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*

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

2.3 2.3.1

Statement/*Bewering*	**Reason/*Rede***
$B\hat{A}C = 54^0 = \hat{E}_3$	corr. $\angle s$ & AC ll GEF/ *ooreenkomstige* $\angle e$*& AC ll GEF* ✓
$\hat{E}_3 = 54°$	
$x = 180° - 54°$	$\angle s$ on a straight line/ $\angle e$ *op 'n reguit lyn* ✓
$x = 126°$ ✓	
OR/*OF*	
Statement/*Bewering*	**Reason/*Rede***
$B\hat{A}C = \hat{E}_2$	alt. $\angle s$ & AC ll GEF/ *verw.*$\angle e$*& AC ll GEF* ✓
$\hat{E}_2 = 54°$	
$x = 180° - 54°$	$\angle s$ on a straight line/ $\angle e$ *op 'n reguit lyn* ✓
$x = 126°$ ✓	

1 mark for statement & reason/*1 punt vir bewering & rede*
1 mark for statement & reason/*1 punt vir bewering & rede*
1 mark for $x = 126°$/ *1 punt vir* $x = 126°$

(3)

2.3.2

Statement/*Bewering*	**Reason/*Rede***
$\hat{B}_1 = 63°$	Vert. opp $\angle s$/ *teenoorstaande* $\angle e$ ✓
$x = 63° + y$	Ext $\angle$ of Δ/ *buite* $\angle$ *van* Δ ✓
$y = 126° - 63° = 63°$ ✓	
OR/*OF*	
Statement/*Bewering*	**Reason/*Rede***
$\hat{B}_1 = 63°$	Vert. opp $\angle s$/ *teenoorstaande* $\angle e$ ✓
$\hat{E}_1 = 63° + y$	Ext $\angle$ of Δ/ *buite* $\angle$ *van* Δ ✓
$y = 126° - 63° = 63°$ ✓	
OR/*OF*	
Statement/*Bewering*	**Reason/*Rede***
$\hat{B}_1 = 63°$	Vert. opp $\angle s$/ *teenoorstaande* $\angle e$ ✓
$y + \hat{B}_1 + \hat{E}_2 = 180°$	Sum of $\angle s$ of Δ/ *som binne* $\angle e$ *van* Δ
$y + 63° + 54° = 180°$ ✓	
$y = 180° - 63° - 54°$	
$y = 63°$ ✓	
OR/*OF*	

1 mark for statement & reason/*1 punt vir bewering & rede*
1 mark for statement & reason/*1 punt vir bewering & rede*
1 mark for $y = 63°$/ *1 punt vir* $y = 63°$

Statement/*Bewering*	Reason/*Rede*
$\hat{C}_1 + 63° + 54° = 180°$	Sum of $\angle s$ of $\frac{\Delta}{Som}$ *binne* $\angle e$ *van* Δ ✓
$\hat{C}_1 = 180° - 63° - 54°$	
$\hat{C}_1 = 63°$	
$\hat{C}_1 = y$	Alt. $\angle s$ & AC ll GEF/ *verw.* $\angle e$ & AC ll GEF ✓
$y = 63°$ ✓	

(3)

[19]

QUESTION 3/*VRAAG 3*

3.1

Statement/*Bewering*	Reason/*Rede*
$\hat{C} = 40$ ✓	
$\hat{B}_2 = \hat{F}_3$ ✓	
$2\hat{F}_3 + 40° = 180°$	Sum int. $\angle s$ of Δ/ *som binne* $\angle e$ *van* Δ ✓
$\therefore \hat{F}_3 = 70°$ ✓	
But $\hat{F}_3 = \hat{B}_1$ ✓	
and $\hat{B}_1 = \hat{E}_2$	$\angle s$ opp. equal sides / *$\angle e$ teenoor gelyke sye*✓
$\hat{F}_2 = 180° - \hat{B}_1 - \hat{E}_2$	Sum int. $\angle s$ of Δ/ *som binne* $\angle e$ *van* Δ✓
$\hat{F}_2 = 180° - 140°$ $\hat{F}_2 = 40°$ ✓	

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 $\hat{F}_3 = 70°$/ *1 punt vir* $\hat{F}_3 = 70°$
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)

<table>
<tr><td>3.2</td><td>3.2.1</td><td>Kite/Vlieër ✓
2 pairs of equal adj. sides/2 pare aangrensende sye is gelyk ✓</td><td>1 mark for answer/
1 punt vir antwoord
1 mark for reason/
1 punt vir rede</td><td>(2)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>3.2.2</td><td><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></td><td>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</td><td>(4)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>3.2.3</td><td><table><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$\hat{C}_2 = A_1 + \widehat{B}$ ✓</td><td>Ext ∠ of Δ/buite ∠ van Δ</td></tr><tr><td>$\hat{C}_3 = A_2 + \widehat{D}$ ✓</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 $\hat{B} = \widehat{D}$</td><td>corr. ∠s ≡ Δs/
ooreenkomstige. ∠e ≡ Δe</td></tr><tr><td>$\therefore \hat{A}_1 + \hat{B} = A_2 + \widehat{D}$ ✓</td><td></td></tr><tr><td>$\therefore \hat{C}_2 = \hat{C}_3$ ✓</td><td></td></tr></table></td><td>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</td><td>(4)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3.3</td><td>3.3.1</td><td>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) ✓</td><td>1 mark for =∠s/
1 punt vir =∠e
1 mark for proportional sides/
1 punt vir proporsionele sye</td><td>(2)</td></tr>
</table>

	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)
				[25]

$\hat{Y} = \hat{Z}$ ✓	$\angle s$ opp. equal sides/$\angle$e *teenoor gelyke sye*
$2\hat{Y} = 180° - 48°$ ✓	Sum int. $\angle s$ of Δ/*Som binne* $\angle e$ *van* Δ
$2\hat{Y} = 132°$	
$\therefore \hat{Y} = 66°$ ✓	
In ΔDEF and ΔXYZ:	
$\hat{D} = \hat{X}$ $\hat{E} = \hat{Y}$ ✓ $\hat{F} = \hat{Z}$	Proved by calculation/ *Bewys deur berekening*
∴ ΔDEF ||| ΔXYZ	$\angle\angle\angle$ ✓

QUESTION 4/*VRAAG 4*

4.1	4.1.1	A(5 ; 5) ✓	1 mark for answer/*1 punt vir antwoord*	(1)
	4.1.2	Horizontal 11 units to the left/ *Horisontaal 11 eenhede na links* ✓ Vertical 3 units down/ *Vertikaal 3 eenhede afwaarts* ✓	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) ✓	1 mark for answer/*1 punt vir antwoord*	(2)
	4.1.4	Reflection in the x-axis/ *Refleksie in die x-as* ✓✓	1 mark for reflection/*1 punt vir refleksie* 1 mark for x-axis/1 *punt vir x-as*	(2)
				[6]

QUESTION 5/*VRAAG 5*

5.1	5.1.1	In ΔTAD: AD = 12 cm ✓ TD = CT- DC $= 25\ cm - 20\ cm$ $= 5\ cm$ ✓ $AT^2 = AD^2 + TD^2$ ✓ $= (12\ cm)^2 + (5\ cm)^2$ ✓ $= 144\ cm^2 + 25\ cm^2$ ✓ $= 169\ cm^2$ AT $= 13\ cm$ ✓	1 mark for $AD = 12\ cm$/ *1 punt vir* $AD = 12\ cm$ 1 mark for $TD = 5\ cm$/ *1 punt vir* $TD = 5\ cm$ 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 $= 20\ cm + 12\ cm + 25\ cm +$ $13\ cm$ ✓ $= 70\ cm$ ✓	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* $20\ cm$ ✓ Diagonal of the square/*Hoeklyn van vierkant* = $28.28\ cm$ theorem of Pythagoras/*stelling van Pythagoras* ✓ Radius of the circle/*radius van sirkel* = $14{,}14\ cm$ ✓ Area of circle/*Oppervlakte van sirkel* $= \pi r^2$ ✓ $= 3{,}14 \times (14{,}14\ cm)^2$ ✓ $= 627{,}81\ cm^2$ ✓		1 mark for side = $20\ cm$/ *1 punt vir sy=20 cm* 1 mark for diagonal = $28{,}28\ cm$/ *1 punt vir hoeklyn=28,28 cm* 1 mark for radius = $14{,}14\ cm$/ *1 punt vir radius=14,14 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 $= 2(lb + bH + lH)$ ✓ $= 2(35\ mm \times 20\ mm + 20\ mm \times 55\ mm + 35\ mm \times 55\ mm)$ ✓ $= 2(700\ mm^2 + 1100\ mm^2 + 1925\ mm^2)$ $= 2(3725\ mm^2)$ $= 7450\ mm^2$ ✓		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 $= l^3$ ✓ $= (13{,}5\ cm)^3$ ✓ $= 2\ 460{,}4\ cm^3$ ✓		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**