10612/14

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

PROOFREAD ☐	DATE ________
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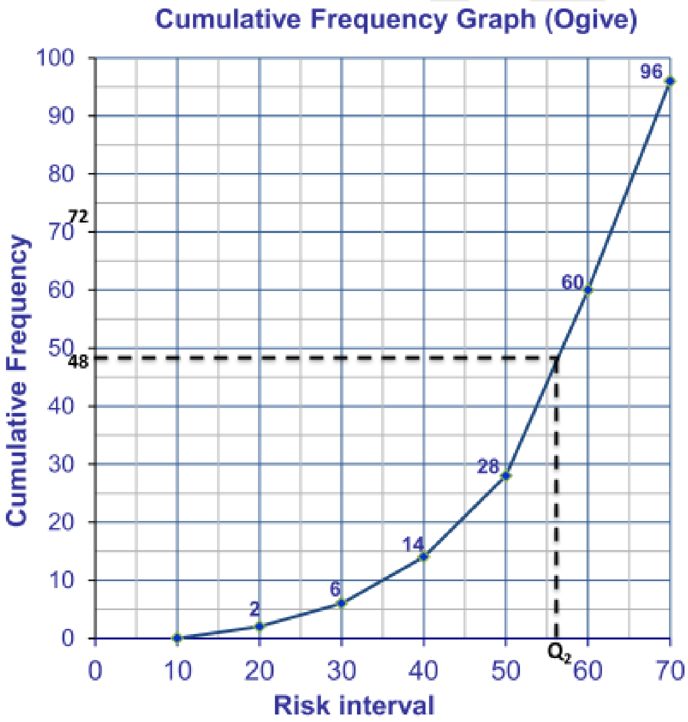
MATHEMATICS
(Second Paper)

MEMORANDUM

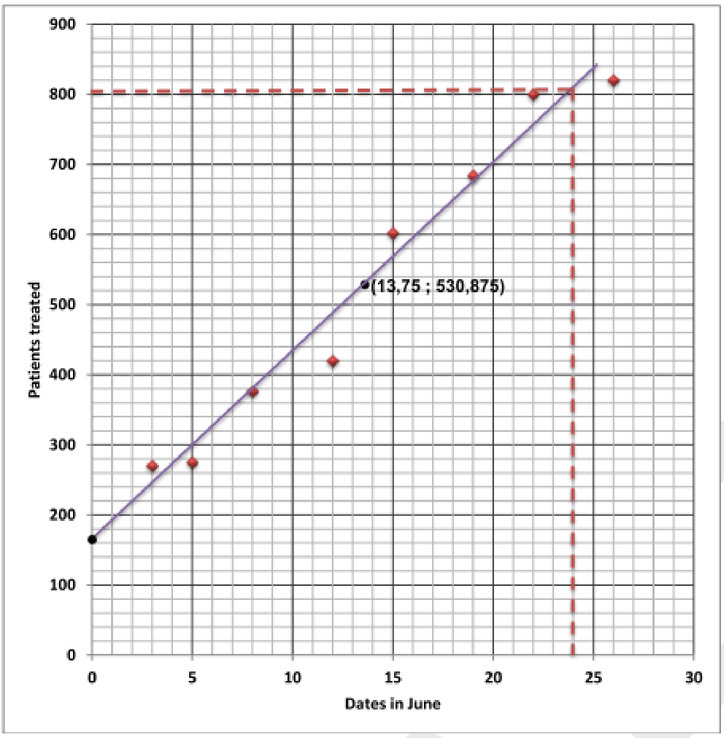
NOTE:

- If a candidate answered a question TWICE, mark the FIRST attempt ONLY.
- Consistent accuracy applies in ALL aspects of the memorandum.
- S/R refers to STATEMENT as well as REASON

QUESTION 1

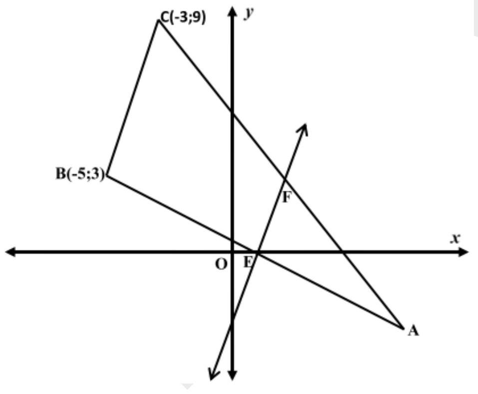
1.1.	• Negatively skewed • *Negatief skeef*	✓negatively skewed / *negatief skeef* (1)
1.2 1.3	 	**1.2** ✓shape ✓grounding at 10 ✓✓accuracy of points Subtract a mark if grounded at (0; 0) and/or at the end (4) **1.3** ✓ Q_2 shown on the graph, linked to cumulative frequency (1) **[6]**

QUESTION 2

2.1		✓✓✓points plotted correctly -1 for every 2 mistakes -1 if points are joined (3)
2.2	$y = 26{,}88x + 161{,}24$	✓value of A = 161,24 ✓value of B = 26,88 ✓equation of the line (3)
2.3	$y = 26{,}88(24) + 161{,}24$ $y = 806{,}36$ 806 people treated on 24th of June CANNOT USE GRAPH – NO LINE OF BEST FIT DRAWN YET	✓substitute in formula ✓answer as Natural Number **answer only (using calculator)** $\hat{y} = 806{,}42$ **full marks** (2)
2.4	See grid	✓straight line ✓graph passes through $(\bar{x}\,;\bar{y})$ ✓graph passes through y-intercept from regression line formula (3)
2.5	$r = 0{,}98$ This is a very strong positive, linear correlation. As the days increase the number of patients increase *Hierdie is 'n baie sterk positiewe lineêre korrelasie.* *Soos wat die dae vermeerder, vermeerder die getal pasiënte*	✓✓correct answer ✓interpretation (3)
2.6	This point is clearly an outlier/*Die punt is 'n duidelike uitskieter* The 16th of June is a public holiday and people might have decided to wait for the next day or certain medical facilities might have been closed. *Die 16de Junie is 'n publieke vakansiedag en mense het dalk besluit om te wag tot die volgende dagof sekere mediese fasiliteite kon dalk gesluit gewees het.*	✓outlier/ *uitskieter* ✓justification (2) **[16]**

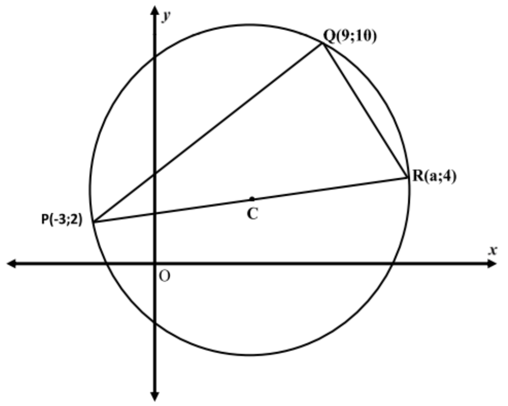
QUESTION 3

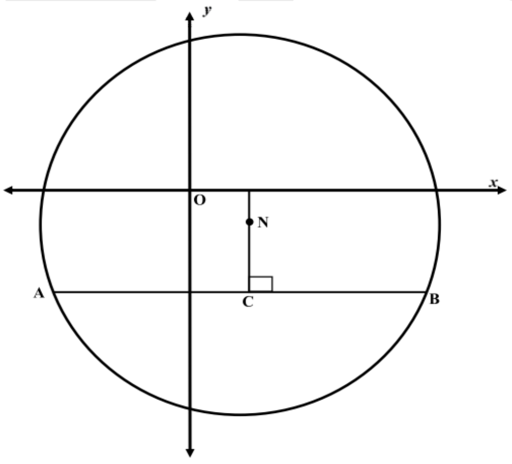
3.1	QR $= \sqrt{(x_Q - x_R)^2 + (y_Q - y_R)^2}$ $= \sqrt{(1-7)^2 + (3-0)^2}$ $= \sqrt{45}$ $= 3\sqrt{5}$ $\therefore \ a = 3$	✓substitution in correct formula ✓ answer for QR ✓ $a = 3$ (3)
	OR	
	QR $= \sqrt{(x_Q - x_R)^2 + (y_Q - y_R)^2}$ $a\sqrt{5} = \sqrt{(1-7)^2 + (3-0)^2}$ $a\sqrt{5} = \sqrt{45}$ $5a^2 = 45$ $a^2 = 9$ $a = 3 \ ; \ a > 0$	✓substitution in correct formula ✓ $5a^2 = 45$ Squaring both side ✓ $a = 3 \ ; \ a > 0$ (3
	OR	
	QR$^2 = (x_Q - x_R)^2 + (y_Q - y_R)^2$ $5a^2 = (1-7)^2 + (3-0)^2$ $5a^2 = 45$ $a^2 = 9$ $a = 3 \ ; \ a > 0$	✓substitution in correct formula ✓ $5a^2 = 45$ Squaring both sides ✓ $a = 3 \ ; \ a > 0$ (3

3.2	$3x + ty = -2$ $3(-3) + ty = -2$ $ty = 7 \ldots\ldots(1)$ $y = -\frac{2}{3}x + 2$ $y = -\frac{2}{3}(-3) + 2$ $y = 4 \ldots\ldots(2)$ $ty = 7$ $t(4) = 7$ $t = \frac{7}{4}$	✓ $3(-3) + ty = -2$ ✓ $ty = 7$ ✓ $y = 4$ ✓value of t (4)
	OR $y = -\frac{2}{3}x + 2$ $3x + ty = -2$ $y = -\frac{3}{t}x - \frac{2}{t}$ $-\frac{3}{t}x - \frac{2}{t} = -\frac{2}{3}x + 2$ $-\frac{3(-3)}{t} - \frac{2}{t} = -\frac{2(-3)}{3} + 2$ $t = \frac{7}{4}$	✓ $y = -\frac{3}{t}x - \frac{2}{t}$ ✓equations equal ✓substitute $x = -3$ ✓value of t (4)
3.3.1	 $\tan\theta = m_{EB}$ $\tan\theta = \frac{3-0}{-5-1}$ $\tan\theta = -\frac{1}{2}$ $\theta = -26{,}565\ldots + 180°$ $\theta = 153{,}43°$ **OR** $\theta = 180° - 26{,}565$ $\theta = 153{,}43°$	✓ gradient of EB = $-\frac{1}{2}$ ✓ $\tan\theta = -\frac{1}{2}$ ✓ $\theta = 153{,}43°$ (3)

3.3.2	Equation of EF: $y - y_1 = m(x - x_1)$ $\quad\quad m_{BC} = m_{EF} = 3$ $y - 0 = 3(x - 1)$ $y = 3x - 3$	✓ $m_{BC} = \dfrac{9-3}{-3+5} = 3$ ✓ $m_{BC} = m_{EF} = 3$ ✓substitute point (1 ; 0) ✓equation of line (4)
3.3.3	$\tan F\hat{E}A = 3$ (From line in 1.3.2) $F\hat{E}A = 71{,}57°$ $B\hat{E}F = 153{,}43° - 71{,}57°$ $\angle$'s on a straight line/ $\angle$'*e op rt lyn* $B\hat{E}F = 81{,}86°$ $E\hat{B}C = 180° - 81{,}86°$ $E\hat{B}C = 98{,}14°$ (co-interior angles /*ko-binnehoeke*; EF // BC)	✓ $F\hat{E}A = 71{,}57°$ ✓ $B\hat{E}F = 81{,}86°$ ✓ $E\hat{B}C = 98{,}14°$ (3) **[17]**

QUESTION 4

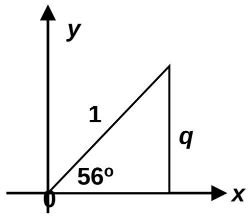
4.1.1	 $\hat{Q} = 90°$ ($\angle$ in semi-circle/$\angle$ *in halfsirkel*) $m_{PQ}.m_{QR} = -1$ $\dfrac{10-4}{9-a} \times \dfrac{10-2}{9+3} = -1$ $\dfrac{6}{9-a} \times \dfrac{8}{12} = -1$ $\dfrac{4}{9-a} = -1$ $4 = -9 + a$ $a = 13$	✓ $\hat{Q} = 90°$ ✓subs into $m_{PQ}.m_{QR} = -1$ ✓simplification (3)

4.1.2	midpoint of PR $C\left(\frac{-3+13}{2};\frac{4+2}{2}\right)$ $C(5;3)$ $r=\sqrt{(13-5)^2+(4-3)^2}$ **or** $r^2=(13-5)^2+(4-3)^2$ $r^2=65$ $=\sqrt{65}$ Eq of circle: $(x-a)^2+(y-b)^2=r^2$ $(x-5)^2+(y-3)^2=65$	✓ $C(5;3)$ ✓ substitute in distance formula ✓ $r=\sqrt{65}$ / $r^2=65$ ✓ $(x-5)^2+(y-3)^2=65$ (4)
4.2	$r_A=3$ and A(2 ; 3) $r_B=4$ and B(1 ; -1) $\therefore r_A+r_B=7$ Distance between A and B $AB=\sqrt{(x_B-x_A)^2+(y_B-y_A)^2}$ $AB=\sqrt{(1-2)^2+(-1-3)^2}$ $=\sqrt{1+16}$ $=\sqrt{17}$ $\therefore r_A+r_B>\sqrt{17}$ The circles intersect each other	✓radius and centre of circle A ✓radius and centre of circle B ✓sum of two radii ✓calculating distance between centres ✓AB $=\sqrt{17}$ ✓correct conclusion (6)
4.3	$x^2-4x+y^2+2y=\frac{149}{4}$ 	
4.3.1	$(x-2)^2-4+(y+1)^2-1=\frac{149}{4}$ $(x-2)^2+(y+1)^2=\frac{169}{4}$ N(2;−1)	✓completing the square ✓standard form ✓ N(2;−1) (3)

4.3.2	$r^2 = \frac{169}{4}$ $r = \frac{13}{2}$ OR $r = 6\frac{1}{2}$ OR $r = 6{,}5$	✓answer of radius (1)
4.3.3	$NC \perp AB$ $\therefore AC = CB = 6$ (line from centre ⊥ chord/ *lyn van midpt van sirkel ⊥ op koord*) $x_A = 2 - 6 = -4$ Substitute $x = -4$ in $(-4)^2 - 4(-4) + y^2 + 2y = \frac{149}{4}$ $32 + y^2 + 2y = \frac{149}{4}$ $128 + 4y^2 + 8y = 149$ $4y^2 + 8y - 21 = 0$ $(2y-3)(2y+7) = 0$ $y = \frac{3}{2}$ *or* $y = -\frac{7}{2}$ invalid $y < 0$ $A\left(-4\,;-\frac{7}{2}\right)$ and $B\left(8\,;-\frac{7}{2}\right)$	✓ $AC = CB = 6$ ✓ $x_A = -4$ ✓substitute $x = -4$ ✓coordinates of A ✓coordinates of B (5) **[22]**

QUESTION 5

5.1.1	$\frac{b}{a} = \tan 110°$	✓ $\tan 110°$ (1)
5.1.2	$\frac{b}{\sqrt{a^2+b^2}} = \sin 110°$ $= 0{,}94$	✓ $\sin 110°$ ✓answer (2)
5.2.1	$\cos 146° = \cos(90° + 56°)$ $= -\sin 56°$ $= -q$ **OR** $\cos(180° - 34°)$ $= -\cos 34°$ $= -\sin 56°$ $= -q$	✓ $-\sin 56°$ ✓ answer (2) ✓ $-\sin 56°$ ✓ answer (2)

5.2.2	 $x^2 = r^2 - y^2$ $= 1^2 - q^2$ $\therefore x = \sqrt{1-q^2}$ $\sin 112°$ $= 2\sin 56° \cos 56°$ $= 2q\sqrt{1-q^2}$ **OR** $\cos^2 56° + \sin^2 56° = 1$ $\cos 56° = \sqrt{1-\sin^2 56°}$ $= \sqrt{1-q^2}$ $\sin 112°$ $= 2\sin 56° \cos 56°$ $= 2q\sqrt{1-q^2}$	✓ $x = \sqrt{1-q^2}$ ✓ $2\sin 56° \cos 56°$ ✓answer (3) ✓ $\cos 56° = \sqrt{1-q^2}$ ✓ $2\sin 56° \cos 56°$ ✓answer (3) **[8]**

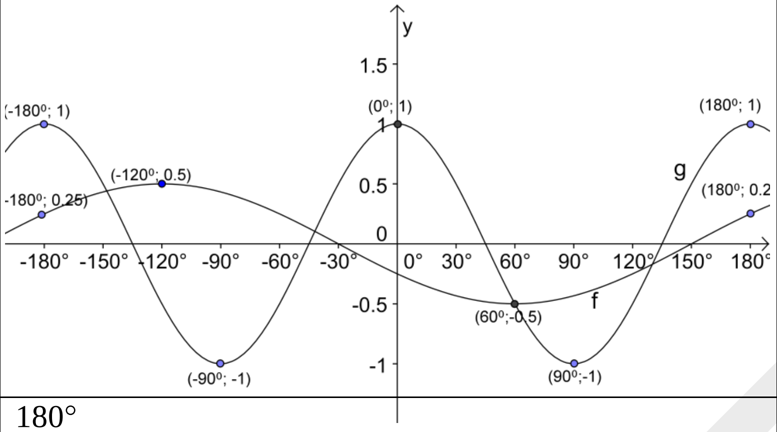
QUESTION 6

6.1	$\cos(P+Q) = \cos P \cos Q - \sin P \sin Q$	✓ correct formula (1)
6.2	$\cos 2P = \cos P \cos P - \sin P \sin P$ $= \cos^2 P - \sin^2 P$ $= \cos^2 P - \left(1 - \cos^2 P\right)$ $= 2\cos^2 P - 1$	✓ $\cos P \cos P - \sin P \sin P$ ✓replacing $\sin^2 P$ with $1-\cos^2 P$ ✓ $2\cos^2 P - 1$ (3)
6.3.1	$LHS = \dfrac{\sin 2x - \cos 2x + 1}{\sin 2x + \cos 2x + 1}$ $= \dfrac{2\sin x \cos - (1 - 2\sin^2 x) + 1}{2\sin x \cos + (2\cos^2 x - 1) + 1}$ $= \dfrac{2\sin^2 x + 2\sin x \cos x}{2\cos^2 x + 2\sin x \cos x}$ $= \dfrac{2\sin x(\sin x + \cos x)}{2\cos x(\cos x + \sin x)}$ $= \dfrac{\sin x}{\cos x}$ $= \tan x$ $= RHS$	✓ $2\sin x \cos x$ ✓ $1 - 2\sin^2 x$ ✓ $2\cos^2 x - 1$ ✓factors ✓ $\dfrac{\sin x}{\cos x}$ (5)

	OR $LHS = \dfrac{\sin 2x - \cos 2x + 1}{\sin 2x + \cos 2x + 1}$ $= \dfrac{2\sin x \cos x - \left(\cos^2 x - \sin^2 x\right) + 1}{2\sin x \cos x + \left(\cos^2 x - \sin^2 x\right) + 1}$ $= \dfrac{2\sin x \cos x - \cos^2 x + \sin^2 x + 1}{2\sin x \cos x + \cos^2 x - \sin^2 x + 1}$ $= \dfrac{2\sin x \cos x + 2\sin^2 x}{2\sin x \cos x + 2\cos^2 x}$ $= \dfrac{2\sin x\left(\cos x + \sin x\right)}{2\cos x\left(\sin x + \cos x\right)}$ $= \dfrac{\sin x}{\cos x}$ $= \tan x$ $= RHS$	✓ $2\sin x \cos x$ ✓ $\cos^2 x - \sin^2 x$ ✓simplification ✓factors ✓ $\dfrac{\sin x}{\cos x}$ (5)
6.3.2	$\tan 22{,}5° = \dfrac{\sin 45° - \cos 45° + 1}{\sin 45° + \cos 45° + 1}$ $= \dfrac{\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} + 1}{\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} + 1}$ $= \dfrac{1}{\frac{2\sqrt{2}}{2} + 1}$ $= \dfrac{1}{\sqrt{2} + 1}$ $= \dfrac{1}{\sqrt{2} + 1} \times \dfrac{\sqrt{2} - 1}{\sqrt{2} - 1}$ $= \sqrt{2} - 1$ **OR**	✓ $\tan 22{,}5° = \dfrac{\sin 45° - \cos 45° + 1}{\sin 45° + \cos 45° + 1}$ ✓substitution of $\dfrac{\sqrt{2}}{2}$ ✓answer (3)

	$\tan 22,5° = \dfrac{\sin 45° - \cos 45° + 1}{\sin 45° + \cos 45° + 1}$ $= \dfrac{\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}} + 1}{\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} + 1}$ $= \dfrac{1}{\frac{1+1}{\sqrt{2}} + 1}$ $= \dfrac{1}{\frac{2}{\sqrt{2}} + 1}$ $= \dfrac{1}{\frac{2}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} + 1}$ $= \dfrac{1}{\sqrt{2} + 1}$ $= \dfrac{1}{\sqrt{2} + 1} \times \dfrac{\sqrt{2} - 1}{\sqrt{2} - 1}$ $= \sqrt{2} - 1$	✓ $\tan 22,5° = \dfrac{\sin 45° - \cos 45° + 1}{\sin 45° + \cos 45° + 1}$ ✓substitution of $\dfrac{1}{\sqrt{2}}$ ✓answer (3)
6.4.1	$\sin 2x.\cos 2x$ $= \dfrac{1}{2}.2\sin 2x.\cos 2x$ $= \dfrac{1}{2}\sin 4x$ $= \dfrac{1}{2}.1$ $= \dfrac{1}{2}$	✓ $\dfrac{1}{2}.2\sin 2x.\cos 2x$ ✓ max of $\sin 4x = 1$ ✓ $\dfrac{1}{2}$ (3)
6.4.2	$\sin 4x = 1$ $4x = 90° + k.360° \quad k \in Z$ $x = 22,5° + k.90° \quad k \in Z$ $x = -67,5°$	✓ $\sin 4x = 1$ ✓ $4x = 90° + k.360° \quad k \in Z$ ✓ $x = 22,5° + k.90°$ ✓ $x = -67,5°$ (4) **[19]**

QUESTION 7

7.1		f: ✓shape ✓✓intercepts ✓✓ turning points g: ✓shape ✓✓intercepts ✓✓ turning points (6)
7.2	180°	✓ answer (1)
7.3	$h(x) = -\frac{1}{2}\sin(x - 90°)$ **OR** $h(x) = -\frac{1}{2}\sin\left[-(90° - x)\right]$ $= -\frac{1}{2}\left[-\sin(90° - x)\right]$ $\therefore h(x) = \frac{1}{2}\cos x$	✓✓ correct equation (2) ✓ $-\frac{1}{2}\sin\left[-(90° - x)\right]$ ✓ $\frac{1}{2}\cos x$ (2)
7.4	$\cos 2x = 1$ $2x = 0° + k.360°,\ k \in Z$ $x = 0° + k.180°,\ k \in Z$ **OR** $\cos 2x = 1$ $2x = k.360°,\ k \in Z$ $x = k.180°,\ k \in Z$	✓ $2x = 0° + k.360°,\ k \in Z$ ✓ $x = 0° + k.180°$ (2) ✓ $2x = k.360°,\ k \in Z$ ✓ $x = k.180°$ (2) **[11]**

QUESTION 8

8.1	In ΔMPQ: $\frac{PM}{\sin z} = \frac{d}{\sin\left(180° - (y+z)\right)}$ $\therefore PM = \frac{d \sin z}{\sin(y+z)}$ ......1 In ΔMPN: $\frac{MN}{PM} = \sin x$ $MN = PM \sin x$ .....2 $\therefore MN = \frac{d \sin z . \sin x}{\sin(y+z)}$	✓ correct substitution into sine rule ✓ $PM = \frac{d \sin z}{\sin(y+z)}$ ✓ $\frac{MN}{PM} = \sin x$ ✓substituting for PM into equation 2 and final answer (4)

8.2	$MN=\frac{1\,000\sin y\sin(90°-y)}{\sin 2y}$ $=\frac{1\,000\sin y\cos y}{2\sin y\cos y}$ $=500$ m	✓ correct replacement of angles ✓ $2\sin y\cos y$ ✓Answer (3) **[7]**

QUESTION 9

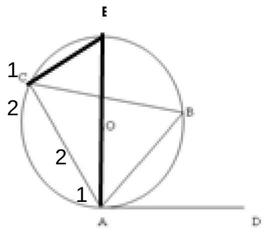
9.1	…perpendicular / *…loodreg*	✓ perpendicular /*loodreg* (1)
9.2.1	$AB\perp CD$ (line from centre to midpoint of chord) / (*lyn van die midpt van sirkel na midpt van koord*) $DB=9$ cm (AD = DB/ Given) In ΔDCB $(CD)^2=(24)^2-(9)^2$ (pythagoras) $CD^2=576-81$ $=495$ $CD=3\sqrt{55}$	✓S/R **[S/R Statement and reason]** ✓DB = 9 cm ✓using Theorem of Pythagoras(S/R) ✓ $CD=3\sqrt{55}$ (4)
9.2.2	$\frac{CD}{DE}=3$ $\frac{3\sqrt{55}}{DE}=3$ $DE=\sqrt{55}$	✓ $\frac{3\sqrt{55}}{DE}=3$ ✓ $DE=\sqrt{55}$ (2) **[7]**

QUESTION 10

10.1	$\hat{E}_1=90°$ ($\angle$in a semi-circle /$\angle$*in halwe sirkel*)	✓ $\hat{E}_1=90°$ ✓ $\angle$in a semi-circle (2)
10.2	$\hat{E}_1=90°$ ($\angle$in a semi-circle /$\angle$*in halwe sirkel*) $\hat{E}+\hat{A}_2=180°$ (opp $\angle$'s cyclic quad/*oorst* $\angle$'e *van kvh*) $\therefore\hat{A}_2=180°-(90°+28°)$ $=62°$ **OR**	✓ $\hat{E}+\hat{A}_2=180°$ ✓ opp $\angle$'s cyclic quad ✓ $\hat{A}_2=62°$ (3)

	$F\hat{A}C = 90°$ $(\angle \text{in a semi-circle} / \angle \textit{in halwe sirkel})$ $\hat{A}_3 = 28°$ $(\angle^s$ in the same segment subt by DC / $\angle e$ *in dieselfde segment ondersp deur* DC) $\therefore \hat{A}_2 = 90° - 28°$ $= 62°$	✓ $F\hat{A}C = 90°$ S/R ✓ $\hat{A}_3 = 28°$ S/R ✓ $\hat{A}_2 = 62°$ (3)
10.3	$\hat{F}_2 = 30°$ (equal chords subtend equal $\angle$'s) / (*gelyke koorde onderspan gelyke hoeke*)	✓ $\hat{F}_2 = 30°$ ✓ equal chords subtend eq $\angle$'s (2) **[7]**

QUESTION 11

11.1	 Construction: Draw a diameter/ *middellyn* AOE and join CE Proof: $\hat{A}_1 + \hat{A}_2 = 90°$ (tan/rk lyn $\perp$ radius) $\hat{C}_1 + \hat{C}_2 = 90°$ $(\angle$ in a semi circle / $\angle$ *in halwe sirkel*) but $\hat{C}_1 = \hat{A}_2$ $(\angle^s$ in the same segment) $\therefore \hat{A}_1 = \hat{C}_2$	✓construction ✓ $\hat{A}_1 + \hat{A}_2 = 90°$ ✓ tang $\perp$ radius ✓ $\hat{C}_1 + \hat{C}_2 = 90°$ (S/R) ✓ $\hat{C}_1 = \hat{A}_2$ (S/R) (5)
11.2.1	$\hat{C}_1 = 90°$ $(\angle$ in a semi circle / $\angle$ *in halwe sirkel*) $\hat{D}_1 = 90°$ (OE $\perp$ BC) $\hat{C}_1 = \hat{D}_1$ $\therefore$ OE$\parallel$AC (corr $\angle^s$ are equal / ooreenk $\angle^e$ is gelyk) **OR** $\hat{C}_1 = 90°$ $(\angle$ in a semi circle / $\angle$ *in halwe sirkel*) $\hat{D}_2 = 90°$ (OE $\perp$ BC) $\hat{C}_1 + \hat{D}_2 = 180°$ $\therefore$ OE$\parallel$AC (co interior $\angle^s$ are equal / ko – *binne* $\angle^e$ is gelyk)	✓ $\hat{C}_1 = 90°$ (S/R) ✓ $\hat{D}_1 = 90°$ (S/R) ✓ $\hat{C}_1 = \hat{D}_1$ (S) ✓ corr $\angle^s$ are equal (4) ✓ $\hat{C}_1 = 90°$ (S/R) ✓ $\hat{D}_{21} = 90°$ (S/R) ✓ $\hat{C}_1 + \hat{D}_2 = 180°$ (S) ✓ co interior $\angle^s$ are equal (4)

11.2.2	$\hat{A} = x$ (tan chord / rk lyn koord) $\hat{O}_1 = x$ (corr $\angle^s$/ooreenk $\angle^e$ OE || AC)	✓ $\hat{A} = x$ ✓ tan chord ✓ $\hat{O}_1 = x$ S/R (3)
11.2.3	In ΔPAC $\hat{P} = 180° - x - 90° - x$ (sum of $\angle^s$ of a triangle/ som van $\angle^e$ van driehoeke) $= 90° - 2x$	✓ $\hat{P} = 90° - 2x$ ✓ sum of $\angle^s$ of a triangle (2) **[14]**

QUESTION 12

12.1	proportionally	✓ proportionally (1)
12.2.1	$\hat{C}_1 = \hat{C}_2$ (given) $\hat{C}_1 = \hat{D}$ (corr $\angle^s$ /ooreenk $\angle^e$ AD||CG) $\hat{C}_2 = \hat{A}_1$ (alt $\angle^s$/verwisselende $\angle^e$ AD||CG) $\therefore \hat{A}_1 = \hat{D}$ $\therefore$ CA = CD (sides opp equal $\angle^s$ / *sye teenoor gelyke* $\angle^e$)	✓ $\hat{C}_1 = \hat{D}$ (S/R) ✓ $\hat{C}_2 = \hat{A}_1$ (S/R) ✓ $\hat{A}_1 = \hat{D}$ ✓ CA = CD (S/R) (4)
12.2.2	$\frac{BC}{CD} = \frac{BG}{GA}$ (line || to one side of Δ / lyn || een sy van Δ) but CA = CD (proved) $\therefore \frac{BC}{AC} = \frac{BG}{AG}$	✓ $\frac{BC}{CD} = \frac{BG}{GA}$ ✓ ✓ replace CD = CA (3)
12.3.1	In ΔKMT and ΔKON $\hat{M}_1 = \hat{O}$ (ext. $\angle$ of a cyclic quad / buite $\angle$ *kvh*) $\hat{T}_2 = \hat{N}$ (ext. $\angle$ of a cyclic quad/ buite $\angle$ *kvh*) $\hat{K} = \hat{K}$ (common/ gemeensk) $\therefore \Delta MTK \|\|\| \Delta ONK$ ($\angle\angle\angle$)	✓✓ for any two of the three statements ✓ equiangular / gelykhoekig / $\angle\angle\angle$ (3)
12.3.2	$\frac{MT}{ON} = \frac{TK}{NK} = \frac{MK}{OK}$ $\therefore$ KM.KN = KT.KO	✓ $\frac{MT}{ON} = \frac{TK}{NK} = \frac{MK}{OK}$ (1)

12.3.2	$\frac{MK}{OK}=\frac{KT}{NK}$ $\frac{5}{6+KT}=\frac{KT}{8}$ $KT^2+6KT=40$ $KT^2+6KT-40=0$ $(KT+10)(KT-4)=0$ $KT=-10$ or $KT=4$ $\therefore KT=4$ units	✓ $\frac{5}{6+KT}=\frac{KT}{8}$ ✓ $KT^2+6KT-40=0$ ✓factors ✓answer (4) **[16]**

TOTAL: 150