

SA's Leading Past Year

Exam Paper Portal



You have Downloaded, yet Another Great
Resource to assist you with your Studies 😊

Thank You for Supporting SA Exam Papers

Your Leading Past Year Exam Paper Resource Portal

Visit us @ www.saexampapers.co.za



SA EXAM PAPERS

SA EXAM PAPERS

Proudly South African



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

**NATIONAL SENIOR
CERTIFICATE/*NASIONALE
SENIOR SERTIFIKAAT***

GRADE/*GRAAD 12*

**MATHEMATICS P2/*WISKUNDE P2*
MARKING GUIDELINES/*NASIENRIGLYNE*
SEPTEMBER 2025**

MARKS/*PUNTE*: 150

This marking guidelines consists of 19 pages/*Hierdie nasienriglyne bestaan uit 19 bladsye*



SA EXAM PAPERS

Proudly South African

NOTE/NOTA:

- If a candidate answers a question TWICE, only mark the FIRST attempt/ *As 'n kandidaat 'n vraag twee keer beantwoord, merk slegs die EERSTE poging.*
- Consistent Accuracy applies in all aspects of the marking guidelines/ *Konsekwente akkuraatheid is van toepassing in alle aspekte van die nasienriglyne*

QUESTION 1 / VRAAG 1																									
1.1.1	130g × 2000 = 260 000 g = 260 kg		✓answer / <i>antwoord</i>	(1)																					
1.1.2	Distributor D. The standard deviation is the smallest and the average grams per packet is the closest to 130g / <i>Verspreider D. Die standaardafwyking is die kleinste en die gemiddelde gram per pakkie is die naaste aan 130g</i>		✓D ✓reason / <i>rede</i>	(2)																					
1.1.3	Distributor A. Even when the packets are filled above the standard deviation of the mean, they do not fill it up to the recommended grams / <i>Verspreider A. Selfs wanneer die pakkies bo die standaardafwyking van die gemiddelde gevul word, vul hulle dit nie tot die aanbevole gram nie</i>		✓A ✓reason / <i>rede</i>	(2)																					
1.2.1	Range / <i>Waardeversameling</i> = 58 – 9 = 49		✓answer / <i>antwoord</i>	(1)																					
1.2.2	<table><tr><th>Interval</th><th>Frequency <i>Frekwensie</i></th><th>Cumulative Frequency <i>Kumulatiewe Frekwensie</i></th></tr><tr><td>0 < x ≤ 10</td><td>3</td><td>3</td></tr><tr><td>10 < x ≤ 20</td><td>15</td><td>18</td></tr><tr><td>20 < x ≤ 30</td><td>27</td><td>45</td></tr><tr><td>30 < x ≤ 40</td><td>45</td><td>90</td></tr><tr><td>40 < x ≤ 50</td><td>38</td><td>128</td></tr><tr><td>50 < x ≤ 60</td><td>12</td><td>140</td></tr></table>		Interval	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>	0 < x ≤ 10	3	3	10 < x ≤ 20	15	18	20 < x ≤ 30	27	45	30 < x ≤ 40	45	90	40 < x ≤ 50	38	128	50 < x ≤ 60	12	140	✓45 ✓140	(2)
Interval	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>																							
0 < x ≤ 10	3	3																							
10 < x ≤ 20	15	18																							
20 < x ≤ 30	27	45																							
30 < x ≤ 40	45	90																							
40 < x ≤ 50	38	128																							
50 < x ≤ 60	12	140																							



NSC – Marking Guidelines/Nasienriglyne

1.2.3	Fish caught in competition	✓grounding / <i>anker</i> ✓use cumulative freq / <i>gebruik kumulatiewe</i> <i>frekwensie</i> ✓shape / <i>vorm</i>	(3)
1.2.4	$60\% \times 140 = 84$ $x < 39$ [accept / <i>aanvaar</i> 37 – 39]	✓84 ✓answer / <i>antwoord</i>	(2)
			[13]
QUESTION 2 / VRAAG 2			
2.1	$\bar{x} = \frac{232}{10} = 23,2$	✓232 ✓answer / <i>antwoord</i>	(2)
2.2	$a = 19,86 \quad b = 1,22$ $y = 19,86 + 1,22x$	✓19,86 ✓1,22 ✓equation / <i>vergelyking</i>	(3)
2.3	$y = 19,86 + 1,22(29) = 55,24 \text{ min}$	✓substitute / <i>vervang</i> ✓answer / <i>antwoord</i>	(2)
			[7]

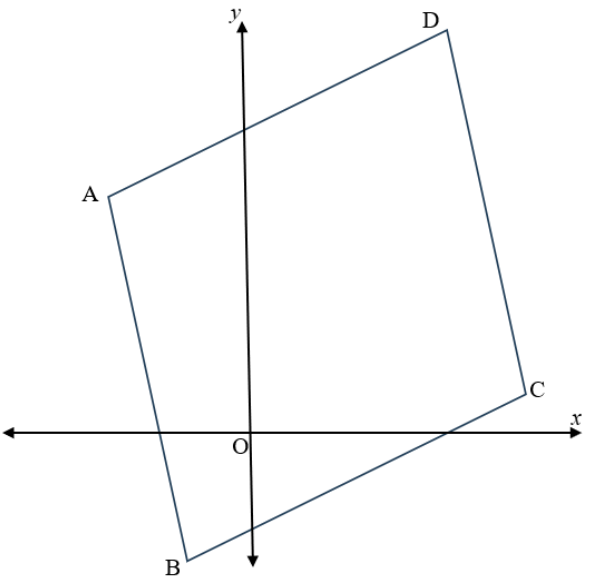


NSC – Marking Guidelines/Nasienriglyne

QUESTION 3 / VRAAG 3			
3.1.1	$PQ = \sqrt{(-3-5)^2 + (2-8)^2}$ $PQ = 10$	✓subst into formula / ✓vervang in formule ✓answer / antwoord	(2)
3.1.2	$m(PQ) = \frac{2-8}{-3-5} = \frac{3}{4}$ $\tan \theta = \frac{3}{4}$ $\theta = 36,87^\circ \approx 37^\circ$	✓gradient ✓trig ratio / trig verh ✓answer / antwoord	(3)
3.1.3	$y - y_1 = m(x - x_1)$ midpt: (1 ; 5) $m(PQ) = \frac{3}{4}$ $m(\perp \text{ line}) = -\frac{4}{3}$ $y - 5 = -\frac{4}{3}(x - 1)$ $y - 5 = -\frac{4}{3}x + \frac{4}{3}$ $y = -\frac{4}{3}x + \frac{19}{3}$	✓midpt ✓gradient of $\perp$ bisector / ✓gradiënt midloodlyn ✓subst into formula / ✓vervang in formule ✓simplify/vereenvoudig ✓answer / antwoord	(5)



NSC – Marking Guidelines/Nasienriglyne

3.2			
3.2.1	$x + 3y = 10$ $3y = -x + 10$ $y = -\frac{1}{3}x + \frac{10}{3}$ $m(AC) = -\frac{1}{3}$ $m(BD) = 3$ point / punt (3 ; 9) $y - 9 = 3(x - 3)$ $y = 3x$	$\checkmark m(AC) = -\frac{1}{3}$ $\checkmark m(BD) = 3$ $\checkmark y = 3x$	(3)
3.2.2	$y = 3x$① $x + 3y = 10$② ① in ②: $x + 3(3x) = 10$ $x + 9x = 10$ $10x = 10$ $x = 1$ Subst / vervang $x = 1$ in ①: $y = 3(1) = 3$ $K(1 ; 3)$	$\checkmark$ subst ① into ② / vervang ① in ② $\checkmark$ simplify / vereenvoudig $\checkmark x = 1$ $\checkmark y = 3$	(4)
3.2.3	$B(-1 ; -3)$	$\checkmark x$ – value / waarde $\checkmark y$ – value / waarde	(2)



NSC – Marking Guidelines/Nasienriglyne

3.2.4	$AD = 5\sqrt{2}$ and / en $x + 3y = 10$ $x = 10 - 3y$ $5\sqrt{2} = \sqrt{(x-3)^2 + (y-9)^2}$ $5\sqrt{2} = \sqrt{(10-3y-3)^2 + (y-9)^2}$ $5\sqrt{2} = \sqrt{(7-3y)^2 + (y-9)^2}$ $5\sqrt{2} = \sqrt{49 - 42y + 9y^2 + y^2 - 18y + 81}$ $50 = 10y^2 - 60y + 130$ $0 = 10y^2 - 60y + 80$ $0 = y^2 - 6y + 8$ $0 = (y-4)(y-2)$ $y = 4$ or / of $y = 2$ $x = -2$ or / of $x = 4$ $A(-2 ; 4)$ C(4 ; 2)	$\checkmark$ subst / vervang $5\sqrt{2}$ $\checkmark$ subst / vervang $x = 10 - 3y$ $\checkmark$ simplify / vereenvoudig $\checkmark$ std form / vorm $\checkmark$ factors / faktore $\checkmark$ y – values / waardes $\checkmark$ x – values / waardes	(7)
3.2.5	$A'(4 ; 4)$	$\checkmark$ y – value / waarde $\checkmark$ x – value / waarde	(2)
			[28]



QUESTION 4 / VRAAG 4			
4.1	$y - y_1 = m(x - x_1) \quad m_1 = -\frac{1}{2} \quad m_2 = 2$ Point / punt $(-4 ; 2)$ $y - 2 = 2(x + 4)$ $y = 2x + 10 \quad \dots\dots\textcircled{1}$ $y = -\frac{1}{2}x + \frac{5}{2} \quad \dots\dots\textcircled{2}$ Subst / vervang $\textcircled{1}$ in $\textcircled{2}$: $2x + 10 = -\frac{1}{2}x + \frac{5}{2}$ $4x + 20 = -x + 5$ $5x = -15$ $x = -3$ $y = 4 \quad \therefore A(-3 ; 4)$	$\checkmark m_2 = 2$ $\checkmark$ equation / vergelyking $\checkmark$ equating / gelykstel $\checkmark x$ -value / waarde $\checkmark y$ -value / waarde	(5)
4.2	$\text{rad} = \sqrt{(-4+3)^2 + (2-4)^2} = \sqrt{5}$ $(x+4)^2 + (y-2)^2 = 5$	$\checkmark \text{rad} = \sqrt{5}$ $\checkmark \text{LHS} / \text{LK} \quad \checkmark \text{RHS} / \text{RK}$	(3)
4.3	y -intercepts at 3 and 5 / y -afsnitte by 3 en 5: $R(a ; 4)$ $(x-a)^2 + (y-4)^2 = 5$ through / deur $(0 ; 3)$ $(0-a)^2 + (3-4)^2 = 5$ $a^2 + 1 = 5$ $a^2 = 4$ $a = \pm 2$ $a = 2 \quad \therefore R(2 ; 4)$	$\checkmark y$ -value / waarde = 4 $\checkmark$ subst point and / vervang punt en $y = 4$ $\checkmark$ simplify / vereenvoudig $\checkmark$ value of / waarde van a	(4)
			[12]



NSC – Marking Guidelines/Nasienriglyne

	OR / OF $\sin 50^\circ$ $= \cos 40^\circ$ $= \cos 2.20^\circ$ $= 1 - 2 \sin^2 20^\circ$ $= 1 - 2 \left(\frac{t}{\sqrt{1+t^2}} \right)^2$ $= 1 - \frac{2t^2}{1+t^2}$ $= \frac{1+t^2-2t^2}{1+t^2}$ $= \frac{1-t^2}{1+t^2}$	$\checkmark$ co-function / <i>kofunksie</i> $\checkmark \cos 2.20^\circ$ $\checkmark$ expansion / <i>uitbrei</i> $\checkmark$ subst / <i>vervang</i> $\frac{t}{\sqrt{1+t^2}}$	(4)
5.1.3	$\cos 20^\circ = 2 \cos^2 10^\circ - 1$ $\frac{1}{\sqrt{1+t^2}} = 2 \cos^2 10^\circ - 1$ $\frac{1}{\sqrt{1+t^2}} + 1 = 2 \cos^2 10^\circ$ $\frac{1}{2\sqrt{1+t^2}} + \frac{1}{2} = \cos^2 10^\circ$ $\cos 10^\circ = \sqrt{\frac{1}{2\sqrt{1+t^2}} + \frac{1}{2}}$	$\checkmark$ double angle / <i>dubbelhoek</i> $\checkmark$ substitution / <i>vervang</i> $\checkmark \cos^2 10^\circ$ the subject / <i>onderwerp</i> $\checkmark$ answer / <i>antwoord</i>	(4)



NSC – Marking Guidelines/Nasienriglyne

5.2	If: $\sin \theta = \frac{15}{17}$ $r^2 = x^2 + y^2$ $17^2 = x^2 + 15^2$ $x^2 = 64$ $x = -8$ $\therefore \tan \theta = \frac{15}{-8}$ In $\triangle PRO$: $\tan \theta = \frac{m}{-4}$ $\frac{m}{-4} = \frac{15}{-8}$ $-60 = -8m$ $m = \frac{15}{2}$ OR / OF $\sin \theta = \frac{15}{17}$ In $\triangle PRO$: $PO^2 = (-4)^2 + m^2 = 16 + m^2$ $PO = \sqrt{16 + m^2}$ $\sin \theta = \frac{m}{\sqrt{16 + m^2}}$ $\frac{m}{\sqrt{16 + m^2}} = \frac{15}{17}$ $17m = 15\sqrt{16 + m^2}$ $289m^2 = 225(16 + m^2)$ $289m^2 = 3600 + 225m^2$ $64m^2 = 3600$ $m^2 = \frac{225}{4} \quad \therefore m = \frac{15}{2}$	✓subst in / vervang in Pyth ✓ $x = -8$ with selection / met seleksie ✓tan ratio ✓equating / gelykstel ✓simplify / vereenvoudig ✓answer / antwoord (6) ✓subst / vervang in Pyth ✓ $PO = \sqrt{16 + m^2}$ ✓sin ratio ✓equating / gelykstel ✓simplify / vereenvoudig ✓answer with selection / antwoord met seleksie (6)	(6) [16]
-----	--	--	------------------------



QUESTION 6 / VRAAG 6			
6.1	$\frac{2 \cos 105^\circ \cos 15^\circ}{\cos(45^\circ - x) \cos x - \sin(45^\circ - x) \sin x}$ $= \frac{-2 \cos 75^\circ \cos 15^\circ}{\cos[(45^\circ - x) + x]}$ $= \frac{-2 \sin 15^\circ \cos 15^\circ}{\cos[45^\circ - x + x]}$ $= \frac{-\sin 30^\circ}{\cos 45^\circ}$ $= \frac{-\left(\frac{1}{2}\right)}{\left(\frac{\sqrt{2}}{2}\right)}$ $= -\frac{\sqrt{2}}{2}$	✓ cos 75° ✓ cos compound angle/ saamgestelde hoek ✓ sin double angle / dubbel hoek ✓ special values / spesiale waardes ✓ answer / antwoord	(5)
6.2	$1 - \tan x = \cos 2x$ $1 - \frac{\sin x}{\cos x} = \cos^2 x - \sin^2 x$ $\cos x - \sin x = \cos x (\cos^2 x - \sin^2 x)$ $0 = \cos x (\cos^2 x - \sin^2 x) - (\cos x - \sin x)$ $0 = \cos x (\cos x - \sin x) (\cos x + \sin x) - (\cos x - \sin x)$ But $\sin x \neq \cos x$ $\cos x (\cos x + \sin x) - 1 = 0$ $\cos^2 x + \cos x \sin x - \sin^2 x - \cos^2 x = 0$ $\cos x \sin x - \sin^2 x = 0$ $\sin x (\cos x - \sin x) = 0$ $\sin x = 0 \quad \text{of / or} \quad \cos x = \sin x$ $x = 0^\circ + k.360^\circ; k \in \mathbb{Z} \quad \text{NA}$ or / of $x = 180^\circ + k.360^\circ; k \in \mathbb{Z}$	✓ $\frac{\sin x}{\cos x}$ ✓ cos double angle / dubbel hoek ✓ grouping / groepering ✓ std form / vorm ✓ both equations / beide vergelykings ✓ $x = 0^\circ + k.360^\circ; k \in \mathbb{Z}$ $x = 180^\circ + k.360^\circ; k \in \mathbb{Z}$	(6)



NSC – Marking Guidelines/Nasienriglyne

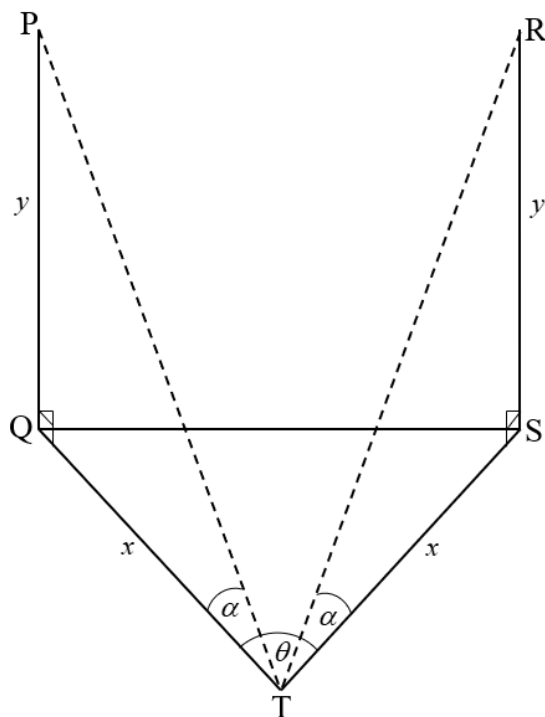
	OR /OF $1 - \tan x = \cos 2x$ $1 - \frac{\sin x}{\cos x} = \cos^2 x - \sin^2 x$ $\frac{\cos x - \sin x}{\cos x} = (\cos x - \sin x)(\cos x + \sin x)$ But $\sin x \neq \cos x$ $\frac{1}{\cos x} = (\cos x + \sin x)$ $1 = \cos x(\cos x + \sin x)$ $\cos^2 x + \cos x \sin x - \sin^2 x - \cos^2 x = 0$ $\cos x \sin x - \sin^2 x = 0$ $\sin x(\cos x - \sin x) = 0$ $\sin x = 0 \quad \text{of / or} \quad \cos x = \sin x$ $x = 0^\circ + k.360^\circ; k \in \mathbb{Z} \quad \text{NA}$ or /of $x = 180^\circ + k.360^\circ; k \in \mathbb{Z}$	$\checkmark \frac{\sin x}{\cos x}$ ✓ cos double angle / <i>dubbel hoek</i> ✓ factors / <i>faktore</i> ✓ std form / <i>vorm</i> ✓ both equations / <i>beide vergelykings</i> $\checkmark x = 0^\circ + k.360^\circ; k \in \mathbb{Z}$ $\checkmark x = 180^\circ + k.360^\circ; k \in \mathbb{Z}$	(6)
6.3	$\cos 90^\circ, \sin 30^\circ, \tan \theta$ $= 0; \frac{1}{2}; \tan \theta$ AS / RR: $T_2 - T_1 = T_3 - T_2$ $\frac{1}{2} - 0 = \tan \theta - \frac{1}{2}$ $\tan \theta = 1$ $\theta = 45^\circ$	$\checkmark \text{special angles / } \textit{spesiale hoeke}$ ✓ common diff / <i>konstante verskil</i> ✓ trig equation / <i>vergelyking</i> ✓ answer / <i>antwoord</i>	(4)
			[15]



NSC – Marking Guidelines/Nasienriglyne

QUESTION 7 / VRAAG 7			
7.1.1	$2 \cos x = \sin(x + 30^\circ)$ $2 \cos x = \sin x \cos 30^\circ + \cos x \sin 30^\circ$ $2 \cos x = \sin x \left(\frac{\sqrt{3}}{2} \right) + \cos x \left(\frac{1}{2} \right)$ $4 \cos x = \sqrt{3} \sin x + \cos x$ $3 \cos x = \sqrt{3} \sin x$	✓ expansion / <i>uitbrei</i> ✓ special values / <i>spesiale waardes</i> ✓ simplify / <i>vereenvoudig</i>	(3)
7.1.2	$2 \cos x = \sin(x + 30^\circ)$ $3 \cos x = \sqrt{3} \sin x$ $\tan x = \frac{3}{\sqrt{3}} = \sqrt{3}$ $x = 60^\circ + k \cdot 180^\circ ; k \in \mathbb{Z}$ $x = \{-120^\circ ; 60^\circ\}$	✓ change to $\tan x$ / <i>verander na $\tan x$</i> ✓ general sol / <i>algemene opl</i> ✓ -120° ✓ 60°	(4)
7.2.1		✓ x – intercept / <i>afsnit</i> ✓ y – intercept / <i>afsnit</i> ✓ shape / <i>vorm</i>	(3)
7.2.2 (a)	$x \in (-120^\circ ; 60^\circ)$	✓ interval ✓ notation / <i>notasie</i>	(2)
7.2.2 (b)	$x \in (-180^\circ ; -90^\circ]$ and / <i>en</i> $x = 0^\circ$	✓ interval ✓ notation / <i>notasie</i> ✓ $x = 0^\circ$	(3)
			[15]



QUESTION 8 / VRAAG 8

$$\text{In } \triangle PQT: \tan \alpha = \frac{y}{x}$$

$$x = \frac{y}{\tan \alpha}$$

$$\text{In } \triangle QST: QS^2 = x^2 + x^2 - 2(x)(x) \cos \theta$$

$$QS^2 = 2x^2 - 2x^2 \cos \theta$$

$$QS^2 = 2x^2 (1 - \cos \theta)$$

$$QS^2 = 2 \left(\frac{y}{\tan \alpha} \right)^2 (1 - \cos \theta)$$

$$QS^2 = \frac{2y^2 (1 - \cos \theta)}{\tan^2 \alpha}$$

✓tan ratio

✓answer / antwoord

✓subst in cos rule /
vervang in cosreël✓common factor /
gemeenskaplike faktor

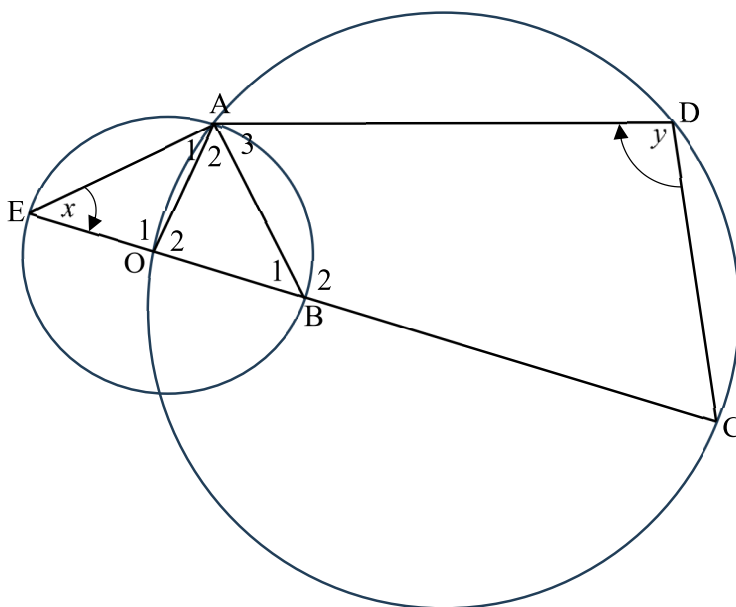
✓substitute / vervang x

(5)

[5]



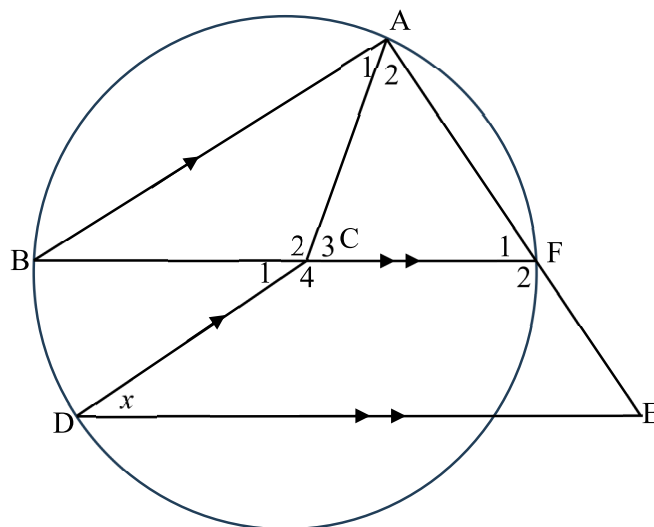
QUESTION 9 / VRAAG 9



9.1	$\hat{E} + \hat{A}_1 + \hat{A}_2 + \hat{B}_1 = 180^\circ$ int $\angle$'s of Δ / binne $\angle$ e Δ $\hat{A}_1 + \hat{A}_2 = 90^\circ$ $\angle$ in semi $\odot$ $x + 90^\circ + 35^\circ = 180^\circ$ $x = 55^\circ$	$\checkmark S$ $\checkmark S/R$ $\checkmark$ answer / <i>antwoord</i>	(3)
9.2	$\hat{O}_2 = 2\hat{E} = 110^\circ$ $\angle$ at centre = $2 \times$ circumf $\angle$ / <i>midpt</i> $\angle$ = $2 \times$ <i>omtr</i> $\angle$ $\hat{O}_2 + \hat{D} = 180^\circ$ opp $\angle$'s cyclic quad / <i>teenoorst</i> $\angle$ e <i>kvh</i> $\hat{D} = 180^\circ - 110^\circ = 70^\circ$	$\checkmark S \checkmark R$ $\checkmark S/R$ $\checkmark$ answer / <i>antwoord</i>	(4)
			[7]



NSC – Marking Guidelines/Nasienriglyne

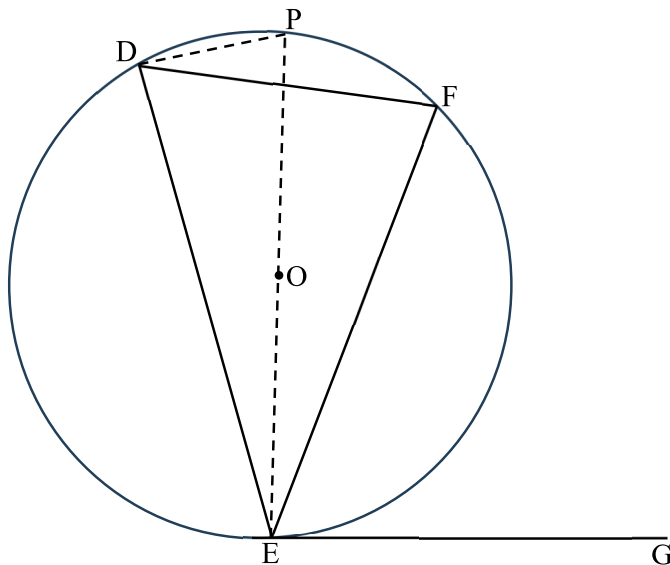
QUESTION 10 / VRAAG 10

10.1	$\hat{D} = \hat{C}_1 = x$ $\hat{C}_1 = \hat{B} = x$ $\hat{B} = \hat{A}_1 = x$	alt $\angle$'s / verw $\angle$ e $BF \parallel DE$ alt $\angle$'s / verw $\angle$ e $DC \parallel BA$ $\angle$'s opp equal sides / $\angle$ e teenoor gelyke sye	$\checkmark$ S $\checkmark$ R $\checkmark$ S/R $\checkmark$ S $\checkmark$ R	(5)
10.2	$\hat{A}_1 + \hat{A}_2 = 90^\circ$ $AB \perp AE$	$\angle$ in semi $\odot$	$\checkmark$ R	(1)
10.3	$\hat{F}_1 = 90^\circ - x$ $\hat{D} = x$ $\hat{F}_1 \neq D$ CDEF is not a cyclic quad	int $\angle$'s Δ / binne $\angle$ e Δ ext $\angle$ not equal opp int $\angle$ / buite $\angle$ nie gelyk aan teenoorst binne $\angle$ nie	$\checkmark$ S $\checkmark$ R $\checkmark$ concl / gevolgtr $\checkmark$ R	(4)
				[10]



QUESTION 11 / VRAAG 11

11.1



Draw EO produced to P on the circumference. Join PD

/ Trek EO verleng na P op die omtrek. Verbind PD

$\hat{P}EG = 90^\circ$

rad $\perp$ tan / rad $\perp$ rklyn

$\hat{E}DP = 90^\circ$

 $\angle$ in semi $\odot$

$\hat{P}EG = \hat{E}DP$

 $\angle$'s in same segment / $\angle$ e in dies segment

But $\hat{P}EF = \hat{P}DF$

$\therefore \hat{F}EG = \hat{D}$

 $\checkmark$ construction /
konstruksie $\checkmark$ S $\checkmark$ R $\checkmark$ S/R $\checkmark$ S/R

(5)



NSC – Marking Guidelines/*Nasienriglyne*[illegible]

NSC – Marking Guidelines/*Nasiénriglyne*

11.2.3	$\frac{TQ}{DQ} = \frac{PQ}{OQ}$ $TQ.OQ = PQ.DQ$ $PQ = 2PD$ $DQ = PD$ $TQ.OQ = 2PD.PD = 2PD^2$	$\Delta PTQ \parallel \Delta ODQ$ radii	$\sqrt{S} \sqrt{R}$ $\sqrt{S}$ $\sqrt{S}$ $\sqrt{\text{substitute / vervang}}$	(5)
11.2.4	$TQ.OQ = 2PD^2$ $TQ = \frac{2PD^2}{OQ}$ $PQ^2 = QT^2 + PT^2$ $\text{And } PQ = 2PD$ $\therefore (2PD)^2 = QT^2 + PT^2$ $4PD^2 = QT^2 + PT^2$ $TQ = \frac{2PD^2}{OQ} = \frac{4PD^2}{2OQ}$ $TQ = \frac{QT^2 + PT^2}{2OQ}$	From / <i>van</i> 10.2.3 Pyth Equivalent fraction / <i>ekwivalente breuke</i>	$\sqrt{S}$ $\sqrt{S/R}$ $\sqrt{S}$ $\sqrt{\text{simplify / vereenvoudig}}$ $\sqrt{S}$	(5)
				[22]

