NASIONALE SENIOR SERTIFIKAAT-EKSAMEN
NOVEMBER 2021

WISKUNDE: VRAESTEL II

NASIENRIGLYNE

Tyd: 3 uur 150 punte

Hierdie nasienriglyne is opgestel vir gebruik deur eksaminators en hulpeksaminators van wie verwag word om almal 'n standaardiseringsvergadering by te woon om te verseker dat die riglyne konsekwent vertolk en toegepas word by die nasien van kandidate se skrifte.

Die IEB sal geen bespreking of korrespondensie oor enige nasienriglyne voer nie. Ons erken dat daar verskillende standpunte oor sommige aangeleenthede van beklemtoning of detail in die riglyne kan wees. Ons erken ook dat daar sonder die voordeel van die bywoning van 'n standaardiseringsvergadering verskillende vertolkings van die toepassing van die nasienriglyne kan wees.

LET WEL:

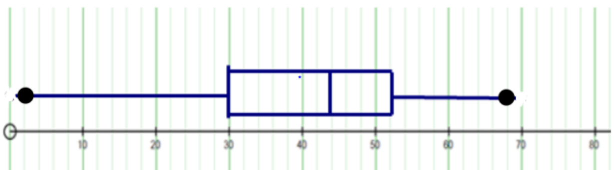
- Indien ‘n kandidaat ‘n vraag meer as een keer beantwoord, sien slegs die EERSTE poging na.
- Deurlopende akkuraatheid is op alle aspekte van die nasienmemorandum van toepassing.

AFDELING A

VRAAG 1

(a)	$A = -160,645$ $B = 21,505$ $y = -160,645 + 21,505x$	$A = -160,645$ $B = 21,505$ korrekte formule en afronding
(b)	$y = -160,645 + 21,505(90)$ $y = 1774,81$ **Alternatief met sakrekenaar:** R1774,79	R1 774,81 Alt: R1 774,79
(c)	Ekstrapolering het risiko’s, d.w.s. wanneer buite die grense van die gegewe data gewerk word.	Ekstrapolering
(d)	$r = 0,912$	$r = 0,912$
(e)	Baie sterk positiewe korrelasie	Baie sterk positiewe korrelasie

VRAAG 2

(a)	 Korrekte houer-en-punt-stipping dienooreenkomstig	Vorm: houer-en-punt Min: 2 Maks: 68 Q1: 30 Q2: 44 Q3: 52 Maks. 2 indien houer-en-punt-stipping foute het
(b)	Skeef na links / negatief skeef	negatief skeef
(c)	Omdat variasiewydte A > variasiewydte B en $IQR_A > IQR_B$, is die hoogtes van die plante in Omgewing A meer verspreid.	soos beskryf

VRAAG 3

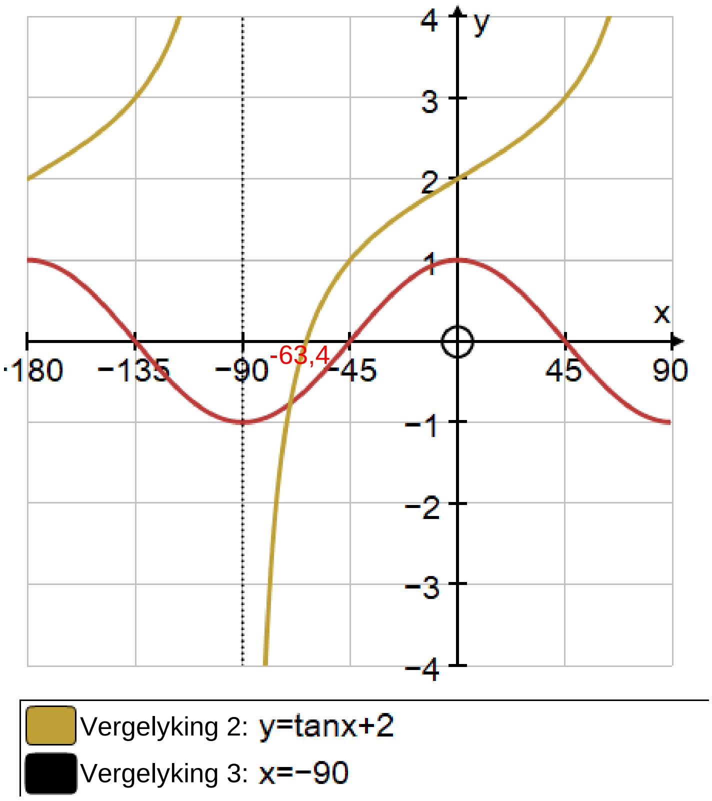
(a)	Lengte AB $=\sqrt{\left(x^2-x_1\right)^2+\left(y_2-y_1\right)^2}$ Lengte AB $=\sqrt{(11-6)^2+(12-16)^2}$ Lengte AB $=\sqrt{25+16}$ Lengte AB $=\sqrt{41}$	$=\sqrt{(11-6)^2+(12-16)^2}$ Vervang in afstandsformule $=\sqrt{41}$
(b)	$m_{AB}=\dfrac{16-12}{6-11}$ $m_{AB}=-\dfrac{4}{5}$ $m_{DE}=\dfrac{-11+3}{6+4}=-\dfrac{8}{10}$ $m_{DE}=-\dfrac{4}{5}$ Gradiënte is gelyk $\therefore$ AB//DE	Gradiënte $m_{AB}=-\dfrac{4}{5}$ $m_{DE}=-\dfrac{4}{5}$
(c)	Vergelyking lyn DB: $y = mx + c$ vervang (m_{DB} = 1) $y=x+c$ vervang (–4;–3) of (11;12) $-3=-4+c$ $c=1$ $\therefore y=x+1$ Vir snypunt vervang $x=6$ $\therefore y=7$ $\therefore k=7$	vervang (m_{DB} = 1) $c=1$ $x=6$ $\therefore y=7$
(d)	$m_{AB}=-\dfrac{4}{5}$ $\tan\theta=m$ $\theta\approx 38{,}7^\circ$ $AE\perp$ x-as $\therefore\alpha=90^\circ$ $B\hat{A}C=180^\circ-(90^\circ+38{,}7^\circ)$ (binne$\angle$ van Δ) $B\hat{A}C=51{,}3^\circ$	$\theta\approx 38{,}7^\circ$ $AE\perp$ x-as $\therefore\alpha=90^\circ$ $B\hat{A}C=51{,}3^\circ$

(e)	$\dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{\frac{1}{2}(\text{AB})(\text{BC})\sin\hat{\text{B}}}{\frac{1}{2}(\text{CD})(\text{DE})\sin\hat{\text{D}}}$
	ΔABC///ΔEDC (gelykhoekig)
	$\therefore \dfrac{\text{AB}}{\text{ED}}=\dfrac{\text{BC}}{\text{DC}}=\dfrac{\text{AC}}{\text{EC}}$
	$\hat{\text{D}}=\hat{\text{B}}$ (verw $\angle$e; // lyne)
	en $\dfrac{\text{AB}}{\text{DE}}=\dfrac{\text{BC}}{\text{DC}}$ (/// Δe, sye eweredig)
	$\therefore \dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{(\text{AB})^2}{(\text{DE})^2}$
	$\therefore \dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{(\sqrt{41})^2}{(2\sqrt{41})^2}$
	$\therefore \dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{1}{4}$
	
	Alternatief 1:
	$\dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{\frac{1}{2}(\text{AC})(\text{AB})\sin\hat{\text{A}}}{\frac{1}{2}(\text{CE})(\text{ED})\sin\hat{\text{E}}}$
	$\dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{9\times\sqrt{41}}{18\times2\sqrt{41}}=\dfrac{1}{4}$
	
	Alternatief 2:
	$\dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{\frac{1}{2}(\text{AC})(h_B)}{\frac{1}{2}(\text{CE})(h_D)}$
	$\dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{9\times5}{18\times10}=\dfrac{1}{4}\quad\ldots\ h_B=12-7$
		$=\dfrac{\frac{1}{2}(\text{AB})(\text{BC})\sin\hat{\text{B}}}{\frac{1}{2}(\text{CD})(\text{DE})\sin\hat{\text{D}}}$
		
		$\hat{\text{D}}=\hat{\text{B}}$ (verw $\angle$e; // lyne)
		
		$\dfrac{\text{AB}}{\text{DE}}=\dfrac{\text{BC}}{\text{DC}}$ (/// Δe, sye eweredig)
		
		$\dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{(\text{AB})^2}{(\text{DE})^2}$
		
		$\dfrac{\text{Oppervlakte }\Delta\text{ABC}}{\text{Oppervlakte }\Delta\text{EDC}}=\dfrac{1}{4}$
		
		$\dfrac{\frac{1}{2}(\text{AC})(\text{AB})\sin\hat{\text{A}}}{\frac{1}{2}(\text{CE})(\text{ED})\sin\hat{\text{E}}}$
		Kansellering
		$\dfrac{9\times\sqrt{41}}{18\times2\sqrt{41}}$
		
		$=\dfrac{1}{4}$
		
		$\dfrac{\frac{1}{2}(\text{AC})(h_B)}{\frac{1}{2}(\text{CE})(h_D)}$
		Lood hoogte 5 en 10
		Waardes 9 en 18
		$\dfrac{9\times5}{18\times10}$
		$=\dfrac{1}{4}$

VRAAG 4

(a)(1)	Lengte AB $=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ Lengte AB $=\sqrt{(2-1)^2+(8+1)^2}$ Lengte AB $=\sqrt{1+81}$ Lengte AB $=\sqrt{82}$ **Alternatief:** $\lvert AB\rvert=\sqrt{82}$	$=\sqrt{(2-1)^2+(8+1)^2}$ Vervang in afstandsformule $=\sqrt{82}$ $\lvert AB\rvert=\sqrt{82}$
(a)(2)	AB is 'n middellyn: Vir middelpunt: Midpt AB$\left(\dfrac{2+1}{2};\dfrac{8-1}{2}\right)$ Midpt AB$\left(\dfrac{3}{2};\dfrac{7}{2}\right)$ $r=\dfrac{\sqrt{82}}{2}$ $\left(x-\dfrac{3}{2}\right)^2+\left(y-\dfrac{7}{2}\right)^2=\dfrac{41}{2}$	Midpt AB$\left(\dfrac{3}{2};\dfrac{7}{2}\right)$ $r=\dfrac{\sqrt{82}}{2}$ $\left(x-\dfrac{3}{2}\right)^2+\left(y-\dfrac{7}{2}\right)^2=\dfrac{41}{2}$
(a)(3)	$m_{middellyn}=\dfrac{8+1}{2-1}\quad\therefore\quad m_{middellyn}=9$ $\therefore\quad m_{raaklyn}=-\dfrac{1}{9}$ $y=-\dfrac{1}{9}x+c$ vervang $(2;8)$ $c=8\dfrac{2}{9}$ $y=-\dfrac{1}{9}x+8\dfrac{2}{9}$ $9y=-x+74$	$m_{middellyn}=\dfrac{8+1}{2-1}\quad\therefore\quad m_{middellyn}=9$ $\therefore\quad m_{raaklyn}=-\dfrac{1}{9}$ $c=8\dfrac{2}{9}$ $9y=-x+74$
(b)	Konstrueer AO $\therefore$ AO=10 eenhede …. Radius AO $\perp$ AM …. Raaklyn $\perp$ Radius $(\text{AM})^2=(13)^2-(10)^2$ …. Pythag AM $=\sqrt{69}$	AO=10 eenhede AO $\perp$ AM ..Raaklyn $\perp$ Radius $(\text{AM})^2=(13)^2-(10)^2$ AM $=\sqrt{69}$

VRAAG 5

(a)		f(x): vorm en (eindpunte) draaipunte x-afsnitte g(x): vorm en (eindpunte) asimptoot x-afsnit $(63,4°)$ Moenie twee keer vir verkeerde eindpunte penaliseer nie
(b)	$\cos 2x \leq \tan x + 2$ $x \in [-180°;-90°) \cup [-70,1°;90°)$ Laat bestek van $[-65°;-75°]$ toe vir snypunt – lees van grafiek af	$[-180°;-90°)$ $[-70,1°;90°)$

VRAAG 6

(a)	Konstruksie: B deur middelpunt O Bewys: $\hat{O}_1 = \hat{A} + \hat{B}_1$ (buite$\angle$ van Δ) $\hat{A} = \hat{B}_1$ (Gelykbenige Δ / Radii) Net so in die ander driehoek: $\hat{O}_1 = 2 \times \hat{B}_1$ $\hat{O}_2 = 2 \times \hat{B}_2$ $\therefore A\hat{O}C = 2 \times A\hat{B}C$	B deur middelpunt O $\hat{O}_1 = \hat{A} + \hat{B}_1$ (buite$\angle$ van Δ) $\hat{A} = \hat{B}_1$ (Gelykb Δ / Radii) $\hat{O}_1 = 2 \times \hat{B}_1$ $\hat{O}_2 = 2 \times \hat{B}_2$ $\therefore A\hat{O}C = 2 \times A\hat{B}C$
(b)(1)	$\hat{C}_1 = \hat{A}_1$ (Raaklyn van pt / gelykbenige Δ) $2\hat{A}_1 + \hat{T} = 180°$ $\hat{A}_1 = 59°$ (Binne$\angle$e van Δ)	$\hat{A}_1 = 59°$ (raaklyn van pt / gelykb Δ) (Binne$\angle$e van Δ)
(b)(2)	$\hat{A}_1 + \hat{A}_2 = 90°$ (radius $\perp$ raaklyn) $\hat{A}_2 = 90° - 59°$ $\hat{A}_2 = 31°$ $\hat{A}_2 = \hat{C}_2$ (gelykbenige Δ; CO=AO radii) $\therefore \hat{O}_1 = 118°$ (binne$\angle$e van Δ) **ALTERNATIEF:** $\hat{A}_1 = \hat{B}$ (raaklyn-koord-stelling) $\hat{A}_1 = 59°$ (Uit (b)(1)) $\therefore \hat{O}_1 = 118°$ ($\angle$ by middelpunt $= 2$ X $\angle$ by sirkel)	$\hat{A}_1 + \hat{A}_2 = 90°$ (radius $\perp$ raaklyn) $\hat{A}_2 = 90° - 59°$ $\hat{A}_2 = 31°$ $\hat{A}_2 = \hat{C}_2$ $\therefore \hat{O}_1 = 118°$ (binne$\angle$e van Δ) $\hat{A}_1 = \hat{B}$ (raaklyn-koord) $\hat{A}_1 = 59°$ (Uit (b)(1)) $\therefore \hat{O}_1 = 118°$ ($\angle$ by midpt $= 2$ X $\angle$ by sir)

VRAAG 7

<table>
<tr><td>(a)</td><td>DO = 3 eenhede
AD:DO = 4 : 3
$\frac{AD}{DO}=\frac{AE}{EC}=\frac{AF}{FB}$ (eweredigheidstelling – DE//OC en EF//CB)
$\therefore$ AF : FB = 4 : 3</td><td>AD:DO = 4 : 3
$\frac{AD}{DO}=\frac{AE}{EC}=\frac{AF}{FB}$ met rede
$\therefore$ AF : FB = 4 : 3</td></tr>
<tr><td>(b)</td><td>$\Delta AHF\ ///\ \Delta AGB$ (gelykhoekig)
$\therefore \frac{AH}{AG}=\frac{HF}{GB}=\frac{AF}{AB}$ (gelykvormige driehoeke, sye eweredig)
$AB=7x$
$\therefore \frac{HF}{GB}=\frac{4x}{7x}$
$\therefore GB:HF=7:4$</td><td>$\Delta AHF\ ///\ \Delta AGB$ met rede
$\therefore \frac{AH}{AG}=\frac{HF}{GB}=\frac{AF}{AB}$ met rede
$\therefore GB:HF=7:4$</td></tr>
<tr><td>(c)</td><td>AE:EC = 4 : 3 (eweredigheidstelling)
EG = GC = $1\frac{1}{2}k$
$\therefore$ AE : EG $=4:\frac{3}{2}$ of $8:3$</td><td>AE:EC = 4 : 3 (eweredigheidstelling)
EG = GC = $1\frac{1}{2}k$
$\therefore$ AE : EG $=4:\frac{3}{2}$ of $8:3$</td></tr>
</table>

AFDELING B

VRAAG 8

(a)	$\sin 3x = -\frac{3}{4}$ $3x = -48,6° + k360°$; $k \in Z$ $x = -16,2° + k120°$; $k \in Z$ of $3x = 180 - (-48,6°) + k360°$; $k \in Z$ $x = 76,2° + k120°$; $k \in Z$ $x = \{-16,2°; -43,8°\}$	$3x = -48,6° + k360°; k \in Z$ $x = -16,2° + k120°; k \in Z$ $x = 76,2° + k120°$; $k \in Z$ Kwadrante $x = \{-46,2°; -73,8°\}$
(b)	$\tan x = \sin 2x$ $\frac{\sin x}{\cos x} = 2\sin x \cos x$ $\sin x = 2\sin x \cos^2 x$ $2\sin x \cos^2 x - \sin x = 0$ $(2\cos^2 x - 1) = 0$ $\cos 2x = 0$ $2x = \pm 90° + k360°$; $k \in Z$ $\therefore x = \pm 45° + k180°$; $k \in Z$ **ALTERNATIEF:** $\tan x = \sin 2x$ $\frac{\sin x}{\cos x} = 2\sin x \cos x$ $\sin x = 2\sin x \cos^2 x$ $2\sin x \cos^2 x - \sin x = 0$ $(2\cos^2 x - 1) = 0$ $\cos^2 x = \frac{1}{2}$ $\cos x = \pm\sqrt{\frac{1}{2}}$ $x = \pm 45° + k360°$; $k \in Z$ **or** $x = \pm 135° + k360°$; $k \in Z$	$\frac{\sin x}{\cos x}$ $2\sin x \cos x$ $\sin x = 2\sin x \cos^2 x$ $(2\cos^2 x - 1) = 0$ $\cos 2x = 0$ $\therefore x = \pm 45° + k180°$; $k \in Z$ $\frac{\sin x}{\cos x}$ $2\sin x \cos x$ $\sin x = 2\sin x \cos^2 x$ $(2\cos^2 x - 1) = 0$ $\cos x = \pm\sqrt{\frac{1}{2}}$ $x = \pm 45° + k360°$; $k \in Z$ **or** $x = \pm 135° + k360°$; $k \in Z$

VRAAG 9

(a)	$\sin\left(\hat{C}-\hat{D}\right)=\sin\hat{C}.\cos\hat{D}-\cos\hat{C}.\sin\hat{D}$ $=\left(\frac{12}{13}\right)\left(\frac{3}{5}\right)-\left(\frac{5}{13}\right)\left(-\frac{4}{5}\right)$ $=\frac{56}{65}$	$=\sin\hat{C}.\cos\hat{D}-\cos\hat{C}.\sin\hat{D}$ $\left(\frac{12}{13}\right)$ $\left(\frac{3}{5}\right)$ $\left(\frac{5}{13}\right)$ $\left(-\frac{4}{5}\right)$ $=\frac{56}{65}$
(b)	$\cos(90°+60°).\cos 28°+\cos 60°.\cos 62°$ $\cos\left(60°+62°\right)$ $\cos 122°$ $=\cos(180°-58°)$ $=-\cos 58°$ $=-k$ **ALTERNATIEF:** $-\sin 60°\cos 28°+\cos 60°\sin 28°$ $=-\sin(60°-28°)$ $=-\sin 32°$ $=-\cos 58°$ $=-k$ **ALTERNATIEF:** $-\cos 30°\cos 28°+\sin 30°\sin 28°$ $=-\cos(30°+28°)$ $=-\cos 58°$ $=-k$	$\cos(90°+60°)$ $\cos\left(60°+62°\right)$ $=\cos(180°-58°)$ $=-\cos 58°$ $=-k$

VRAAG 10

(a)	In ΔAEC $\dfrac{EC}{\sin 60°} = \dfrac{80}{\sin 45°}$ $EC = \dfrac{80\sin 60°}{\sin 45°}$ $EC \approx 98$ m In ΔEDC: $C\hat{E}D = 135°$ (aangrensende $\angle$e op reguitlyn) $(CD)^2 = (53)^2 + (97,98)^2 - 2(53)(97,98) \times \cos 135°$ $CD = 140,54499...$ m $CD \approx 140,5$ m	$\dfrac{EC}{\sin 60°} = \dfrac{80}{\sin 45°}$ $EC = \dfrac{80\sin 60°}{\sin 45°}$ $EC \approx 98$ m $C\hat{E}D = 135°$ $(CD)^2 = (53)^2 + (97,98)^2$ $-2(53)(97,98) \times \cos 135°$ $CD = 140,5$ m
(b)	In ΔACB: $\tan 37° = \dfrac{BC}{AC}$ $BC = 80\tan 37°$ $BC = 60,284$ m Laat M die middelpunt van BC wees: In ΔDMC: $MC = \dfrac{1}{2}BC$ $\therefore MC = 30,142$ m $\tan C\hat{D}M = \dfrac{MC}{CD}$ $\tan C\hat{D}M = \dfrac{30,142}{140,55}$ $C\hat{D}M \approx 12,1°$ Die hoogtehoek van M vanaf D is $12,1°$.	In ΔACB: $\tan 37° = \dfrac{BC}{AC}$ $BC = 60,284$ m $\tan C\hat{D}M = \dfrac{MC}{CD}$ $MC = 30,142$ m $C\hat{D}M \approx 12,1°$

VRAAG 11

(a)	Sirkel met middelpunt P: $x^2-6x+y^2-12y=-41$ $(x-3)^2+(y-6)^2=4$ Middelpunt: P(3; 6) Radius: 2 eenhede	$(x-3)^2+(y-6)^2=4$ P(3;6) Radius: 2 eenhede
(b)	Middelpunt: $Q(9;3)$ Afstand PQ $=\sqrt{(9-3)^2+(3-6)^2}$ Afstand PQ $=\sqrt{45}$ Afstand PQ $=3\sqrt{5}$ $\therefore 3\sqrt{5}-(2+2)$ $=2{,}7$	$=\sqrt{(9-3)^2+(3-6)^2}$ $=3\sqrt{5}$ $\therefore 3\sqrt{5}-(2+2)$
(c)	Volume van blok $=lbh-2\times(\pi r^2h)$ $=(20\times14\times10)-2(\pi(4)(20))$ $=2800-160\pi$ $\approx 2297{,}3$ eenhede^3	$=lbh-2\times(\pi r^2h)$ $=2800-160\pi$ $\approx 2297{,}3$ eenhede^3

VRAAG 12

(a)	$\bar{x} = \frac{5a+5b}{10}$ $\bar{x} = \frac{a+b}{2}$	$\bar{x} = \frac{a+b}{2}$
(b)	$\sigma^2 = \frac{5\left[a - \frac{a+b}{2}\right]^2 + 5\left[b - \frac{(a+b)}{2}\right]^2}{10}$ $\sigma^2 = \frac{\left(\frac{a-b}{2}\right)^2 + \left(\frac{b-a}{2}\right)^2}{2}$ $\sigma^2 = \frac{\frac{(a-b)^2}{4} + \frac{(a-b)^2}{4}}{2}$ $\sigma^2 = \frac{(a-b)^2}{4}$ $\sigma = \frac{(a-b)}{2}$	$\sigma^2 = \frac{5\left[a - \frac{a+b}{2}\right]^2 + 5\left[b - \frac{(a+b)}{2}\right]^2}{10}$ $\sigma^2 = \frac{\left(\frac{a-b}{2}\right)^2 + \left(\frac{b-a}{2}\right)^2}{2}$ $\sigma = \frac{(a-b)}{2}$

VRAAG 13

(a)	Laat: $\hat{O}_1 = 2x$ $\therefore \hat{D} = x$ ($\angle$ by middelpunt = 2x) $\therefore \hat{A}_1 = x$ (verwisselende $\angle$e; AC//BC) $\therefore \hat{C} = x$ ($\angle$ in dieselfde segment) In ΔCAE: $\hat{E}_1 = 180° - 2x$ (binne$\angle$e van Δ) $\therefore \hat{E}_2 = 2x$ (aangrensende $\angle$e op reguitlyn) $\therefore \hat{E}_2 = 2x = \hat{O}_1$ En hulle word onderspan deur AB. Dus AEOB koordevierhoek ($\angle$e in dieselfde segment =)	$\hat{D} = x$ ($\angle$ by middelpt = 2x) $\therefore \hat{A}_1 = x$ (verw $\angle$e; AC//BC) $\hat{C} = x$ ($\angle$ in dieselfde segment) $\hat{E}_2 = 2x$ (aangr $\angle$e op reguitlyn) En hulle word onderspan deur AB, dus is AEOB koordevierhoek ($\angle$e in dieselfde segment =)
(b)	Laat: $\hat{D}_1 = x$ $\therefore \hat{B}_2 = x$ ... gelyke koorde onderspan = $\angle$e Laat: $\hat{E}_1 = y$ $\therefore \hat{B}_1 = y$ ... buite$\angle$ koordevh = oorst binne $\therefore \hat{A}_1 = y - x$ ... buite$\angle$ Δ = som oorst binne $\therefore \hat{B}_1 - \hat{B}_2 = \hat{A}_1$	$\therefore \hat{B}_2 = x$ gelyke koorde onderspan = $\angle$e $\therefore \hat{B}_1 = y$ buite$\angle$ koordevh = oorst binne $\therefore \hat{A}_1 = y - x$ buite$\angle$ Δ = som oorst binne $\therefore \hat{B}_1 - \hat{B}_2 = \hat{A}_1$
(c)	Trek loodlyn van P na SQ Noem loodlyn PU $\therefore UQ = 5 - 3$ $UQ = 2$ cm $\therefore PQ = 3 + 5$ $PQ = 8$ cm $(PU)^2 = (PQ)^2 - (UQ)^2$ Pythag $(PU)^2 = (8)^2 - (2)^2$ Pythag $PU = \sqrt{60}$ $PU = 7{,}7$ cm PU = RS (reghoek) $\therefore RS = 7{,}7$ cm	Trek loodlyn van P na SQ $UQ = 2$ cm $PQ = 8$ cm $(PU)^2 = (8)^2 - (2)^2$ Pythag $PU = \sqrt{60}$ PU = RS (reghoek)

VRAAG 14

(a)	In ΔBOC: $\hat{C} = 90° - \theta$ (Gelykb Δ; Radii; Binne$\angle$e Δ) In ΔOCF: $\therefore \hat{C} = \theta$ $\dfrac{CF}{8} = \cos\theta$ $CF = 8\cos\theta$ $OF = 8\sin\theta$ $\therefore P = 2 \times CF + 4 \times OF$ $\therefore P = 16\cos\theta + 32\sin\theta$	$\therefore \hat{C} = \theta$ $CF = 8\cos\theta$ $OF = 8\sin\theta$ $\therefore P = 2 \times CF + 4 \times OF$
(b)	$P = 16\cos\theta + 32\sin\theta$ en $P = 16\sqrt{5}\sin(\theta + \alpha)$ $P = 16\sqrt{5}\sin\theta.\cos\alpha + 16\sqrt{5}\cos\theta.\sin\alpha$ $\therefore 16\sqrt{5}\sin\alpha = 16$ en $16\sqrt{5}\cos\alpha = 32$ $\alpha \approx 26,6°$	$16\sqrt{5}\sin\theta.\cos\alpha + 16\sqrt{5}\cos\theta.\sin\alpha$ $\therefore 16\sqrt{5}\sin\alpha = 16$ $16\sqrt{5}\cos\alpha = 32$ $\alpha \approx 26,6°$

Totaal: 150 punte