education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICS PAPER 2

September 2019

MARKING GUIDELINES

MARKS: 150

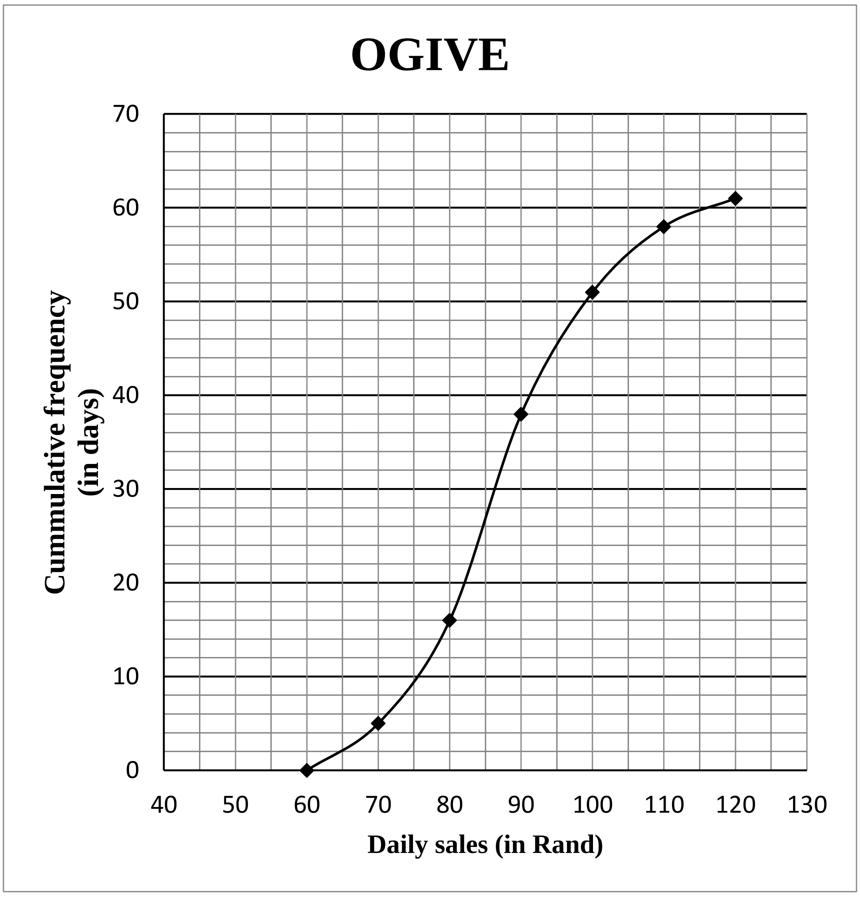
This marking guidelines consist of 23 pages

Question 1

<table>
<tr><td>1.1</td><td>

Interval	Frequency	Cummulative frequency
$60 < x \leq 70$	5	5
$70 < x \leq 80$	11	16
$80 < x \leq 90$	22	38
$90 < x \leq 100$	13	51
$100 < x \leq 110$	7	58
$110 < x \leq 120$	3	61

</td><td>✓ frequency
✓✓ accumulative frequency
(3)</td></tr>
<tr><td>1.2</td><td>

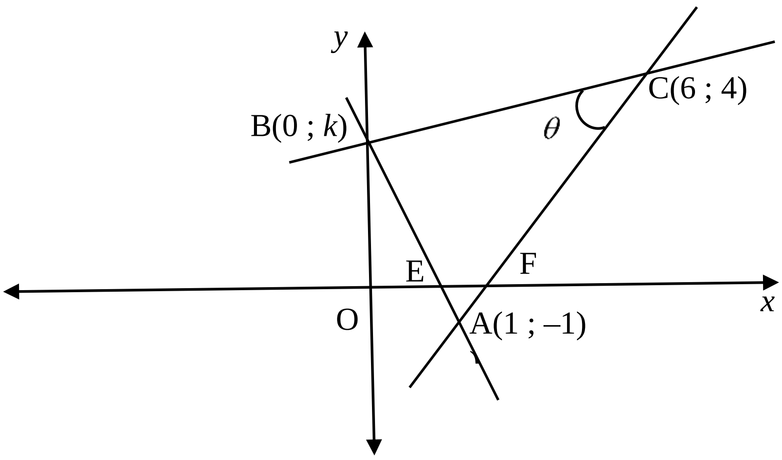


</td><td>✓angle point
✓use of cumulative frequency
✓ upper limits
✓ free hand curve
(4)</td></tr>
<tr><td>1.3</td><td>$61 - 51 = 10$</td><td>✓✓ answer
(2)</td></tr>
<tr><td>1.4</td><td>Medium = 87 (between 85 and 88)</td><td>✓ ✓answer (2)</td></tr>
<tr><td></td><td></td><td>[11]</td></tr>
</table>

QUESTION 2

2.1.1	By using a calculator : a = 76,60 (76,59564211) b = 0,1(0.09544928654) $\therefore$ equation of line of least squares is $y = 76{,}60 + 0{,}10x$	✓ a ✓ b ✓ equation (3)
2.1.2	$y = 76{,}60 + 0{,}10(57)$ ≈ 82	✓substitution ✓answer (2)
2.1.3	r = 0,1408374211 $r \approx 0{,}14$	✓✓ r $\approx 0{,}14$ (1)
2.1.4	r value is low which means that the data is spread around the regression line. Therefore prediction using the regression line will be **invalid**.	✓invalid (1)
2.2.1	22	✓ 22 (1)
2.2.2	$\frac{1320}{22} = 60$	✓ $\frac{1320}{22}$ ✓ 60 (2)
		[10]

QUESTION 3

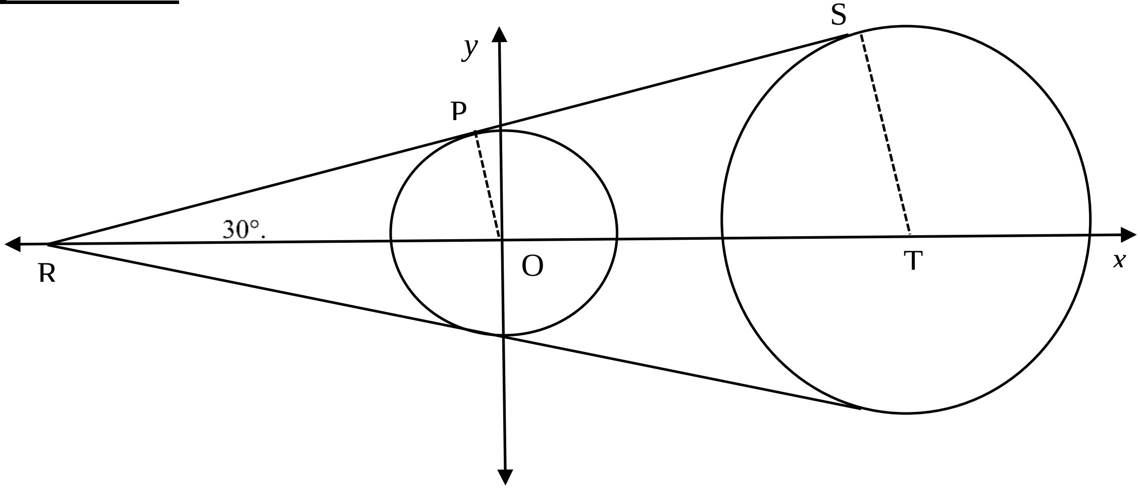


3.1	$AB: y+3x-2=0$ $\therefore y=-3x+2$ $\therefore k=2$	✓ $y=-3x+2$ ✓ $k=2$ (2)
3.2	$AC=\sqrt{(1-6)^2+(-1-4)^2}$ $=\sqrt{50}$ $=5\sqrt{2}$	✓ substitution ✓answer (2)
3.3	$m_{AB}=\dfrac{-1-2}{1-0}=-3$ $m_{BC}=\dfrac{4-2}{6-0}=\dfrac{1}{3}$ $m_{AB}\times m_{BC}=-3\times\dfrac{1}{3}=-1$ $\therefore A\hat{B}C=90°.$	✓ $m_{AB}=-3$ ✓ $m_{BC}=\dfrac{1}{3}$ ✓ $m_{AB}\times m_{BC}=-1$ (3)
3.4	$\tan\beta=m_{AC}=1$ $\beta=45°$ $\tan\phi=m_{BC}=\dfrac{1}{3}$ $\phi=18{,}43°$ $\theta=45°-18{,}43°$ [ext ∠of Δ] $=26{,}57°$ **OR**	✓ $\tan\beta=m_{AC}=1$ ✓ β ✓ ϕ ✓method ✓answer (5)

	$AC = \sqrt{(1-6)^2 + (-1-4)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $AB = \sqrt{(0-1)^2 + (2+1)^2}$ $= \sqrt{10}$ $\sin\theta = \frac{AB}{AC}$ $= \frac{\sqrt{10}}{5\sqrt{2}}$ $= \frac{\sqrt{5}}{2}$ $\therefore \theta = 26.57^\circ$ **OR** $\frac{\sin\theta}{AB} = \frac{\sin B}{AC}$ $\sin\theta = \frac{\sqrt{10}\sin 90^\circ}{5\sqrt{2}}$ $= \frac{\sqrt{5}}{5}$ $\therefore \theta = 26{,}57^\circ$	✓ $AC = 5\sqrt{2}$ ✓ $AB = \sqrt{10}$ ✓ $\sin\theta = \frac{AB}{AC}$ ✓ $\sin\theta = \frac{\sqrt{10}}{5\sqrt{2}}$ ✓ answer (5) ✓ $\frac{\sin\theta}{AB} = \frac{\sin B}{AC}$ ✓ $AC = 5\sqrt{2}$ ✓ $AB = \sqrt{10}$ ✓ $\sin\theta = \frac{\sqrt{10}\sin 90^\circ}{5\sqrt{2}}$ ✓ answer (5)

3.5	$B\hat{D}C = 90^\circ$ altitude $\therefore$ BC is the diameter (line subtends $90^\circ\angle$) midpoint of BC : $\left(\frac{0+6}{2};\frac{2+4}{2}\right)$ $=(3;3)$ $(x-3)^2+(y-3)^2=r^2$ subst $B(0;2)$ $(0-3)^2+(2-3)^2=r^2$ $\therefore r^2=10$ $(x-3)^2+(y-3)^2=10$ **OR** $B\hat{D}C = 90^\circ$ altitude $\therefore$ BC is the diameter (line subtends $90^\circ\angle$) midpoint of BC : $\left(\frac{0+6}{2};\frac{2+4}{2}\right)$ $=(3;3)$ $(x-3)^2+(y-3)^2=r^2$ subst $B(0;2)$ $(0-3)^2+(2-3)^2=r^2$ $\therefore r^2=10$ $(x-3)^2+(y-3)^2=10$	✓ BC is diameter ✓ $(3;3)$ ✓ Substitution of (0 ; 2) ✓ equation (4) ✓ BC is diameter ✓ $(3;3)$ ✓ Substitution of (0 ; 2) ✓ equation (4)
3.6	$M_{AC}=\left(\frac{1+6}{2};\frac{2+1}{2}\right)$ $=\left(\frac{7}{2};\frac{3}{2}\right)$ $\frac{7}{2}=\frac{x+0}{2}$ $\qquad$ $\frac{3}{2}=\frac{2+y}{2}$ $x=7$ $\qquad$ $y=1$ D(7 ; 1)	✓ $\frac{7}{2}$ ✓ $\frac{3}{2}$ ✓ $x=7$ ✓ $y=1$ (4)
		[20]

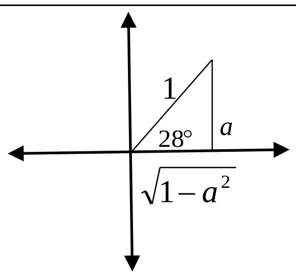
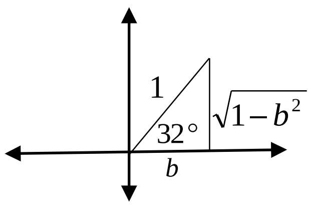
QUESTION 4



4.1	T(6; 0)	✓ (6; 0) (1)
4.2	radius $= 3$	✓radius = 3 (1)
4.3	$\tan 30° = \frac{\sqrt{3}}{3}$ $0 = \frac{\sqrt{3}}{3}(-3) + c$ $c = \sqrt{3}$ $y = \frac{\sqrt{3}}{3}x + \sqrt{3}$	✓ $\tan 30° = \frac{\sqrt{3}}{3}$ ✓substitution ✓ $c = \sqrt{3}$ ✓equation (4)
4.4	$y = -\frac{3}{\sqrt{3}}x + c$ radius $\perp$ tangent $0 = -\frac{3}{\sqrt{3}}(6) + c$ $c = \frac{18}{\sqrt{3}}$ $y = -\frac{3}{\sqrt{3}}x + \frac{18}{\sqrt{3}}$	✓gradient ✓ $c = \frac{18}{\sqrt{3}}$ ✓equation (3)

4.5	$\frac{\sqrt{3}}{3}x+\sqrt{3}=-\frac{3}{\sqrt{3}}x+\frac{18}{\sqrt{3}}$ $\frac{9x+54}{3\sqrt{3}}=+\frac{3x+9}{3\sqrt{3}}$ $12x=45$ $x=\frac{15}{4}=3\frac{3}{4}$ $y=\frac{\sqrt{3}}{3}\left(\frac{15}{4}\right)+\sqrt{3}$ $y=\left(\frac{9\sqrt{3}}{4}\right)$ $\mathrm{S}\left(\frac{15}{4};\frac{9\sqrt{3}}{4}\right)$	✓equating ✓simplification ✓x-value ✓substitution ✓y-value (5)
4.6	**The distance between centres of circles: OT = 6** $r+R=1+3$ $\quad\quad=4$ The distance between the two circles = OT –(r + R) = 6 –4 = 2 units	✓ **OT = 6** ✓ $r+R=1+3$ ✓4 ✓2 (4)
		[18]

QUESTION 5

5.1	$\dfrac{\sin(A-180°).\tan(180°-A).\cos A}{\cos(90°+A)}$ $=\dfrac{\sin(-(180°-A)).(-\tan A).\cos A}{-\sin A}$ $=\dfrac{-\sin A.(-\tan A).\cos A}{-\sin A}$ $=-\dfrac{\sin A}{\cos A}.\cos A$ $=-\sin A$	✓ $-\tan A$ ✓ $-\sin A$ ✓ $-\sin A$ ✓ identity ✓answer (5)
5.2.1	 $\cos 28^\circ = \sqrt{1-a^2}$ **OR** $\cos^2 28^\circ + \sin^2 28^\circ = 1$ $\cos^2 28^\circ + a^2 = 1$ $\cos^2 28^\circ = 1-a^2$ $\cos 28^\circ = \sqrt{1-a^2}$	✓ sketch ✓answer (2) ✓ identity ✓answer (2)
5.2.2	 $\cos 64^\circ$ $=\cos(2\times 32^\circ)$ $=2\cos^2 32^\circ - 1$ $=2b^2 - 1$ **OR**	✓double angle ✓answer (2)

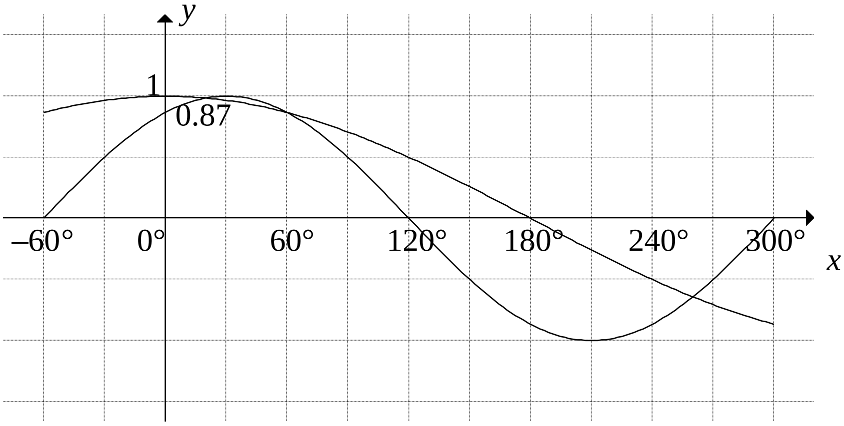
	$\cos 64^\circ$ $= \cos(2\times 32^\circ)$ $= 1-2\sin^2 32$ $= 1-2\left(\sqrt{1-b^2}\right)^2$ $= 1-2+2b^2$ $= 2b^2-1$ **OR** $\cos(2\times 32^\circ)$ $= \cos^2 32^\circ - \sin^2 32^\circ$ $= b^2 - \left(\sqrt{1-b^2}\right)^2$ $= b^2-1+b^2$ $= 2b^2-1$	✓double angle ✓answer (2) ✓double angle ✓answer (2)
5.2.3	$\sin 4^\circ$ $= \sin(32^\circ - 28^\circ)$ $= \sin 32^\circ.\cos 28^\circ - \cos 32^\circ.\sin 28^\circ$ $= \left(\sqrt{1-b^2}\right)\left(\sqrt{1-a^2}\right) - b.a$ $= \sqrt{(1-b^2)(1-a^2)} - ab$	✓compound ∠ ✓ expansion ✓ $\sqrt{1-b^2}$ ✓ $\sqrt{1-a^2}$ (4)
5.3	$\frac{1}{1-\sin x} - \frac{1}{1+\sin x} = \frac{2\tan x}{\cos x}$ LHS: $\frac{1}{1-\sin x} - \frac{1}{1+\sin x} = \frac{1+\sin x-(1-\sin x)}{(1-\sin x)(1+\sin x)}$ $= \frac{1+\sin x - 1 + \sin x}{1-\sin^2 x}$ $= \frac{2\sin x}{\cos^2 x}$ RHS: $\frac{2\tan x}{\cos x} = \frac{2\frac{\sin x}{\cos x}}{\cos x}$ $= \frac{2\sin x}{\cos^2 x}$ $\therefore$ LHS = RHS	✓LCD ✓numerator ✓ $\frac{2\sin x}{\cos^2 x}$ ✓ $\frac{\sin x}{\cos x}$ ✓ $\frac{2\sin x}{\cos^2 x}$ (5)

	OR $\frac{1}{1-\sin x}-\frac{1}{1+\sin x}=\frac{2\tan x}{\cos x}$ LHS: $\frac{1}{1-\sin x}-\frac{1}{1+\sin x}=\frac{1+\sin x-(1-\sin x)}{(1-\sin x)(1+\sin x)}$ $=\frac{1+\sin x-1+\sin x}{1-\sin^2 x}$ $=\frac{2\sin x}{\cos^2 x}$ $=\frac{2\sin x}{\cos x.\cos x}$ $=\frac{2\tan x}{\cos x}$ $\therefore$ LHS $=$ RHS	✓LCD ✓numerator ✓simplification ✓ $\frac{2\sin x}{\cos^2 x}$ ✓ $\frac{\sin x}{\cos x}=\tan x$ (5)
		[18]

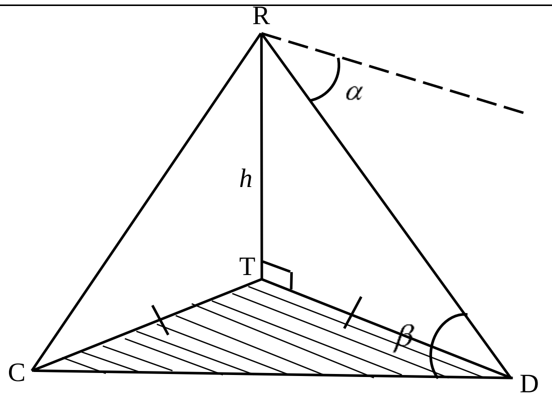
QUESTION 6 **[16]**

6.1	$\sin(x+60^\circ)=\cos\frac{1}{2}x$ $\sin(x+60^\circ)=\sin\left(90^\circ-\frac{1}{2}x\right)$ $quadrant1:$ $x+60^\circ=90^\circ-\frac{1}{2}x+360.k, k\in Z$ $x+\frac{1}{2}x=30^\circ+360.k$ $\frac{3}{2}x=30^\circ+360.k$ $x=20^\circ+240.k, k\in Z$ $quadrant2:$ $x+60^\circ=180^\circ-(90^\circ-\frac{1}{2}x)+360.k, k\in Z$ $x+60^\circ=180^\circ-90^\circ+\frac{1}{2}x+360.k$ $\frac{1}{2}x=30^\circ+360.k$ $x=60^\circ+720.k, k\in Z$ $x\in\{20^\circ;60^\circ;260^\circ\}$ **OR**	✓co-function ✓1st quad equation ✓ $x=20^\circ+240.k$ ✓2nd quad equation ✓ $x=60^\circ+720.k$ ✓✓ $x\in\{20^\circ;60^\circ;260^\circ\}$ (7)

	$\sin(x+60^\circ)=\cos\frac{1}{2}x$ $\cos[90-(x+60^\circ)]=\cos\frac{1}{2}x$ $quadrant 1$ $[90-(x+60^\circ)]=\frac{1}{2}x+360.k, k\in Z$ $90-x-60^\circ=\frac{1}{2}x+360.k$ $-\frac{3}{2}x=-30^\circ+360.k$ $x=20^\circ+240.k, k\in Z$ $quadrant 4$ $[90-(x+60^\circ)]=360^\circ-\frac{1}{2}x+360.k, k\in Z$ $90-x-60^\circ=360^\circ-\frac{1}{2}x+360k$ $30^\circ-x=360^\circ-\frac{1}{2}x+360.k$ $-\frac{1}{2}x=330^\circ+360.k$ $x=-660^\circ+720.k$ $x\in\{20^\circ;60^\circ;260^\circ\}$	✓co-function ✓1st quad equation ✓ $x=20^\circ+240.k$ ✓4th quad equation ✓ $x=-660^\circ+720.k$ ✓✓ $x\in\{20^\circ;60^\circ;260^\circ\}$ (7)

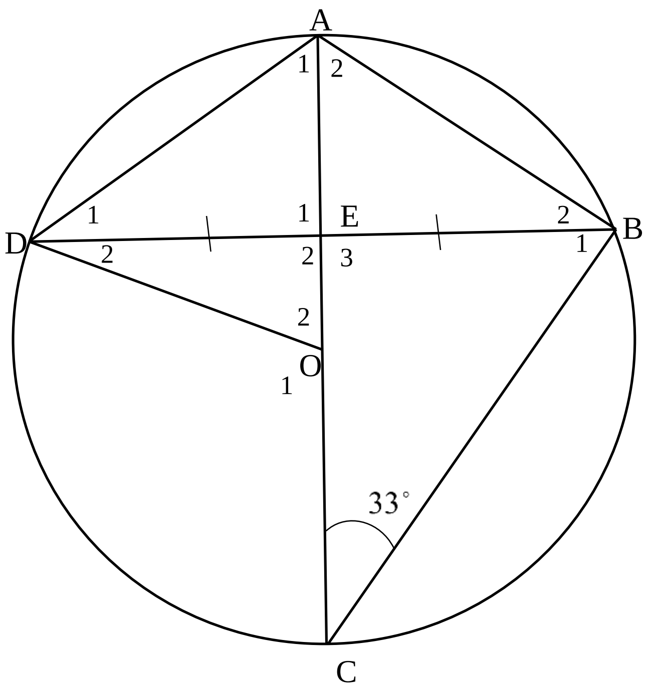
6.2.1		*g*: ✓ $x-$intercepts ✓ $y-$intercept ✓turning points (3)
6.2.2	$20^\circ < x < 60^\circ$ or $260 <^\circ x \le 300^\circ$ **OR** $x \in (20^\circ;60^\circ) \cup x \in (600^\circ;300^\circ]$	✓ $20^\circ < x < 60^\circ$ ✓ $260 <^\circ x \le 300^\circ$ ✓notation (3)
6.2.3	$120^\circ \le x \le 180^\circ$ $x = -60^\circ$ $x = 300^\circ$	✓✓ $120^\circ \le x \le 180^\circ$ ✓ $x = -60^\circ$;300° (3)
		[16]

QUESTION 7

		
7.1	CR = RD (congruency OR SAS) $\text{C}\hat{\text{R}}\text{D} = 180° - 2\beta$ $(\angle s \text{ in } \Delta)$	✓ CR = RD ✓answer (2)
7.2	$\text{T}\hat{\text{R}}\text{D} = 90° - \alpha$ $\cos(90° - \alpha) = \dfrac{h}{\text{RD}}$ $\text{RD} = \dfrac{h}{\sin\alpha}$ $\text{CD}^2 = \left(\dfrac{h}{\sin\alpha}\right)^2 + \left(\dfrac{h}{\sin\alpha}\right)^2 - 2\left(\dfrac{h}{\sin\alpha}\right)\left(\dfrac{h}{\sin\alpha}\right)\cos(180° - 2\beta)$ $= \dfrac{2h^2}{\sin^2\alpha} - 2\left(\dfrac{h^2}{\sin^2\alpha}\right)(-\cos 2\beta)$ $= \dfrac{2h^2}{\sin^2\alpha}(1 + \cos 2\beta)$ $= \dfrac{2h^2}{\sin^2\alpha}(1 + 2\cos^2\beta - 1)$ $= \dfrac{2h^2}{\sin^2\alpha}(2\cos^2\beta)$ $= \dfrac{4h^2}{\sin^2\alpha}(\cos^2\beta)$ $\therefore \text{C}D = \dfrac{2h.\cos\beta}{\sin\alpha}$	✓ratio ✓ $\text{RD} = \dfrac{h}{\sin\alpha}$ ✓substitution ✓ $\dfrac{2h^2}{\sin^2\alpha}(1 + 2\cos^2\beta - 1)$ ✓ $\dfrac{4h^2}{\sin^2\alpha}(\cos^2\beta)$ (5)
7.3	$\text{CD} = \dfrac{2h.\cos\beta}{\sin\alpha}.$	✓substitution

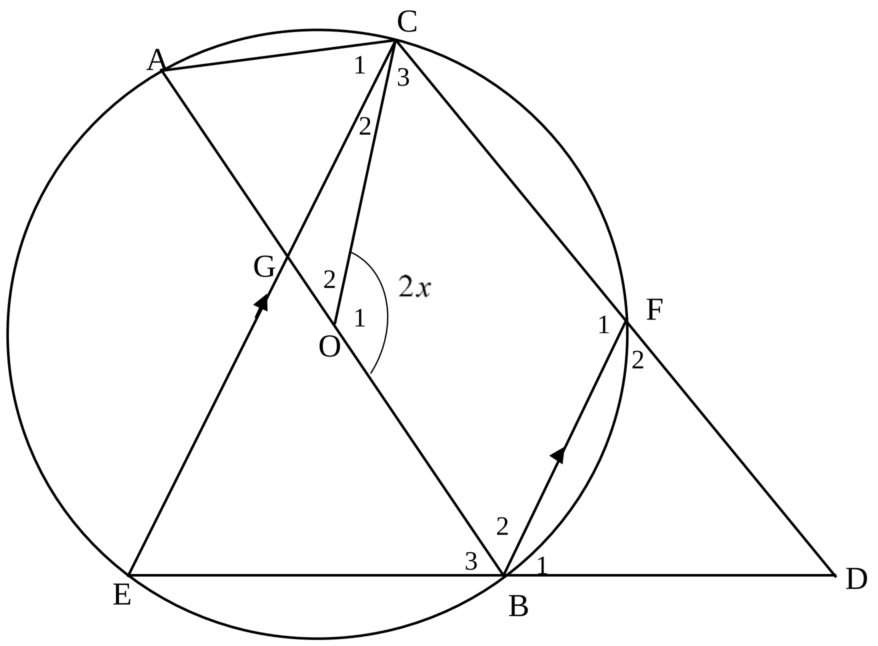
	$5{,}4=\dfrac{2h.\cos 65°}{\sin 51°}$. $h=\dfrac{5{,}42.\sin 51°}{2\cos 65°}$. $h=4{,}96$ $h\approx 5$	✓h to the nearest unit (2)
		[9]

QUESTION 8

8.1		
8.1	$\hat{D}_1 = 33°$ (∠'s in same circle segment)	✓S ✓R (2)
8.2	In Δ DAE : $\hat{E}_1 = 90°$ (line from centre to midpt of chord) $\hat{D}_1 = \hat{C} = 33°$ (∠s in same circle segment) $\therefore \hat{A}_1 = 57°$ (∠'s of Δ) **OR** In Δ EBC : $\hat{E}_3 = 90°$ (line from centre to midpt of chord) $\hat{C} = 33°$ (given) $\therefore \hat{B}_1 = 57°$ (∠s of Δ) $\therefore \hat{B}_1 = \hat{A}_1 = 57°$ (∠'s in same circle segment)	✓S ✓R ✓S (3) ✓S ✓R ✓S (3)
8.3	$\hat{O}_1 = 2\hat{A}_1 = 114°$ (∠ at center = 2 × ∠ at circumference)	✓S ✓R (2)

8.4	$\hat{D}_1 + \hat{D}_2 = \hat{A}_1 = 57^\circ$ ($\angle$s opposite = sides) But $\hat{D}_1 = \hat{C} = 33^\circ$ (*$\angle$s in same circle segment*) $\therefore \hat{D}_2 = 24^\circ$ **OR** $D\hat{O}C = 2 \times \hat{B}_1$ ($\angle$@centre $= 2 \times \angle$@circum) $D\hat{O}C = 2 \times 57^\circ$ $= 114^\circ$ $D\hat{O}C = \hat{E}_2 + \hat{D}_2$ (ext $\angle$ of Δ) $114^\circ = 90^\circ + \hat{D}_2$ $\therefore \hat{D}_2 = 24^\circ$	✓S/R ✓S (2) ✓S/R ✓S (2)
8.5	$\hat{B}_1 + \hat{B}_2 = 90^\circ$ ($\angle$ in semi-circle) $\hat{A}_2 = 57^\circ$ ($\angle s$ of Δ) **OR** $\Delta ADE \equiv \Delta ABE$ (S$\angle$S) $\therefore \hat{A}_1 = \hat{A}_2 = 57^\circ$	✓S ✓R ✓S (3) ✓S ✓R ✓S (3)
		[12]

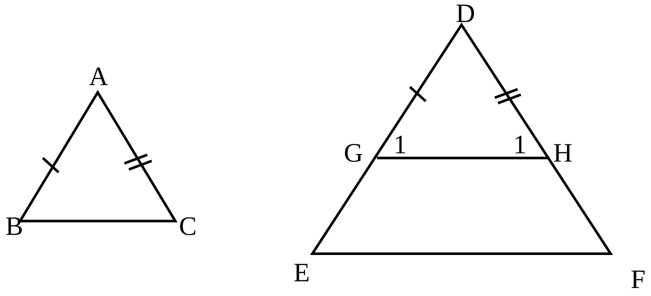
QUESTION 9

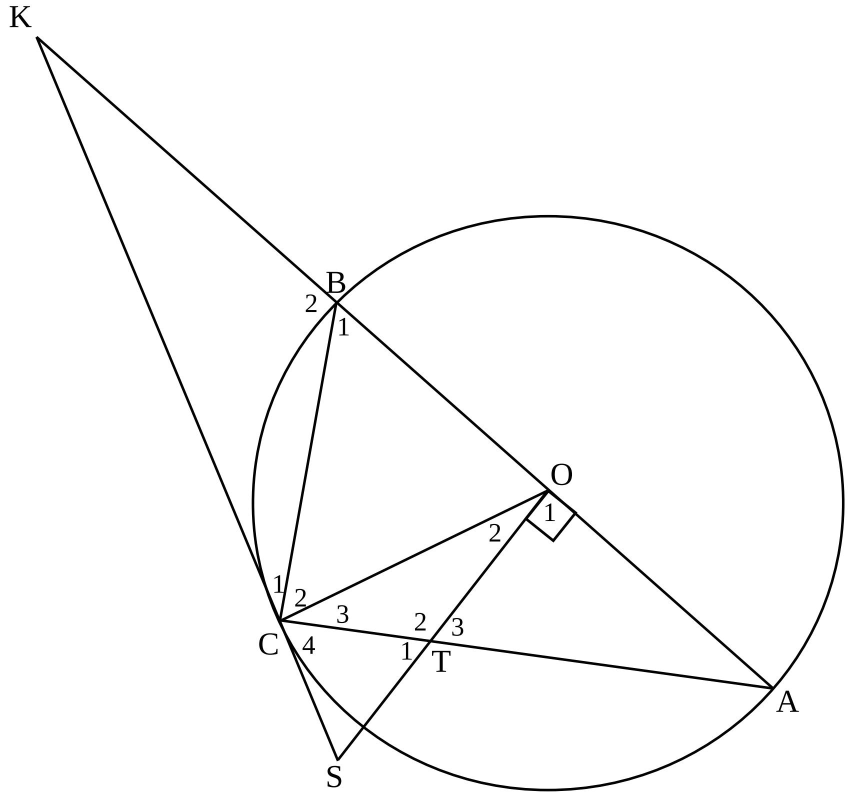


9.1	$\hat{E} = x$ $(\angle \text{at centre} = 2 \times \angle \text{at circum})$ $\hat{F}_1 = 180^\circ - x$ (opposite $\angle$s of cyclic quad) $\hat{F}_2 = x$ ($\angle$s on straight line) **OR** $\hat{E} = x$ $(\angle \text{at centre} = 2 \times \angle \text{at circum})$ $\hat{F}_2 = x$ (ext $\angle$ of cyclicquad)	✓S ✓R ✓S (3) ✓S ✓R ✓S/R (3)
9.2	$\hat{F}_2 = x$ (ext $\angle$ of cyclic quad OR straight line) $\hat{B}_1 = x = \hat{E}$ (correspon ding $\angle$s, EC || BF) $\therefore \hat{F}_2 = \hat{B}_1 = x$ $\therefore$ DF = DB (sides oppposite = $\angle$s)	✓S ✓R ✓S ✓R (4)

9.3	$\hat{A} = x$ ($\angle$ at centre $= 2\times\angle$ at circum) $\hat{C}_1 + \hat{C}_2 = x$ ($\angle$s opposite = sides) $\hat{C}_2 + \hat{C}_3 = x$ (ext. $\angle$ of cyclic quad) $\therefore \hat{C}_1 + \hat{C}_2 = \hat{C}_2 + \hat{C}_3$ $\therefore \hat{C}_1 = \hat{C}_3$ **OR** $\hat{A} = x$ ($\angle$ at centre $= 2\times\angle$ at circum) $\hat{C}_1 + \hat{C}_2 = \hat{A}$ ($\angle$s opposite = sides) $\hat{A} = \hat{F}_2$ (exterior $\angle$ of cyclic quad) $\hat{F}_2 = \hat{C}_2 + \hat{C}_3$(corresponding $\angle$s, CE ‖ BF) $\therefore \hat{C}_1 + \hat{C}_2 = \hat{C}_2 + \hat{C}_3$ $\therefore \hat{C}_1 = \hat{C}_3$	✓S ✓S ✓S ✓R (4) ✓S ✓R ✓S ✓R (4)
9.4	CG = FB, CG ‖ BF (given) $\therefore$ CGBF is a parm (one pair opp. sides equal and parallel) BG = FC = 2 (opp. sides of parm.) CF : FD = 2 : 1 $\frac{BD}{ED} = \frac{FD}{CD}$ (line ‖ to one side of Δ or proportionality theorem) $\frac{BD}{ED} = \frac{1}{3}$	✓ R ✓S/R ✓S ✓S\R ✓ $\frac{BD}{ED} = \frac{1}{3}$ (5)
		[16]

QUESTION 10

		
10.1	Construction : DG = AB and DH = AC In ΔABC and ΔDEF 1. $\hat{A} = \hat{D}$ (given) 2. AB = DG (construction) 3. AC = DH (construction) $\therefore \Delta ABC \equiv \Delta DEF$ (S∠S) $\therefore \hat{B} = \hat{G}_1$ and $\hat{B} = \hat{E}$ (given) $\therefore \hat{E} = \hat{G}_1$ $\therefore$ EF ∥ GH (corresponding $\angle s$ =) $\therefore \frac{DG}{DE} = \frac{DH}{DF}$ (line ∥ to side of Δ) but AB = DG and AC = DH $\therefore \frac{AB}{DE} = \frac{AC}{DF}$	✓construction ✓S/R ✓S ✓S/R ✓S ✓R (6)

10.2		
10.2.1	In ΔCKB and ΔAKC $\hat{C}_1 = \hat{A}$ (tan-chord) $\hat{K} = \hat{K}$ (common $\angle$) $K\hat{C}T = \hat{B}_2$ (3^{rd} $\angle$ in Δ) $\therefore \Delta CKB \,\vert\vert\vert\, \Delta AKC$ ($\angle\ \angle\ \angle$)	✓S/R ✓S ✓R (3)
10.2.2	$\hat{T}_2 = \hat{O}_1 + \hat{A}$ (ext $\angle$ of Δ) $K\hat{C}T = \hat{C}_1 + \hat{C}_2 + \hat{C}_3$ But $\hat{C}_2 + \hat{C}_3 = 90°$ ($\angle$s in semi-circle) But $\hat{C}_1 = \hat{A}$ (proven) $K\hat{C}T = \hat{A} + 90°$ $\therefore \hat{T}_2 = K\hat{C}T = \hat{A} + 90°$	✓S/R ✓S ✓R ✓S

		(4)
10.2.3	$\Delta COT \ \vert\vert\vert \ \Delta AKC$ $T\hat{C}O = \hat{A}$ ($\angle$s opp equal sides; CO = AO) $\hat{T}_2 = K\hat{C}A$ (proved) $\hat{O}_2 = \hat{K}$ (3^{rd} $\angle$ in Δ) $\Delta COT \ \vert\vert\vert \ \Delta AKC$ ($\angle\angle\angle$)	✓S/R ✓S ✓R (3)
10.2.4	$\Delta CKB \ \vert\vert\vert \ \Delta AKC$ $\therefore \frac{BK}{KC} = \frac{CK}{AK}$ $\therefore BK.AK = KC^2$ $\Delta COT \ \vert\vert\vert \ \Delta AKC$ $\therefore \frac{KC}{OT} = \frac{AC}{CT}$ $\therefore KC.CT = AC.OT$ $\therefore KC = \frac{AC.OT}{CT}$ $\therefore KC^2 = \frac{AC^2.OT^2}{CT^2}$	✓ratio ✓S ✓ratio ✓S (4)
		[20]