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**NATIONAL
SENIOR CERTIFICATE
NASIONALE SENIOR
SERTIFIKAAT**

GRADE 12 / GRAAD 12

MATHEMATICS PAPER 2/ WISKUNDE VRAESTEL 2

SEPTEMBER 2025

MARKING GUIDELINE / NASIENRIGLYN

MARKS / PUNTE: 150

These marking guidelines consist of 17 pages.

Hierdie nasienriglyn bestaan uit 17 bladsye.

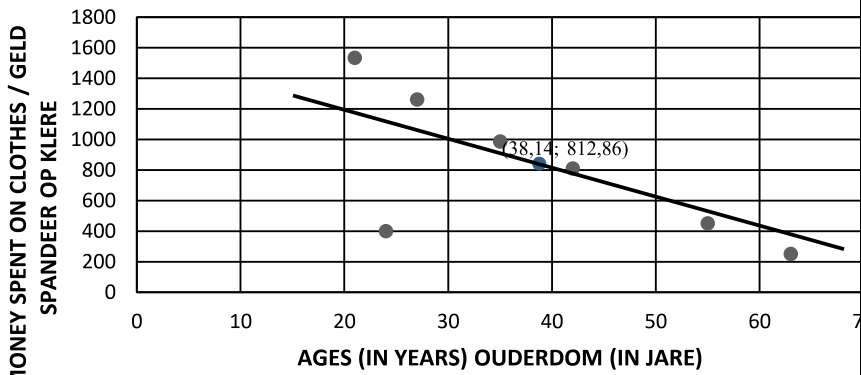


NOTE:

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guideline.
- Assuming values/answers in order to solve a problem is unacceptable.

LET WEL:

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyn van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.

QUESTION 1		
1.1	$A = 1\,607,113187$ $B = -20,82319216$ $\hat{y} = 1607,11 - 20,82x$	✓ 1578,539116 ✓ -22,32125028 ✓ equation / vergelyking (3)
1.2	AGES VS SPENDING MONEY ON BUYING CLOTHES OUDERDOM TEENoor GELD SPANDEER OP KLERE  Y-axis: MONEY SPENT ON CLOTHES / GELD SPANDEER OP KLERE X-axis: AGES (IN YEARS) OUERDOM (IN JARE)	✓ shape/vorm ✓ passes through the mean point (38,14; 812,86) / deur die gemiddelde punt (2)
1.3	$r = -0,68 \quad -0,69995 \dots = -0,70$	✓ answer antwoord (1)
1.4	$\hat{y} = 1578,54 - 22,32(50) \quad 1607,11 - 20,82(50)$ $= 462,54 \quad 566,11$ OR / OF	✓ substitution / substitusie ✓ answer antwoord (2)



NCS-Marking Guideline/NSS-Nasienriglyn

	$\hat{y} = 462,48$ 565,95 (from calculator)(sakrekenaar)	OR / OF ✓ ✓ Answer
1.5	It is NOT reliable since there is NO STRONG correlation between the variables / It is FAIRLY reliable since there is an AVERAGE correlation between the variables. Dit is NIE betroubaar nie want daar is nie 'n STERK korrelasie tussen die veranderlikes nie / Dit is REDELIK betroubaar, want daar is 'n GEMIDDELDE korrelasie.	✓ Not reliable Nie betroubaar ✓ Not strong / nie sterk OR / OF ✓ Fairly reliable / redelik betroubaar ✓ average correlation / gemiddelde korrelasie (2)
1.6	The gradient will DECREASE (become more negative) when the point is removed. Die gradiënt sal VERMINDER (meer negatief word) as die punt verwyder word.	✓ increase (more negative) / vermeerder (meer negatief) (1)
		[11]

QUESTION 2 / VRAAG 2

Performance in programming test / Prestasie in programmeertoets <table><caption>Data points from the cumulative frequency graph</caption><thead><tr><th>Marks / Punte</th><th>Cumulative frequency / Kumulatiewe frekwensie</th></tr></thead><tbody><tr><td>0</td><td>0</td></tr><tr><td>10</td><td>1</td></tr><tr><td>20</td><td>4</td></tr><tr><td>30</td><td>8</td></tr><tr><td>40</td><td>19</td></tr><tr><td>50</td><td>31</td></tr><tr><td>60</td><td>40</td></tr><tr><td>70</td><td>44</td></tr><tr><td>80</td><td>49</td></tr><tr><td>90</td><td>50</td></tr></tbody></table>			Marks / Punte	Cumulative frequency / Kumulatiewe frekwensie	0	0	10	1	20	4	30	8	40	19	50	31	60	40	70	44	80	49	90	50
Marks / Punte	Cumulative frequency / Kumulatiewe frekwensie																							
0	0																							
10	1																							
20	4																							
30	8																							
40	19																							
50	31																							
60	40																							
70	44																							
80	49																							
90	50																							
2.1.1	50 students/studente	✓ answer /antwoord (1)																						



NCS-Marking Guideline/NSS-Nasienriglyn

2.1.2	$\frac{75}{100} \times 50 = 37,5$ 65 marks/punte or/of 65%	✓ 37,5 ✓ 65 (2)																														
2.1.3	<table border="1"> <thead> <tr> <th>Marks(out of 100) Punte (uit 100)</th><th>Frequency(f) Frekwensie(f)</th><th>Cumulative frequency Kumulatiewe frekwensie</th></tr> </thead> <tbody> <tr> <td>$0 \leq x < 10$</td><td>1</td><td>1</td></tr> <tr> <td>$10 \leq x < 20$</td><td>3</td><td>4</td></tr> <tr> <td>$20 \leq x < 30$</td><td>4</td><td>8</td></tr> <tr> <td>$30 \leq x < 40$</td><td>11</td><td>19</td></tr> <tr> <td>$40 \leq x < 50$</td><td>12</td><td>31</td></tr> <tr> <td>$50 \leq x < 60$</td><td>9</td><td>40</td></tr> <tr> <td>$60 \leq x < 70$</td><td>4</td><td>44</td></tr> <tr> <td>$70 \leq x < 80$</td><td>5</td><td>49</td></tr> <tr> <td>$80 \leq x < 90$</td><td>1</td><td>50</td></tr> </tbody> </table>	Marks(out of 100) Punte (uit 100)	Frequency(f) Frekwensie(f)	Cumulative frequency Kumulatiewe frekwensie	$0 \leq x < 10$	1	1	$10 \leq x < 20$	3	4	$20 \leq x < 30$	4	8	$30 \leq x < 40$	11	19	$40 \leq x < 50$	12	31	$50 \leq x < 60$	9	40	$60 \leq x < 70$	4	44	$70 \leq x < 80$	5	49	$80 \leq x < 90$	1	50	✓ 1st 3 values / 1e 3 waardes ✓ all values / al die waardes (2)
Marks(out of 100) Punte (uit 100)	Frequency(f) Frekwensie(f)	Cumulative frequency Kumulatiewe frekwensie																														
$0 \leq x < 10$	1	1																														
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$60 \leq x < 70$	4	44																														
$70 \leq x < 80$	5	49																														
$80 \leq x < 90$	1	50																														
2.1.4	$\bar{x} = \frac{(1 \times 5) + (3 \times 15) + (4 \times 25) + (11 \times 35) + \dots + (1 \times 85)}{50}$ $= \frac{2290}{50} = 45,8$ OR / OF 45,8 (from calculator)(van sakrekenaar)	✓ mid pts / middelwaardes ✓ divide by 50 / deel deur 50 ✓ answer/ antwoord OR / OF ✓✓✓ answer / antwoord (3)																														
2.2	$\bar{x} = 25 \text{ min}$ $\sigma = 6 \text{ min}$ $= 25 + 6 = 31$ $\therefore 2 \text{ vouchers will be free / } 2 \text{ bewyse sal gratis wees}$	✓ 25 ✓ 6 ✓ 2 (3)																														
		[11]																														



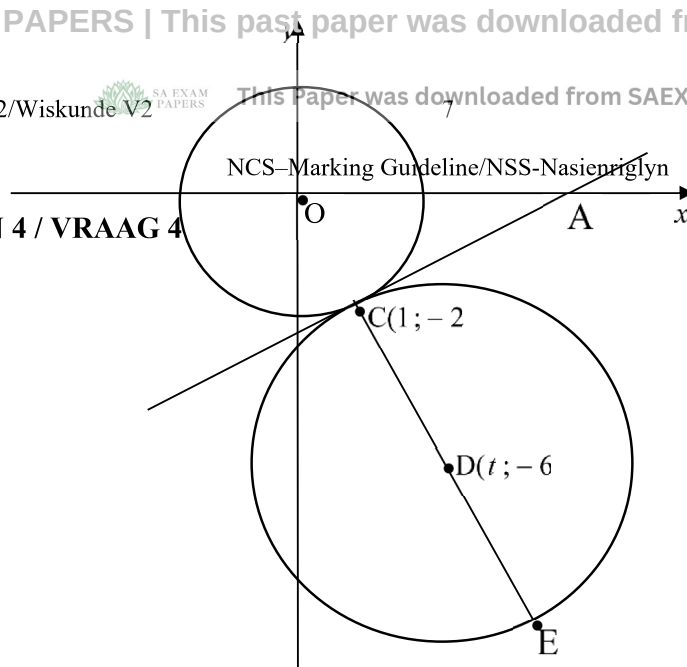


NCS-Marking Guideline/NSS-Nasienriglyn

3.4	$y = \frac{3}{2}x$ and/en $y = 5x + 14$ $5x + 14 = \frac{3}{2}x$ $7x = -28$ $x = -4$ $y = -6$ $\therefore R(-4; -6)$	✓ equating /vergelykings gelyk ✓ $x = -4$ ✓ $y = -6$ (3)
3.5	$m_{PR} = 5$ $\tan \alpha = 5$ $\alpha = 78,69^\circ$ $m_{MR} = \frac{3}{2}$ $\tan \beta = \left(\frac{3}{2}\right)$ $\beta = 56,31^\circ$ $\therefore \theta = \alpha - \beta$ $= 22,38^\circ$	✓ $\tan \alpha = 5$ ✓ $78,69^\circ$ ✓ $56,31^\circ$ ✓ $22,38^\circ$ (4)
3.6	$PR = \sqrt{(-4+2)^2 + (-6-4)^2}$ $= \sqrt{104}$ or $2\sqrt{26}$ $MR = \sqrt{(4+4)^2 + (6+6)^2}$ $= \sqrt{208}$ or/of $4\sqrt{13}$ Area of $\triangle PMR$ / Oppervlakte van $\triangle PMR$ $= \frac{1}{2} PR.MR.\sin \theta$ $= \frac{1}{2} 2\sqrt{26}.4\sqrt{13}.\sin 22,38^\circ$ or $\frac{1}{2} \sqrt{104} .4\sqrt{13}.\sin 22,38^\circ$ $= 28$ Area PMSR = 56 units ² /eenhede ²	✓ PR ✓ MR ✓ Sub into the area rule/vervang in opp reël ✓ Answer /antwoord (4)
		[19]



QUESTION 4 / VRAAG 4



4.1	$OC \perp \text{tangent}$ [radius $\perp$ tangent] [radius $\perp$ raaklyn] $CE \perp \text{tangent}$ [radius $\perp$ tangent] [radius $\perp$ raaklyn] $\therefore O, C$ and E lies on a straight line [adjacent $\angle$ s $= 180^\circ$] $\therefore O, C$ en E lê op 'n reguit lyn. [Aangrensende $\angle$ e $= 180^\circ$]	$\checkmark$ both S / beide bewerings $\checkmark$ both reasons/ beide redes (2)
4.2	$m_{OC} = \frac{-2-0}{1-0} = -2$	$\checkmark$ subst into formula vervang in formule $\checkmark$ answer/antw (2)
4.3	$m_{CD} = -2$ $\frac{y_2 - y_1}{x_2 - x_1} = -2$ $\frac{-6+2}{t-1} = -2$ $t = 3$	$\checkmark m_{CD}$ $\checkmark$ subst / vervanging (2)
4.4	$m_{\text{tangent}} = \frac{1}{2}$ $AC: y - y_1 = m(x - x_1)$ $y + 2 = \frac{1}{2}(x - 1)$ $y = \frac{1}{2}x - \frac{5}{2}$	$\checkmark m$ $\checkmark$ subst/vervang (1;-2) $\checkmark$ equation vergelyking . (3)



4.5	D is the midpoint of circle / D is die middelpunt van die sirkel $\frac{1+x}{2} = 3$ $x = 5$ $\frac{y-2}{2} = -6$ $y = -10$ $E(5; -10)$	✓ $x = 5$ ✓ $y = -10$ OR/OF answer only / slegs antw (2)
4.6	$\hat{ACD} = 90^\circ$ [radius $\perp$ tangent] [radius $\perp$ raaklyn] $\therefore AE$ is the diameter of circle ACE [converse $\angle$ in semi-circle] AE is die middellyn van die sirkel [hoek in halwe sirkel omgekeerde] $AE = \sqrt{(5-5)^2 + (0+10)^2}$ $AE = \sqrt{0+100}$ $AE = 10$ $\therefore \text{radius} = 5$ $\text{midpt}_{AE} = \left(\frac{5+5}{2}; \frac{-10}{2} \right)$ $= (5; -5) = \text{centre of circle} / \text{mdpt van sirkel}$ Vgl van sirkel/Equation of circle ACE: $(x-5)^2 + (y+5)^2 = 25$	✓ S / R ✓ R ✓ Radius = 5 ✓ midpt/middelpunt ✓ LHS & RHS LK en RK (5)
4.7	Circle centre O: $x^2 + y^2 = 5$ Sirkel met middelpunt O Diameter = $2\sqrt{5}$ middellyn $\sqrt{20} < r < \sqrt{80}$ $2\sqrt{5} < r < 4\sqrt{5}$	✓ $r^2 = 5$ ✓ diameter middellyn ✓ $\sqrt{80} = 4\sqrt{5}$ ✓ endpoints eindpunte (4)
		[20]



QUESTION 5 / VRAAG 5

5.1		
5.1.1	$\cos A = -\frac{12}{13}$	✓ Diagram in quadrant 3 skets in kwadrant 3 ✓ $r = 13$ ✓ $-\frac{12}{13}$ (3)
5.1.2	$\begin{aligned}\sin 2A &= 2 \sin A \cos A \\ &= 2 \left(-\frac{5}{13}\right) \left(-\frac{12}{13}\right) \\ &= \frac{120}{169}\end{aligned}$	✓ $2 \sin A \cos A$ ✓ substitution / vervanging ✓ answer / antwoord (3)
5.2	$\begin{aligned}&= \frac{1}{\cos \theta \cdot \cos \theta} - (-\tan \theta)^2 \\ &= \frac{1}{\cos^2 \theta} - \tan^2 \theta \\ &= \frac{1}{\cos^2 \theta} - \frac{\sin^2 \theta}{\cos^2 \theta} \\ &= \frac{1 - \sin^2 \theta}{\cos^2 \theta} \\ &= \frac{\cos^2 \theta}{\cos^2 \theta} \\ &= 1\end{aligned}$	✓ $\cos \theta$ ✓ $\cos \theta$ ✓ $-\tan^2 \theta$ ✓ $\frac{\sin^2 \theta}{\cos^2 \theta}$ ✓ $\cos^2 \theta$ ✓ answer/antwoord (6)
		[12]



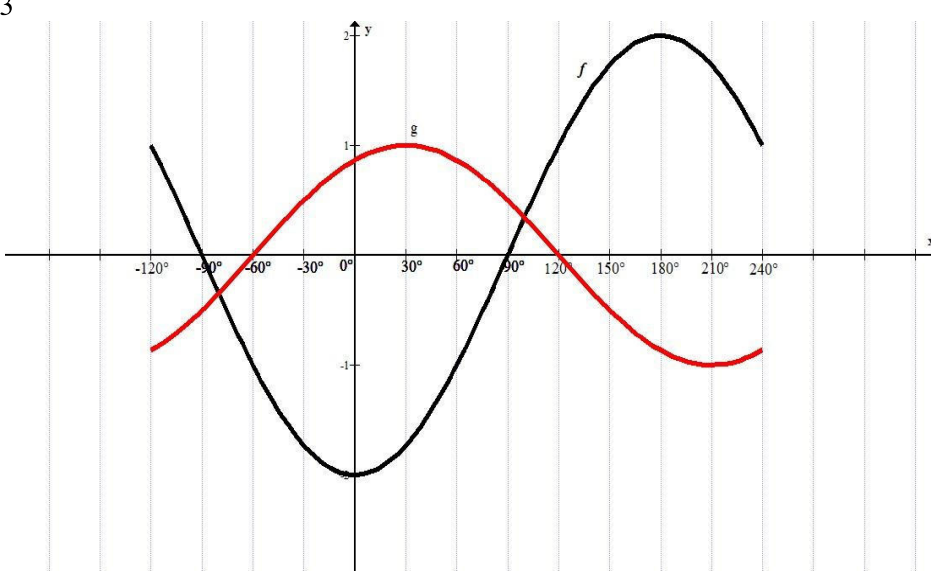
QUESTION 6 / VRAAG 6		
6.1.1	$LHS = \frac{-\sin 2\theta - \cos^2 \theta + 1}{\sin \theta - 2\cos \theta}$ $= \frac{-2\sin \theta \cdot \cos \theta - \cos^2 \theta + \sin^2 \theta + \cos^2 \theta}{\sin \theta - 2\cos \theta}$ $= \frac{\sin^2 \theta - 2\sin \theta \cdot \cos \theta}{\sin \theta - 2\cos \theta}$ $= \frac{\sin \theta (\sin \theta - 2\cos \theta)}{\sin \theta - 2\cos \theta}$ $= \sin \theta$ $\therefore LHS = RHS$ OR/OF $LHS = \frac{-\sin 2\theta - \cos^2 \theta + 1}{\sin \theta - 2\cos \theta}$ $= \frac{-2\sin \theta \cdot \cos \theta + \sin^2 \theta}{\sin \theta - 2\cos \theta}$ $= \frac{\sin^2 \theta - 2\sin \theta \cdot \cos \theta}{\sin \theta - 2\cos \theta}$ $= \frac{\sin \theta (\sin \theta - 2\cos \theta)}{\sin \theta - 2\cos \theta}$ $= \sin \theta$ $\therefore LHS = RHS$	✓ $-\sin 2\theta$ ✓ $2\sin \theta \cdot \cos \theta$ ✓ $\sin^2 \theta$ ✓ common factor / gemeensk faktor ✓ simplification vereenvoudiging OR/OF ✓ $-\sin 2\theta$ ✓ $2\sin \theta \cdot \cos \theta$ ✓ $\sin^2 \theta + \cos^2 \theta$ ✓ common factor/gemeensk faktor ✓ simplification / vereenvoudig (5)
6.1.2	$\sin \theta - 2\cos \theta = 0$ $\frac{\sin \theta}{\cos \theta} = \frac{2\cos \theta}{\cos \theta}$ $\tan \theta = 2$ $\theta = 63,43^\circ$ $\theta = \{-116,57^\circ; 63,43^\circ\}$	✓ $\sin \theta - 2\cos \theta = 0$ ✓ $\tan \theta = 2$ ✓ $-116,57^\circ$ ✓ $63,43^\circ$ (4)
6.2	$\sin[(2x + 40^\circ) - (x + 30^\circ)] = \cos(2x - 20^\circ)$ $\sin(x + 10^\circ) = \cos(2x - 20^\circ)$ $\cos[90^\circ - (x + 10^\circ)] = \cos(2x - 20^\circ)$ $90^\circ - (x + 10^\circ) = \pm(2x - 20^\circ) + k360^\circ \quad k \in \mathbb{Z}$ $x = -60^\circ + k \cdot 360^\circ \quad k \in \mathbb{Z} \quad \text{or} \quad x = 33,33^\circ - k \cdot 120^\circ \quad k \in \mathbb{Z}$	✓ Compound angle / saamgestelde hoek ✓ $\sin(x + 10^\circ)$ ✓ $\cos[90^\circ - (x + 10^\circ)]$ ✓ equating <s/ stel <e gelyk ✓ $x = -60^\circ + k360^\circ$ ✓ $x = 33,33^\circ + k120^\circ$ (6)



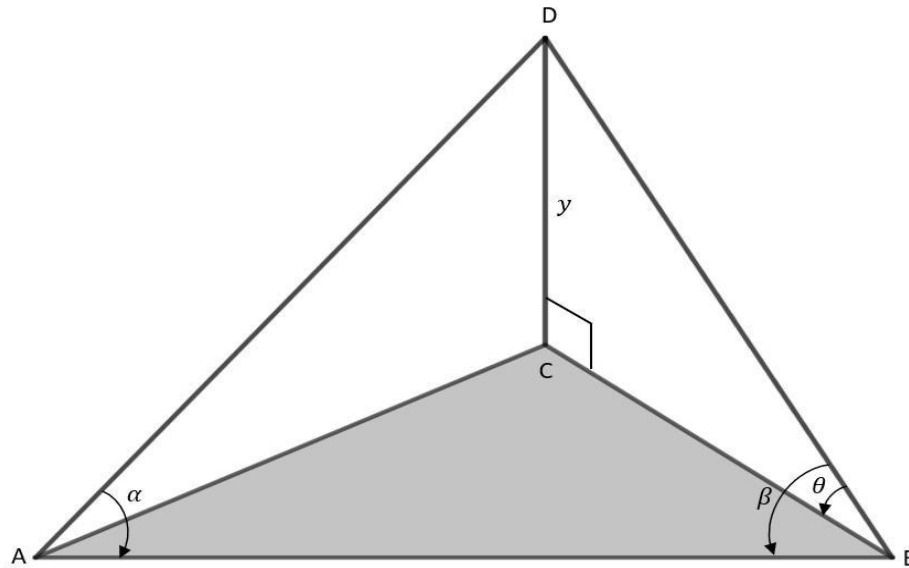
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6.3	$f(x) = 2\cos^2 x - 2$ $= 2\cos^2 x - 1 - 1$ $= \cos 2x - 1$ Max value/Maks waarde = 0	✓ $2\cos^2 x - 1 - 1$ ✓ identity/identiteit ✓ answer/antwoord (3)
		[18]

QUESTION 7 / VRAAG 7

7.1	Amplitude = 2	✓ answer/antwoord (1)
7.2	$y \in [-2 + 3; 2 + 3]$ $y \in [1; 5]$	✓✓ $y \in [1; 5]$ (2)
7.3		✓ y-intercept y-afsnit ✓ x-intercepts x-afsnitte ✓ Min / Max points Min/maks punte (3)
7.4	$k < -2$ or/of $k > 2$	✓ $k < -2$ ✓ $k > 2$ (2)
7.5	$-120^\circ \leq x < 0^\circ$ $30^\circ < x < 210^\circ$	✓✓ $-120^\circ \leq x < 0^\circ$ ✓ $30^\circ < x < 210^\circ$ (3)
		[11]



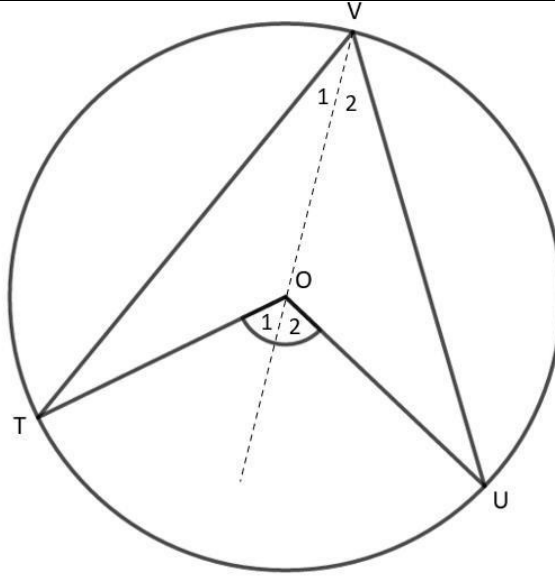
QUESTION 8 / VRAAG 8

8.1	In $\triangle CDB$ $\sin \hat{B} = \frac{DC}{DB}$ $\sin \theta = \frac{y}{DB}$ $DB = \frac{y}{\sin \theta}$	✓ trig ratio/verhouding ✓ subst / vervang ✓ answer / antwoord (3)
8.2	In $\triangle ADB$: $\hat{A}DB = 180^\circ - (\alpha + \beta) \quad [\text{sum of } \angle \text{ s in } \triangle][\text{som binne } \angle \text{ e van } \triangle]$ $\frac{\sin \hat{A}}{DB} = \frac{\sin \hat{D}}{AB}$ $\frac{\sin \alpha}{\frac{y}{\sin \theta}} = \frac{\sin[180^\circ - (\alpha + \beta)]}{AB}$ $AB \cdot \sin \alpha \cdot \sin \theta = y \cdot \sin(\alpha + \beta)$ $AB = \frac{y \sin(\alpha + \beta)}{\sin \alpha \cdot \sin \theta}$	✓ $180^\circ - (\alpha + \beta)$ ✓ subst into sine rule/ vervang in sin-reël ✓ simplify/vereenvoudig ✓ $\sin(\alpha + \beta)$ (4)
		[7]



QUESTION 9 / VRAAG 9

9.1



Construction/Konstruksie: Join/verbind VO and extend to Z / en verleng na Z

In $\triangle TOV$:

$$TO = OV \quad [\text{radii}]$$

$$\hat{T} = \hat{V}_1 \quad [\angle\text{'s opp = sides}] [\text{hoeke teenoor gelyke sye}]$$

$$\hat{O}_1 = \hat{T} + \hat{V}_1 \quad [\text{ext } \angle \text{ of } \triangle] [\text{buitehoek van } \triangle]$$

$$\hat{O}_1 = 2\hat{V}_1$$

Similarly in $\triangle OUV$ / soortgelyk in $\triangle OUV$:

$$\hat{O}_2 = 2\hat{V}_2$$

$$\hat{O}_1 + \hat{O}_2 = 2\hat{V}_1 + 2\hat{V}_2$$

$$\hat{T}\hat{O}\hat{U} = 2(\hat{V}_1 + \hat{V}_2)$$

$$\therefore \hat{T}\hat{O}\hat{U} = 2\hat{T}\hat{V}\hat{U}$$

✓

construction/konstruksie

✓ S ✓ R

✓ S/R

✓ S

✓ S

(6)



9.2		
9.2.1	$\hat{AOC} = 2\hat{D}$ [∠ at the centre = $2 \times$ ∠ at circumference.] $104^\circ = 2\hat{D}$ [mdpts∠ = $2 \times$ omtreks∠] $\therefore \hat{D} = 52^\circ$	✓ S ✓ R (2)
9.2.2	$\hat{DAB} = \hat{C}_3 = 32^\circ$ [∠s in the same segment] [∠e in selfde sirkelsegment]	✓ S/R (1)
9.2.3	$\hat{A}_1 = \hat{C}_1$ [∠'s opp = radii] [∠e teenoor gelyke radiusse] $\hat{A}_1 + \hat{C}_1 + \hat{O} = 180^\circ$ [sum of ∠'s in Δ] [som binne∠e van Δ] $2\hat{A}_1 + 104^\circ = 180^\circ$ $\hat{A}_1 = 38^\circ$	✓ S/R ✓ S/R ✓ answer/antwoord (3)
9.2.4	$\hat{ACB} = 90^\circ$ [∠'s in the semi-circle] [∠e in halwe sirkel] $\hat{C}_3 = 32^\circ$ [∠'s in same circle segment] [∠e in selfde sirkelsegment] Maar/ But $\hat{ACB} = \hat{C}_1 + \hat{C}_2 + \hat{C}_3$ $90^\circ = 38^\circ + \hat{C}_2 + 32^\circ$ $\hat{C}_2 = 20^\circ$	✓ S / R ✓ S/R ✓ answer (3)



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9.3		
9.3.1	$\hat{O}QR = 90^\circ$ [tan $\perp$ radius][radius $\perp$ raaklyn] $\hat{O}BR = 90^\circ$ [tan $\perp$ radius][radius $\perp$ raaklyn] $\therefore \hat{O}QR + \hat{O}BR = 180^\circ$ $RBOQ$ is a cyclic quad [opp $\angle$ s of quad supp] $\therefore RBOQ$ is 'n KVH [teenoorst $\angle$ e van KVH omgekeerde] OR/OF $\hat{P}QO = 90^\circ$ [tan $\perp$ radius][radius $\perp$ raaklyn] $\hat{O}BR = 90^\circ$ [tan $\perp$ radius][radius $\perp$ raaklyn] $\therefore RBOQ$ is a cyclic quad [converse ext $\angle$ of a cyclic quad] $\therefore RBOQ$ is 'n KVH [buite $\angle$ van KVH omgekeerde]	$\checkmark$ S $\checkmark$ R $\checkmark$ S/R $\checkmark$ R OR/OF $\checkmark$ S $\checkmark$ R $\checkmark$ S/R $\checkmark$ R (4)
9.3.2	$\hat{O}TB = 90^\circ$ [line from centre circle to midpt of chord] [lyn vanaf midpt sirkel na mdpt koord] $\therefore \hat{O}_3 = 90^\circ - \hat{B}_1$ [sum of $\angle$'s in Δ][som binne $\angle$ e van Δ] maar/ but $\hat{B}_2 = 90^\circ - \hat{B}_1$ $\hat{O}_3 = \hat{B}_2$ [both/beide = $90^\circ - \hat{B}_1$] $\therefore RB$ is a tangent passing through T, O and B [converse tan chord theorem] $\therefore RB$ is 'n raaklyn deur T, O en B [raaklyn koord stelling omgekeerde]	$\checkmark$ S $\checkmark$ R $\checkmark$ S $\checkmark$ R (4)
9.3.3	$\hat{Q}_2 = 90^\circ - \hat{Q}_1$ [tan $\perp$ radius][radius $\perp$ raaklyn]	$\checkmark$ S/R $\checkmark$ S/R



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maar/ but $\hat{Q}_1 = \hat{B}_1$ [tan-chord theorem][raaklyn koord stelling] en/ and $\hat{Q}_3 = \hat{B}_1$ [$\angle$'s opp = sides][$\angle$ e teenoor gelyke sye] In $\triangle PQB$ $\hat{P} + \hat{B}_1 + \hat{Q}_1 + \hat{Q}_2 = 180^\circ$ [sum of $\angle$'s in $\triangle$][som binne $\angle$ e van $\triangle$] $\hat{P} + \hat{B}_1 + \hat{B}_1 + 90^\circ - \hat{B}_1 + \hat{B}_1 = 180^\circ$ $\hat{P} = 90^\circ - 2\hat{B}_1$	✓ answer/antwoord (3)
	[26]

QUESTION 10 / VRAAG 10

10.1	$\frac{DG}{GC} = \frac{EH}{HC}$ [prop theorem, $ED \parallel HG$] [eweredigheidstelling] $\frac{3}{2} = \frac{EH}{HC}$	✓ S ✓ R (2)
10.2	$\frac{BG}{BD} = \frac{AB}{BE}$ [prop theorem, $ED \parallel AG$] [eweredigheidstelling] $\frac{BG}{BD} = \frac{3}{1}$ $\frac{\text{Area of } \triangle ABG}{\text{Area of } \triangle CAG} = \frac{\frac{1}{2} \cdot BG \cdot h}{\frac{1}{2} \cdot GC \cdot h} = \frac{9}{2} \quad \text{OR /OF} \quad \frac{3}{\frac{1}{4}} = \frac{12}{1}$ $= \frac{9}{4}$	✓ S/ R ✓ S/ R ✓ answer/antwoord (3)
		[5]



QUESTION 11 / VRAAG 11

11.1	$\hat{R}_1 = \hat{T}_2$ [tan chord theorem] [raaklyn koord stelling]	✓ R (1)
11.2	1. $\hat{R}_1 = \hat{T}_2$ [proved] [bewys] $\hat{R}_3 = \hat{T}_2$ [alt <s, verw $\angle e$, $QM \parallel RS$] $\therefore \hat{R}_3 = \hat{R}_1$ [= $\hat{T}_2$] 2. $T\hat{S}R = \hat{M}_3$ [ext < of cyclic quad] [buite $\angle$ van KVH] 3. $\hat{T}_1 = \hat{Q}_2$ [sum of <s of $\triangle s$] [som binne $\angle e$ van $\triangle$] $\therefore \triangle RTS \parallel \triangle RQM$ [AAA] [HHH]	✓ S/R ✓ S ✓ S/R ✓ R (4)
11.3	$\frac{RT}{RQ} = \frac{TS}{QM}$ [$\triangle$'s] $RQ \times TS = QM \times RT$	✓ S/R (1)
11.4	$\frac{PQ}{QR} = \frac{PM}{MS}$ [<i>prop theorem</i> , $QM \parallel RS$] [eweredigheidstelling] $\frac{QR}{RT} = \frac{QM}{ST}$ [$\triangle$] $\frac{PQ}{QR} \times \frac{QR}{RT} = \frac{PM}{MS} \times \frac{QM}{ST}$ $\frac{PQ}{RT} = \frac{PM}{MS} \times \frac{QM}{ST} = \frac{PM}{ST} \times \frac{QM}{MS}$ $\frac{PQ}{RT} = \frac{2}{3} \times \frac{1}{2}$ $= \frac{1}{3}$	✓ S/R ✓ S ✓ substitution/vervang ✓ answer/antwoord (4)
		[10]



NCS–Marking Guideline/NSS-Nasienriglyn

		TOTAL/TOTAAL:150
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