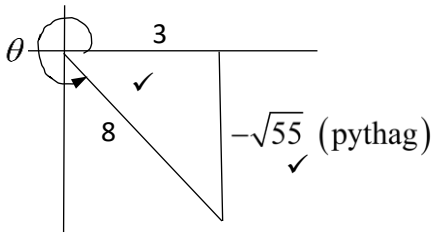
GRADE 11 PAPER 2 MEMO

QUESTION 1

1.1.1	$m = \frac{7-(-1)}{6-2}$ ✓ $m = 2$ ✓	✓ subst ✓ answer (CA only if positive)	(2)
1.1.2	$m = \frac{7-11}{6+2} = \frac{-1}{2}$ ✓ $\therefore \perp \ (m_1 \times m_2 = -1)$ ✓	✓ gradient ✓ reason	(2)
1.1.3	$m\left(\frac{-2+2}{2}; \frac{11-1}{2}\right)$ ✓ $m(0;5)$ ✓	✓ subst ✓ answer (CA)	(2)
1.1.4	$y - y_1 = m(x - x_1)$ $y - (11) = 2(x - (-2))$ ✓✓ $y - 11 = 2x + 4$ $y = 2x + 15$ ✓ *OR* $y = mx + c$ $11 = 2(-2) + c$ ✓✓ $c = 15$ $y = 2x + 15$ ✓	✓ grad (CA from 1.1.1) ✓ subst (x;y) ✓ equation	(3)
1.1.5	$K(-6;3)$ ✓✓	✓ x value ✓ y value	(2)
1.1.6	$m = \tan\theta$ $\tan\theta = 2$ ✓ $\theta = 63,43$ $\therefore \beta = 180 - 63,43$ $= 116,57$ ✓	✓ equation ✓ obtuse angle	(2)
1.1.7	$d_{LM} = \sqrt{(7-11)^2 + (6+2)^2}$ ✓ $= \sqrt{16+64}$ $= \sqrt{80}$ $(4\sqrt{5} = 8,94)$ ✓ $d_{MN} = \sqrt{(7-(-1))^2 + (6-2)^2}$ $= \sqrt{64+16}$ $= \sqrt{80}$ ✓ ✓ $\therefore$ square (adj sides =)	✓ substitution ✓ answer (CA) ✓ 2nd answer ✓ reason	(4)
1.2	$x^2 - 10x + y^2 + 8y = 40$ $(x^2 - 10x + 25) + (y^2 + 8y + 16) = 40 + 25 + 16$ ✓ $(x-5)^2 + (y+4)^2 = 81$ ✓ $m(+5;-4)$ & $r = 9$ ✓	✓ addition on both sides ✓ factorising ✓ centre (CA) ✓ radius (CA)	(4)

QUESTION 2



2.1.1	$8\sin^2\theta$ $= 8\left(\frac{-\sqrt{55}}{8}\right)^2$ ✓ $= \frac{55}{8}$ ✓	✓ quadrant ✓ pythag side ✓ subst (CA) ✓ answer (CA)	(4)
2.1.2	$\cos(\theta + 90) = \frac{adj}{hyp}$ ✓ $\sin\theta = \frac{adj}{16}$ $\frac{\sqrt{55}}{8} = \frac{adj}{16}$ ✓ $= 2\sqrt{55} = adj$ ✓	✓ trig ratio ✓ subst ✓ answer Answer only (1/3)	(3)
2.2	$\frac{\cos(90-x).\sin(360+x)+\cos^2(-180+x)}{\cos(-x)}$ $= \frac{\sin x.\sin x+(-\cos x)^2}{\cos x}$ ✓ ✓ ✓ ✓ $= \frac{\sin^2 x+\cos^2 x}{\cos x}$ $= \frac{1}{\cos x}$ ✓		(5)
2.3	$\frac{\sin 120.\cos(-330)}{\tan 135.\tan 480}$ $= \frac{\sin(180-60).\cos 30}{\tan(180-45).\tan(180-60)}$ $= \frac{\sin 60.\cos 30}{-\tan 45.-\tan 60}$ ✓ ✓ ✓ $= \frac{\frac{\sqrt{3}}{2}.\frac{\sqrt{3}}{2}}{+1.\sqrt{3}}$ ✓ $\frac{3\sqrt{3}}{4}$ ✓		(6)

2.4	$\frac{\cos x}{1-\sin x}-\tan x$ $\frac{\cos x}{1-\sin x}-\frac{\sin x}{\cos x}$ ✓ $\frac{\cos x.\cos x-\sin x(1-\sin x)}{\cos x(1-\sin x)}$ ✓ $\frac{\cos^2 x-\sin x+\sin^2 x}{\cos x(1-\sin x)}$ ✓ $\frac{1-\sin x}{\cos x(1-\sin x)}$ ✓ $=\frac{1}{\cos x}$	✓ tan identity ✓ LCD ✓ multiply out numerator ✓ 1 ✓ division	(5)
2.5	$\frac{\sin x}{\cos x}=\frac{3\cos x}{\cos x}$ ✓ $\tan x=3$ $x=71,57$ ✓ 1st quad $x=71,57+180n,\ n\in\mathbb{Z}$ ✓	✓ $\div$ *by* $\cos x$ ✓ ref $\angle$ ✓ 71,57 + 180n ✓ $n\in Z$	(4)
2.6	$2\cos(3x)=-1,26$ $\cos 3x=-0,63$ $3x=50,95$ ✓ 2nd quad $3x=180-50,95+360n$ ✓ $3x=129,05+360n$ $x=43,02+120n$ ✓ 3rd quad $3x=180+50,95+360n$ $3x=230,95+360n$ $x=76,98+120n$ ✓ $x\in\{-43,02;\ 43,02;\ 76,98\}$ ✓	✓ ref $\angle$ ✓ 2nd quad ✓ simplified ✓ 3rd quad ✓ specific solutions	(5)

QUESTION 3

3.1	$G_2 = 131$ ✓ (ext $\angle$ Δ) $\frac{g}{\sin 131} = \frac{7,3}{\sin 10}$ ✓ ✓ $g = BH = 31,73$ ✓	✓ angle G ✓ use of sin rule ✓ correct subst ✓ BH	(4)
3.2	$b^2 = j^2 + h^2 - 2jh\cos B$ $= (31,73)^2 + (21)^2 - 2(31,73)(21)\cos 20$ ✓ $b^2 = 195,5$ ✓ $b = 13,98$ ✓	✓ correct subst into Cos rule ✓ b^2 ✓ b	(3)

QUESTION 4

4.1	Twice/double the angle formed at the circumference ✓ ✓	✓ twice/double ✓ circumference	(2)
4.2.1	$G\hat{O}K = 116$ ✓ ($\angle$ at centre = 2 x $\angle$ at circumference) ✓	✓ S ✓ R	(2)
4.2.2	$\hat{G} = 70$ ✓ (ext $\angle$ of cyc. quad) ✓ $G_2 = (180 - 116)/2 = 32$ ($\angle$ opp = radii) ✓ $\therefore G_1 = 70 - 32 = 38$ ✓	✓ S ✓ R ✓ S and R ✓ answer	(4)

QUESTION 5

5.1	Draw diameter $R\hat{O}B$ ✓ Join B to P $OR \perp DF$ (tan $\perp$ *rad*) ✓ $B\hat{P}R = 90$ ($\angle$ in semicircle) ✓ let $B\hat{R}Q = x$ Then $B\hat{P}Q = x$ ✓ ✓ ($\angle s$ in same segment) $\therefore$ $QRF = B\hat{P}R$	✓ construction ✓ 90° S and R ✓ 90° S and R ✓ x ✓ R	(5)
5.2.1	$B = 50$ ✓ (tan chord th) ✓	✓ S ✓ R	(2)
5.2.2	$A = 50$ ✓ ($\angle s$ in same seg / tan chord th) ✓ ✓	✓ S ✓ R	(2)
5.2.3	$C_2 = 50$ (alt. $\angle s$, $AC \parallel PR$) ✓	✓ S ✓ R	(2)
5.2.4	$Q_1 = 50$ (tan chord th) ✓ $\therefore Q_2 + Q_3 = 80$ ($\angle s$ on a straight line) ✓ ✓ $\therefore$ not a diameter as not subtending an angle of 90	✓ tan ch S/R ✓ angle ✓ "no" answer and reason	(3)

QUESTION 6

6.1	Prove opp $\angle s$ supp. ✓ Prove ext $\angle$ = int. opp. $\angle$ ✓ Prove $\angle s$ in same seg. are = ✓	✓ R ✓ R ✓ R	(3)
6.2.1	$P_1 = x$ ✓ $(\angle$ at centre = 2 $\times$ $\angle$ at circ ✓$)$ $R_1 = x$ ✓ $(\angle s$ in same seg$)$ ✓ $N_2 = x$ ✓ $(\angle s$ opp = radii$)$ ✓	✓ S ✓ R ✓ S ✓ R ✓ S ✓ R	(6)
6.2.2	$S = 90 - x$ ✓ $(\angle s$ of $\Delta)$ ✓	✓ Angle size ✓ R	(2)
6.2.3	$P = 90$ ✓ $(\angle$ in semi circle$)$ ✓ $S = 90 - x$ (proven) $\therefore R_2 = 180 - 90 - (90 - x)$ $(\angle s$ of $\Delta SPR)$ ✓ $R_2 = x$ ✓ $\therefore$ bisects	✓ P=90° ✓ Reason ✓ R_2=x ✓ Reason	(4)
6.2.4	$W_1 = 90$ ✓ $(\text{line fron centre to midpt chord})$ ✓ $\therefore TNWO$ is cyclic quad (converse opp $\angle$s cyc. quad supp) OR (converse ext. $\angle$ ofc q = int opp $\angle$) ✓	✓ S ✓ R ✓ cyclic quad reason	(3)