



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

**PROVINCIAL EXAMINATION/
PROVINSIALE EKSAMEN
NOVEMBER 2021
GRADE/*GRAAD* 9
MARKING GUIDELINES/*NASIENRIGLYNE***

MATHEMATICS (PAPER 2)/*WISKUNDE (VRAESTEL 2)*

8 pages/*bladsye*

MARKING GUIDELINES
NASIENRIGLYNE
MATHEMATICS/(Paper 1)
WISKUNDE /Vraestel 2)
GRADE/GRAAD 9
QUESTION 1/VRAAG 1

1.1	1.2	1.3	1.4	1.5	
B ✓	C ✓	C ✓	D ✓	C ✓	
					[5]

QUESTION 2/VRAAG 2

2.1		Statement/Bewering	Reason/Rede	1 mark for each correct statement or reason/1 punt vir elke korrekte bewering of rede	(10)										
	2.1.1	$\hat{B}_1 = \hat{B}\hat{C}D$	corr. $\angle s$ & AB CD/ ooreenkomstige. $\angle e$ & AB CD ✓												
	2.1.2	$\hat{A}_1 + \hat{A}_2 + \hat{B}_2 = 180^\circ$ ✓	co-int. $\angle s$ & AD BC/ ko-binne $\angle e$ & AD BC												
	2.1.3	$\hat{B}_1 = \hat{A}_1 + \hat{C}_2$ ✓	ext $\angle$ of Δ /buite $\angle$ van Δ												
	2.1.4	$\hat{A}_2 = \hat{C}_2$	alt. $\angle s$ & AB CD/ verw. $\angle e$ & AB CD ✓												
	2.1.5	$\hat{D}_2 = \hat{D}_4$	Vert. opp $\angle s$ / teenoorstaande $\angle e$ ✓												
	2.1.6	$\hat{D}_2 = \hat{C}_1 + \hat{C}_2$	corr. $\angle s$ & AD BC/ ooreenkomstige $\angle e$ & AD BC ✓												
	2.1.7	$\hat{C}_1 + \hat{C}_2 + \hat{C}_3 = 180^\circ$	$\angle s$ on a straight line/ $\angle e$ op 'n reguitly ✓												
	2.1.8	$\hat{A}_1 + \hat{B}_2 + \hat{C}_2 = 180^\circ$ ✓	Sum int. $\angle s$ of Δ / som binne $\angle e$ van Δ												
	2.1.9	$\hat{D}_2 = \hat{A}$ ✓	alt. $\angle s$ & AB CD/ verw. $\angle e$ & AB CD												
	2.1.10	$\hat{A}_1 = \hat{C}_1$	alt. $\angle s$ & AB CD/ verw. $\angle e$ & AB CD / ✓												
2.2	<table><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$\hat{P}_1 = x$</td><td>vert. opp $\angle s$/ teenoorstaande $\angle e$ ✓</td></tr><tr><td>$85^\circ + \hat{P}_1 + 70^\circ = 180^\circ$</td><td>$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn. ✓</td></tr><tr><td>$\hat{P}_1 = 180^\circ - 155^\circ$</td><td></td></tr><tr><td>$\hat{P}_1 = x = 25^\circ$ ✓</td><td></td></tr></table>			Statement/Bewering	Reason/Rede	$\hat{P}_1 = x$	vert. opp $\angle s$ / teenoorstaande $\angle e$ ✓	$85^\circ + \hat{P}_1 + 70^\circ = 180^\circ$	$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn. ✓	$\hat{P}_1 = 180^\circ - 155^\circ$		$\hat{P}_1 = x = 25^\circ$ ✓		1 mark for statement & reason/1 punt vir bewering & rede 1 mark for statement & reason/1 punt vir bewering & rede 1 mark for $x = 25^\circ$ / 1 punt vir $x = 25^\circ$	(3)
Statement/Bewering	Reason/Rede														
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$\hat{P}_1 = x = 25^\circ$ ✓															

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2.3	2.3.1	<table><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$B\hat{A}C = 54^0 = \hat{E}_3$</td><td>corr. $\angle s$ & AC GEF/ ooreenkomstige $\angle e$ & AC GEF ✓</td></tr><tr><td>$\hat{E}_3 = 54^0$</td><td></td></tr><tr><td>$x = 180^0 - 54^0$</td><td>$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓</td></tr><tr><td>$x = 126^0$ ✓</td><td></td></tr><tr><td colspan="2">OR/OF</td></tr><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$B\hat{A}C = \hat{E}_2$</td><td>alt. $\angle s$ & AC GEF/ verw. $\angle e$ & AC GEF ✓</td></tr><tr><td>$\hat{E}_2 = 54^0$</td><td></td></tr><tr><td>$x = 180^0 - 54^0$</td><td>$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓</td></tr><tr><td>$x = 126^0$ ✓</td><td></td></tr></table>	Statement/Bewering	Reason/Rede	$B\hat{A}C = 54^0 = \hat{E}_3$	corr. $\angle s$ & AC GEF/ ooreenkomstige $\angle e$ & AC GEF ✓	$\hat{E}_3 = 54^0$		$x = 180^0 - 54^0$	$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓	$x = 126^0$ ✓		OR/OF		Statement/Bewering	Reason/Rede	$B\hat{A}C = \hat{E}_2$	alt. $\angle s$ & AC GEF/ verw. $\angle e$ & AC GEF ✓	$\hat{E}_2 = 54^0$		$x = 180^0 - 54^0$	$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓	$x = 126^0$ ✓		1 mark for statement & reason/1 punt vir bewering & rede 1 mark for statement & reason/1 punt vir bewering & rede 1 mark for $x = 126^0$ / 1 punt vir $x = 126^0$	(3)												
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Statement/Bewering	Reason/Rede		
$\hat{C}_1 + 63^\circ + 54^\circ = 180^\circ$	Sum of $\angle$ s of $\frac{\Delta}{\text{som}}$ binne $\angle$ e van Δ ✓		
$\hat{C}_1 = 180^\circ - 63^\circ - 54^\circ$			
$\hat{C}_1 = 63^\circ$			
$\hat{C}_1 = y$	Alt. $\angle$ s & AC $\parallel$ GEF/ verw. $\angle$ e & AC $\parallel$ GEF ✓		
$y = 63^\circ$ ✓			(3)
			[19]

QUESTION 3/VRAAG 3

3.1	<table> <tr> <th>Statement/Bewering</th> <th>Reason/Rede</th> </tr> <tr> <td>$\hat{C} = 40^\circ \checkmark$</td> <td></td> </tr> <tr> <td>$\hat{B}_2 = \hat{F}_3 \checkmark$</td> <td></td> </tr> <tr> <td>$2\hat{F}_3 + 40^\circ = 180^\circ$</td> <td>Sum int. $\angle$s of Δ/ som binne $\angle$e van $\Delta \checkmark$</td> </tr> <tr> <td>$\therefore \hat{F}_3 = 70^\circ \checkmark$</td> <td></td> </tr> <tr> <td>But $\hat{F}_3 = \hat{B}_1 \checkmark$</td> <td></td> </tr> <tr> <td>and $\hat{B}_1 = \hat{E}_2$</td> <td>$\angle$s opp. equal sides / $\angle$e teenoor gelyke sye $\checkmark$</td> </tr> <tr> <td>$\hat{F}_2 = 180^\circ - \hat{B}_1 - \hat{E}_2$</td> <td>Sum int. $\angle$s of Δ/ som binne $\angle$e van $\Delta \checkmark$</td> </tr> <tr> <td>$\hat{F}_2 = 180^\circ - 140^\circ$</td> <td></td> </tr> <tr> <td>$\hat{F}_2 = 40^\circ \checkmark$</td> <td></td> </tr> </table>	Statement/Bewering	Reason/Rede	$\hat{C} = 40^\circ \checkmark$		$\hat{B}_2 = \hat{F}_3 \checkmark$		$2\hat{F}_3 + 40^\circ = 180^\circ$	Sum int. $\angle$ s of Δ / som binne $\angle$ e van $\Delta \checkmark$	$\therefore \hat{F}_3 = 70^\circ \checkmark$		But $\hat{F}_3 = \hat{B}_1 \checkmark$		and $\hat{B}_1 = \hat{E}_2$	$\angle$ s opp. equal sides / $\angle$ e teenoor gelyke sye $\checkmark$	$\hat{F}_2 = 180^\circ - \hat{B}_1 - \hat{E}_2$	Sum int. $\angle$ s of Δ / som binne $\angle$ e van $\Delta \checkmark$	$\hat{F}_2 = 180^\circ - 140^\circ$		$\hat{F}_2 = 40^\circ \checkmark$		1 mark for statement/ 1 punt vir bewering 1 mark for statement/ 1 punt vir bewering 1 mark for reason/ 1 punt vir rede 1 mark for $\hat{F}_3 = 70^\circ$/ 1 punt vir $\hat{F}_3 = 70^\circ$ 1 mark for statement/ 1 punt vir bewering 1 mark for statement & reason/ 1 punt vir bewering & rede 1 mark for reason/ 1 punt vir rede 1 mark for answer/1 punt vir antwoord	(8)
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3.2	3.2.1	Kite/Vlieër ✓ 2 pairs of equal adj. sides/2 pare aangrensende sye is gelyk ✓	1 mark for answer/ 1 punt vir antwoord 1 mark for reason/ 1 punt vir rede	(2)														
	3.2.2	<table><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>AB = AD</td><td>Given/Gegee ✓</td></tr><tr><td>BC = DC</td><td>Given/Gegee ✓</td></tr><tr><td>AC = AC</td><td>Common side/gemene sy ✓</td></tr><tr><td>ΔABC ≡ ΔADC</td><td>sss ✓</td></tr></table>	Statement/Bewering	Reason/Rede	AB = AD	Given/Gegee ✓	BC = DC	Given/Gegee ✓	AC = AC	Common side/gemene sy ✓	ΔABC ≡ ΔADC	sss ✓	1 mark for statement and reason/1 punt vir bewering & rede 1 mark for statement and reason/1 punt vir bewering & rede 1 mark for statement and reason/1 punt vir bewering & rede 1 mark for statement and reason/1 punt vir bewering & rede	(4)				
Statement/Bewering	Reason/Rede																	
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ΔABC ≡ ΔADC	sss ✓																	
	3.2.3	<table><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$\hat{C}_2 = A_1 + \hat{B}$ ✓</td><td>Ext ∠ of Δ/buite ∠ van Δ</td></tr><tr><td>$\hat{C}_3 = A_2 + \hat{D}$ ✓</td><td>Ext ∠ of Δ/buite ∠ van Δ</td></tr><tr><td>but $\hat{A}_1 = A_2$</td><td>corr. ∠s ≡ Δs/ ooreenkomstige. ∠e ≡ Δe</td></tr><tr><td>and $\hat{B} = \hat{D}$</td><td>corr. ∠s ≡ Δs/ ooreenkomstige. ∠e ≡ Δe</td></tr><tr><td>$\therefore \hat{A}_1 + \hat{B} = A_2 + \hat{D}$ ✓</td><td></td></tr><tr><td>$\therefore \hat{C}_2 = \hat{C}_3$ ✓</td><td></td></tr></table>	Statement/Bewering	Reason/Rede	$\hat{C}_2 = A_1 + \hat{B}$ ✓	Ext ∠ of Δ/buite ∠ van Δ	$\hat{C}_3 = A_2 + \hat{D}$ ✓	Ext ∠ of Δ/buite ∠ van Δ	but $\hat{A}_1 = A_2$	corr. ∠s ≡ Δs/ ooreenkomstige. ∠e ≡ Δe	and $\hat{B} = \hat{D}$	corr. ∠s ≡ Δs/ ooreenkomstige. ∠e ≡ Δe	$\therefore \hat{A}_1 + \hat{B} = A_2 + \hat{D}$ ✓		$\therefore \hat{C}_2 = \hat{C}_3$ ✓		1 mark for statement/ 1 punt vir bewering 1 mark for statement/ 1 punt vir bewering 1 mark for reasoning/ 1 punt vir redenasie 1 mark for correct conclusion/1 punt vir korrekte gevolgtrekking	(4)
Statement/Bewering	Reason/Rede																	
$\hat{C}_2 = A_1 + \hat{B}$ ✓	Ext ∠ of Δ/buite ∠ van Δ																	
$\hat{C}_3 = A_2 + \hat{D}$ ✓	Ext ∠ of Δ/buite ∠ van Δ																	
but $\hat{A}_1 = A_2$	corr. ∠s ≡ Δs/ ooreenkomstige. ∠e ≡ Δe																	
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$\therefore \hat{A}_1 + \hat{B} = A_2 + \hat{D}$ ✓																		
$\therefore \hat{C}_2 = \hat{C}_3$ ✓																		
3.3	3.3.1	Triangles must be equiangular/all 3 corr. pairs of ∠s equal/Driehoeke moet gelykhoekig wees/al 3 pare ooreenkomstige ∠e gelyk ✓ Sides must be proportional/Sye moet in verhouding wees (proporsioneel) ✓	1 mark for =∠s/ 1 punt vir =∠e 1 mark for proportional sides/ 1 punt vir proporsionele sye	(2)														

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3.3.2	Statement/Bewering	Reason/Rede	1 mark for statement/1 punt vir bewering 1 mark for substitution/1 punt vir vervanging 1 mark for answer/1 punt vir antwoord 1 mark for statement/1 punt vir bewering 1 mark for statement & reason/ 1 punt vir bewering & rede	(5)
	$\hat{Y} = \hat{Z} \checkmark$	$\angle$ s opp. equal sides/ $\angle$ e teenoor gelyke sye		
	$2\hat{Y} = 180^\circ - 48^\circ \checkmark$	Sum int. $\angle$ s of Δ /Som binne $\angle$ e van Δ		
	$2\hat{Y} = 132^\circ$			
	$\therefore \hat{Y} = 66^\circ \checkmark$			
	In $\triangle DEF$ and $\triangle XYZ$:			
	$\hat{D} = \hat{X}$ $\hat{E} = \hat{Y} \checkmark$ $\hat{F} = \hat{Z}$	Proved by calculation/ Bewys deur berekening		
	$\therefore \triangle DEF \equiv \triangle XYZ$	$\angle\angle\angle \checkmark$		
				[25]

QUESTION 4/VRAAG 4

4.1	4.1.1	$A(5; 5) \checkmark$	1 mark for answer/1 punt vir antwoord	(1)
	4.1.2	Horizontal 11 units to the left/ Horisontaal 11 eenhede na links $\checkmark$ Vertical 3 units down/ Vertikaal 3 eenhede afwaarts $\checkmark$	1 mark for horizontal shift/1 punt vir horisontale skuif 1 mark for vertical shift/1 punt vir vertikale skuif	(2)
	4.1.3	$B'(-5; -8) \checkmark$	1 mark for answer/1 punt vir antwoord	(2)
	4.1.4	Reflection in the x-axis/ Refleksie in die x-as $\checkmark\checkmark$	1 mark for reflection/1 punt vir refleksie 1 mark for x-axis/1 punt vir x-as	(2)
				[6]

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QUESTION 5/VRAAG 5

5.1	5.1.1	In $\triangle TAD$: $AD = 12 \text{ cm} \checkmark$ $TD = CT - DC$ $= 25 \text{ cm} - 20 \text{ cm}$ $= 5 \text{ cm} \checkmark$ $AT^2 = AD^2 + TD^2 \checkmark$ $= (12 \text{ cm})^2 + (5 \text{ cm})^2 \checkmark$ $= 144 \text{ cm}^2 + 25 \text{ cm}^2 \checkmark$ $= 169 \text{ cm}^2$ $AT = 13 \text{ cm} \checkmark$	1 mark for $AD = 12 \text{ cm}/$ 1 punt vir $AD = 12 \text{ cm}$ 1 mark for $TD = 5 \text{ cm}/$ 1 punt vir $TD = 5 \text{ cm}$ 1 mark for formula/1punt vir formule 1 mark for substitution/ 1 punt vir vervanging 1 mark for squaring/1 punt vir vierkante 1 mark for answer/1 punt vir antwoord	(6)
	5.1.2	$P = AB + BC + CT + AT$ $= 20 \text{ cm} + 12 \text{ cm} + 25 \text{ cm} + 13 \text{ cm} \checkmark$ $= 70 \text{ cm} \checkmark$	1 mark for adding sides/1 punt vir bymekaartel van sye 1 mark for answer/1 punt vir antwoord	(2)
5.2		Side of the square/Sy van vierkant $20 \text{ cm} \checkmark$ Diagonal of the square/Hoeklyn van vierkant $= 28.28 \text{ cm}$ theorem of Pythagoras/stelling van Pythagoras $\checkmark$ Radius of the circle/radius van sirkel $= 14.14 \text{ cm} \checkmark$ Area of circle/Oppervlakte van sirkel $= \pi r^2 \checkmark$ $= 3.14 \times (14.14 \text{ cm})^2 \checkmark$ $= 627.81 \text{ cm}^2 \checkmark$	1 mark for side $= 20 \text{ cm}/$ 1 punt vir sy $= 20 \text{ cm}$ 1 mark for diagonal $= 28.28 \text{ cm}/$ 1 punt vir hoeklyn $= 28.28 \text{ cm}$ 1 mark for radius $= 14.14 \text{ cm}/$ 1 punt vir radius $= 14.14 \text{ cm}$ 1 mark for formula/1 punt vir formule 1 mark for substitution/ 1 punt vir vervanging 1 mark for answer/1 punt vir antwoord	(6)
5.3		$SA = 2(lb + bH + lH) \checkmark$ $= 2(35 \text{ mm} \times 20 \text{ mm} + 20 \text{ mm} \times 55 \text{ mm} + 35 \text{ mm} \times 55 \text{ mm}) \checkmark$ $= 2(700 \text{ mm}^2 + 1100 \text{ mm}^2 + 1925 \text{ mm}^2)$ $= 2(3725 \text{ mm}^2)$ $= 7450 \text{ mm}^2 \checkmark$	1 mark for formula/1 punt vir formule 1 mark for substitution/ 1 punt vir vervanging 1 mark for answer/1 punt vir antwoord	(3)
5.4		$V = l^3 \checkmark$ $= (13.5 \text{ cm})^3 \checkmark$ $= 2460.4 \text{ cm}^3 \checkmark$	1 mark for formula/1 punt vir formule 1 mark for substitution/ 1 punt vir vervanging 1 mark for answer/1 punt vir antwoord	(3)
				[20]
TOTAL/TOTAAL:				75