ $M_{BD} \times M_{AC} = -1$ (3)

1.4	$P(1;2)$ $AP = \sqrt{(-3-1)^2 + (4-2)^2}$ $= 2\sqrt{5}$ $BP = \sqrt{(4-1)^2 + (8-2)^2}$ $= 3\sqrt{5}$ Area $\Delta APB = \frac{1}{2} \times base \times \perp height$ $= \frac{1}{2} \times 2\sqrt{5} \times 3\sqrt{5}$ $= 15$ square units	✓ ✓coordinates of P ✓ length of AP ✓ length of BP ✓ substitution into area formula ✓ answer (6)
1.5	$M_{AD} = M_{BC} = -8$ AB is parallel to BC $y - y_A = M_{AD}(x - x_A)$ $y - 4 = -8(x + 3)$ $y = -8x - 20$ $8x + y + 20 = 0$ OR $y = mx + c$ $-4 = -8(-2) + c$ $c = -20$ $y = -8x - 20$ $8x + y + 20 = 0$	✓ gradient of AD ✓ substitution into straight line formula ✓ standard form of linear line $ax + by + c = 0$ (3)
1.6	Midpoint of AF = Midpoint of DC $\frac{x-3}{2} = \frac{-2+5}{2}$ $x = 6$ $\frac{y+4}{2} = \frac{-4+0}{2}$ $y = -8$ F$(6;-8)$	✓ $x = 6$ ✓ $y = -8$ (2)
1.7	$\tan\alpha = -8$ $\alpha = 180° - 82.87°$ $\alpha = 97.13°$ $\tan\beta = 2$ $\beta = 63{,}43°$ $E\hat{O}D = \beta = 63{,}43°$ vert opp. $\angle s$ = $E\hat{D}O = \alpha - \beta$ ext. $\angle$ of a $\triangle$ $= 97{,}13° - 63{,}43°$ $= 33{,}7°$	✓ $\tan\alpha = -8$ ✓ $\alpha = 97{,}13°$ ✓ $\beta = 63{,}43°$ ✓ $\alpha - \beta$ ✓ Answer (5)
		[25]

	QUESTION 2	
2.1		
2.1.1	$\sin 149° = \sin(180° - 31°)$ $= \sin 31°$ $= p$	✓ $\sin(180° - 31°)$ ✓ p (2)
2.1.2	$\cos(-59°) = \cos 59°$ $= p$	✓ $\cos 59°$ ✓ Answer (2)
2.1.3	$x^2 = 1^2 - p^2$ $x = \sqrt{1-p^2}$ $\cos 31° = \sqrt{1-p^2}$	✓ correct diagram ✓ Pythagoras ✓ $\cos 31° = \sqrt{1-p^2}$ (3)
2.2	$= -\tan\theta . cos^2\theta - \cos\theta . \sin\theta$ $= -\frac{\sin\theta}{\cos\theta} . cos^2\theta - \cos\theta . \sin\theta$ $= -2\sin\theta . \cos\theta$	✓ $-\tan\theta$ ✓ $cos^2\theta$ ✓ $-\cos\theta$ ✓ $\frac{-\sin\theta}{\cos\theta}$ ✓ $-2sin\theta . \cos\theta$ (5)
		[12]

	QUESTION 3	
3.1	$\frac{\cos 135° . \sin 135° + \sin 330°}{\tan 225°}$ $= \frac{-\cos 45° . \sin 45° - \sin 30°}{\tan 45°}$ $= \frac{-\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} - \frac{1}{2}}{1}$ $= -1$	✓ $-\cos 45°$ ✓ $\sin 45°$ ✓ $-\sin 30°$ ✓ $\frac{-1}{\sqrt{2}}$ or $\frac{-\sqrt{2}}{2}$ ✓ $-\frac{1}{2}$ ✓ -1 (6)

3.2.1	$LHS = \dfrac{\cos x \times \cos x + (1+\sin x)(1+\sin x)}{\cos x\,(1+\sin x)}$ $= \dfrac{cos^2x + 1 + 2\sin x + sin^2x}{\cos x(1+\sin x)}$ $= \dfrac{1+1+2\sin x}{\cos x\,(1+\sin x)}$ $= \dfrac{2(1+\sin x)}{\cos x(1+\sin x)}$ $= \dfrac{2}{\cos x}$	✓denominator ✓cos^2x ✓ $1 + 2\sin x + sin^2x$ ✓identity ✓factors (5)
3.2.2	$1 + \sin x = 0$ or $\cos x = 0$ $sinx = -1$ $x = 90°$ or $x = 270°$	✓ Equating the denominator with zero ✓$x = 90°$ ✓$x = 270°$ (3)
3.3	$\tan x = \frac{-1}{2}$ ref $\angle = 26.57°$ $x = 153{,}43° + k.180°$ *or* $x = 333{,}43 + k.180°; k \in \mathbb{Z}$ or $\sin 2x = \frac{1}{3}$ ref $\angle = 19.47°$ $2x = 19{,}47° + k.360°$ *or* $2x = 160{,}53° + k.360°$ $x = 9{,}74° + k.180°$ $x = 80{,}27° + k.180°; k \in \mathbb{Z}$	✓ $\tan x = \frac{-1}{2}$ ✓ $x = 153.43° + k.180°$ ✓ $x = 333.43 + k.180°$ ✓ $\sin 2x = \frac{1}{3}$ ✓ $x = 9{,}74° + k.180°$ ✓ $x = 80{,}27° + k.180°$ (6)
		[20]

	QUESTION 4	
4.1	Stanmorephysics.com Construction: Join OP and OR In ΔPOQ and ΔROQ $\hat{Q}_1 = \hat{Q}_2$ [Given] $OP = OR$ [Radii] $OQ = OQ$ [Common] $\therefore \Delta POQ \equiv \Delta ROQ$ [RHS] $PQ = QR$	✓ Construction OP and OR ✓ S ✓ R ✓ S/R ✓ S ✓ R (6)
4.2.1	$r = MQ$ Radii $r = x + 20$	✓ S/R ✓ Answer (2)
4.2.2	$(x + 20)^2 = (80)^2 + (x)^2$ $x^2 + 40x + 400 = (80)^2 + x^2$ $40x = 6000$ $x = 150$ $r = 150 + 20$ $= 170$	✓ Application of Pyth. Theorem ✓ Substitution ✓ Simplification ✓ *x* value ✓ Answer (5)
		[13]

	QUESTION 5	
5.1.1	$\hat{O}_1 = 2 \times 50°$ [∠ at centre =2 × ∠ at circumference] $\hat{O}_1 = 100°$	✓ S/R ✓ Answer (2)
5.1.2	$\hat{E}_1 = \hat{A}_2$ ∠ opp. = sides $\hat{O}_1 + \hat{E}_1 + \hat{E}_1 = 180°$ sum of ∠s in a △ $2\hat{E}_1 = 180° - 100°$ $\hat{E}_1 = 40°$	✓ S ✓ R ✓ S/R ✓ Answer (4)
5.2.1	$CD = DB$ [Line from centre perpendicular to chord]	✓ R (1)
5.2.2	$A\hat{C}B = 90°$[∠ in the semi circle] $\hat{D}_1 = 90°$ $[Given]$ $AC \parallel OE$ Corresp. ∠s =	✓ S/R ✓ R ✓ S/R (3)
5.2.3	$\hat{C} = \hat{A} = x$ $[tan - chord\ theorem]$ $E\hat{O}B = \hat{A} = x$ [Corresp. ∠s; AC ∥ OE]	✓ S ✓R ✓ S ✓R (4)
5.2.4	$\hat{C} = x$ [Given] $E\hat{O}B = x$ proven $\therefore \hat{C} = E\hat{O}B$ OBEC is a cyclic quad [converse ∠s in the same segment]	✓S/R ✓S ✓ R (3)
		[17]

	QUESTION 6	
6.1	$\hat{C}_1 = \hat{B}_2 = x$ [∠s in the same segment] $\hat{B}_2 = \hat{D}_2 = x$ [∠s opp = sides $\hat{D}_2 = \hat{C}_2 = x$ [∠s in same segment]	✓ S ✓ R ✓ S ✓ R ✓ S ✓ R (6)
6.2	$B\hat{O}D = 180° - 2x$ [opp ∠s of cyclic quad] $\hat{A} = 90° - x$ [∠ at centre = 2 × ∠ at circumference]	✓ S ✓R ✓ S ✓R (4)
6.3	$\hat{A} + \hat{E}_1 + \hat{C}_2 = 180°$ [sum of ∠s in a △] $\hat{E}_1 = 180° - (90° - x + x)$ $\hat{E}_1 = 90°$ [Line from centre perpendicular to chord]	✓ S ✓ R ✓ S/R (3)
		[13]
		Total: 100