



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENGSE DEPARTEMENT VAN ONDERWYS
PROVINSIALE EKSAMEN
NOVEMBER 2021

GRAAD 9

WISKUNDE
(VRAESTEL 2)

NAAM VAN LEERDER: _____

GRAAD: _____

TYD: 1½ uur

PUNTE: 75

14 bladsye

INSTRUKSIES EN INLIGTING

1. Beantwoord AL die vrae in die spasies wat voorsien is in die vraestel.
2. Vraag 1 bestaan uit 5 meervoudige-keuse vrae. Omkring die letter langs die korrekte antwoord.
3. Antwoord vrae 2 tot 5 in die spasies wat voorsien is.
4. Wys duidelik alle berekeninge, diagramme en grafieke wat gebruik is om die vrae te antwoord. Slegs antwoorde sal nie noodwendig volpunte verdien nie.
5. Diagramme is nie noodwendig volgens skaal geteken nie. Redes MOET altyd gegee word vir elke bewering wat gemaak word wanneer meetkunde vrae beantwoord word.
6. Die onderwyser sal jou deur die oefenvrae lei voordat jy met die toets begin.
7. 'n Goedgekeurde wetenskaplike sakrekenaar (nie-programmeerbaar en nie-grafies) mag gebruik word, tensy anders vermeld.
8. Skryf netjies en leesbaar.

OEFEENVRAAG

Omkring die letter langs die korrekte antwoord.

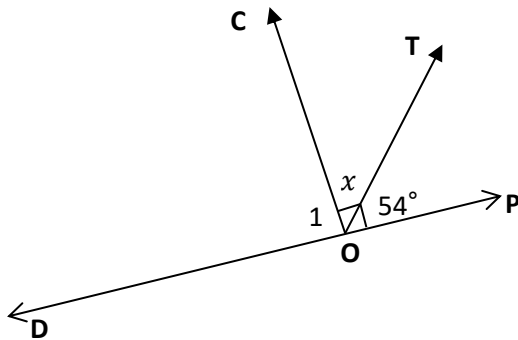
1. Voltooi: $\hat{A}$ is 'n stomphoek, omdat ...
A $0^\circ < \hat{A} < 90^\circ$
B $180^\circ < \hat{A} < 360^\circ$
☒ C $90^\circ < \hat{A} < 180^\circ$
D $\hat{A} = 180^\circ$

Jy het dit reg gedoen as jy C omkring het.

VRAAG 1

Omkring die letter langs die korrekte antwoord.

1.1



Voltooi: Die grootte van $x = \dots$

- A 54°
- B 36°
- C 136°
- D 90°

(1)

1.2

In $\triangle ABC$, $AB = BC$ en $\hat{B} = 97^\circ$

Voltooi: $\triangle ABC$ is ...

- A 'n skerphoekige gelykbenige driehoek.
- B 'n gelyksydige driehoek.
- C 'n stomphoekige gelykbenige driehoek.
- D 'n ongelyksydige driehoek.

(1)

1.3

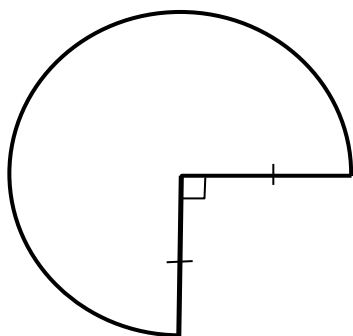
Gegee: $\hat{A} = 36^\circ$ en $\hat{K} = 54^\circ$

Voltooi: $\hat{K}$ is ...

- A die supplement van $\hat{A}$.
- B 'n ooreenkomstige hoek van $\hat{A}$.
- C die komplement van $\hat{A}$.
- D 'n ko-binnehoek van $\hat{A}$.

(1)

- 1.4 Gegee: Driekwart van 'n sirkel met 'n radius van 6 cm.



Die omtrek van die sirkel is ...

A $\frac{3 \times \pi \times (6 \text{ cm})^2}{4}$

B $\frac{4 \times \pi \times 12 \text{ cm}}{3}$

C $\frac{4 \times \pi \times (6 \text{ cm})^2}{3}$

D $\frac{3 \times \pi \times 12 \text{ cm}}{4}$

(1)

- 1.5 Die koördinate van die afbeelding van A (2 ; -3) onder die translasië $(x ; y) \rightarrow (x ; y - 3)$ is ...

A (-1 ; 0)

B (2 ; 0)

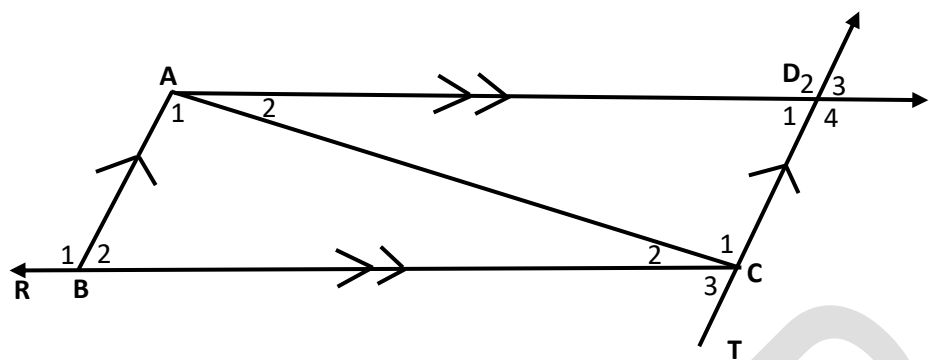
C (2 ; -6)

D (-1 ; -6)

(1)
[5]

VRAAG 2

2.1

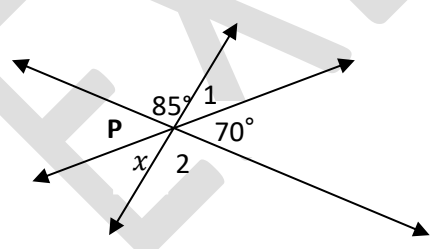


Vul die ontbrekende inligting in om die bewering of rede te voltooi.

	Bewering	Rede
2.1.1	$\hat{B}_1 = \hat{B}\hat{C}\hat{D}$	_____
2.1.2	$\hat{A}_1 + \hat{A}_2 + \hat{B}_2 =$ _____	ko-binne. $\angle e$ en $AD \parallel BC$
2.1.3	$\hat{B}_1 =$ _____	buite $\angle$ van Δ
2.1.4	$\hat{A}_2 = \hat{C}_2$	_____
2.1.5	$\hat{D}_2 = \hat{D}_4$	_____
2.1.6	$\hat{D}_2 = \hat{C}_1 + \hat{C}_2$	_____
2.1.7	$\hat{C}_1 + \hat{C}_2 + \hat{C}_3 = 180^\circ$	_____
2.1.8	$\hat{A}_1 + \hat{B}_2 + \hat{C}_2 =$ _____	som van binne $\angle e$ van Δ
2.1.9	$\hat{D}_2 =$ _____	verw. $\angle e$ en $AB \parallel DC$
2.1.10	$\hat{A}_1 = \hat{C}_1$	_____

(10)

2.2



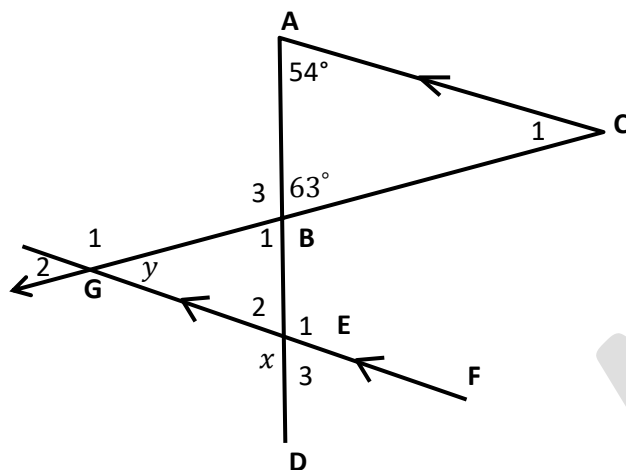
Bereken, met redes, die grootte van x .

Bewering	Rede

(3)

b.o.

- 2.3 $\triangle ABC$ met AB verleng na D en CB verleng na G, GF sny AD by E, $\widehat{BAC} = 54^\circ$, $\widehat{ABC} = 63^\circ$, $\widehat{DEF} = x$ en $\widehat{BGE} = y$.



- 2.3.1 Bereken, met redes, die grootte van x .

Bewering	Rede

(3)

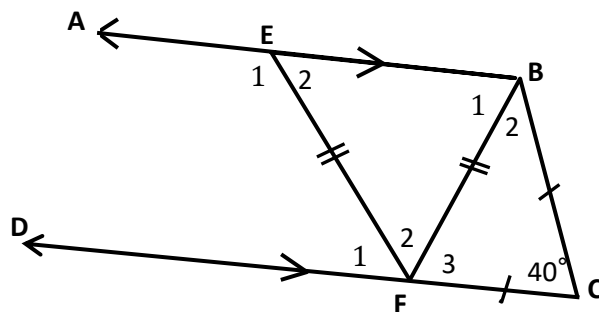
- 2.3.2 Bereken, met redes, die grootte van y .

Bewering	Rede

(3)
[19]

VRAAG 3

3.1 Gegee: $AB \parallel DC$, $BC = FC$, $EF = BF$ en $\hat{C} = 40^\circ$



Voltooi die tabel en bereken vervolgens, met redes, die grootte van $\hat{F}_2$

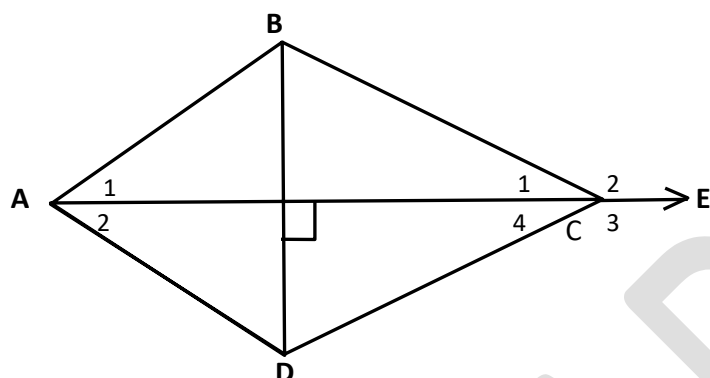
Bewering	Rede
$\hat{C} =$ _____	Gegee
$\hat{B}_2 =$ _____	$\angle$ e teenoor gelyke sye
$2\hat{F}_3 + 40^\circ = 180^\circ$	_____
$2\hat{F}_3 =$ _____	

$\therefore \hat{F}_3 =$ _____	
Maar $\hat{F}_3 =$ _____	verw. $\angle$ e en $AB \parallel DC$
en $\hat{B}_1 =$ _____	_____
$\hat{F}_2 + \hat{B}_1 + \hat{E}_2 = 180^\circ$	_____

$\therefore \hat{F}_2 =$ _____	

(8)

3.2 Gegee $AB = AD$ en $BC = DC$.



3.2.1 Watter tipe vierhoek is ABCD? Noem een eienskap om jou antwoord te regverdig.

(2)

3.2.2 Bewys dat $\triangle ABC \equiv \triangle ADC$.

Bewering	Rede
$AB =$ _____	_____
$BC =$ _____	_____
$AC =$ _____	_____
$\therefore \triangle ABC \equiv$ _____	_____

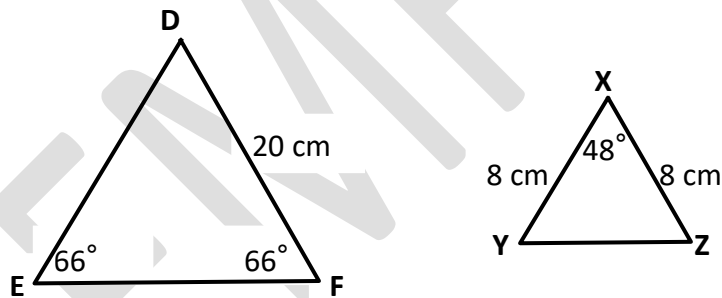
(4)

3.2.3 Vervolgens, bewys dat $\hat{C}_2 = \hat{C}_3$.

Bewering	Rede
$\hat{C}_2 =$ _____	buite $\angle$ van Δ
$\hat{C}_3 =$ _____	buite $\angle$ van Δ
maar $\hat{A}_1 =$ _____	$\angle e$ van $\equiv \Delta e$
en $\hat{B} =$ _____	$\angle e$ van $\equiv \Delta e$
$\therefore \hat{A}_1 + \hat{B} =$ _____	
$\therefore \hat{C}_2 =$ _____	

(4)

3.3 Gegee: ΔDEF met $DE = DF = 20 \text{ cm}$, $\hat{E} = \hat{F} = 66^\circ$ en ΔXYZ met $XY = XZ = 8 \text{ cm}$ en $\hat{X} = 48^\circ$



3.3.1 Skryf TWEE voorwaardes neer vir driehoeke om gelykvormig te wees.

(2)

3.3.2 Vervolgens, bewys dat $\triangle DEF \parallel \triangle XYZ$

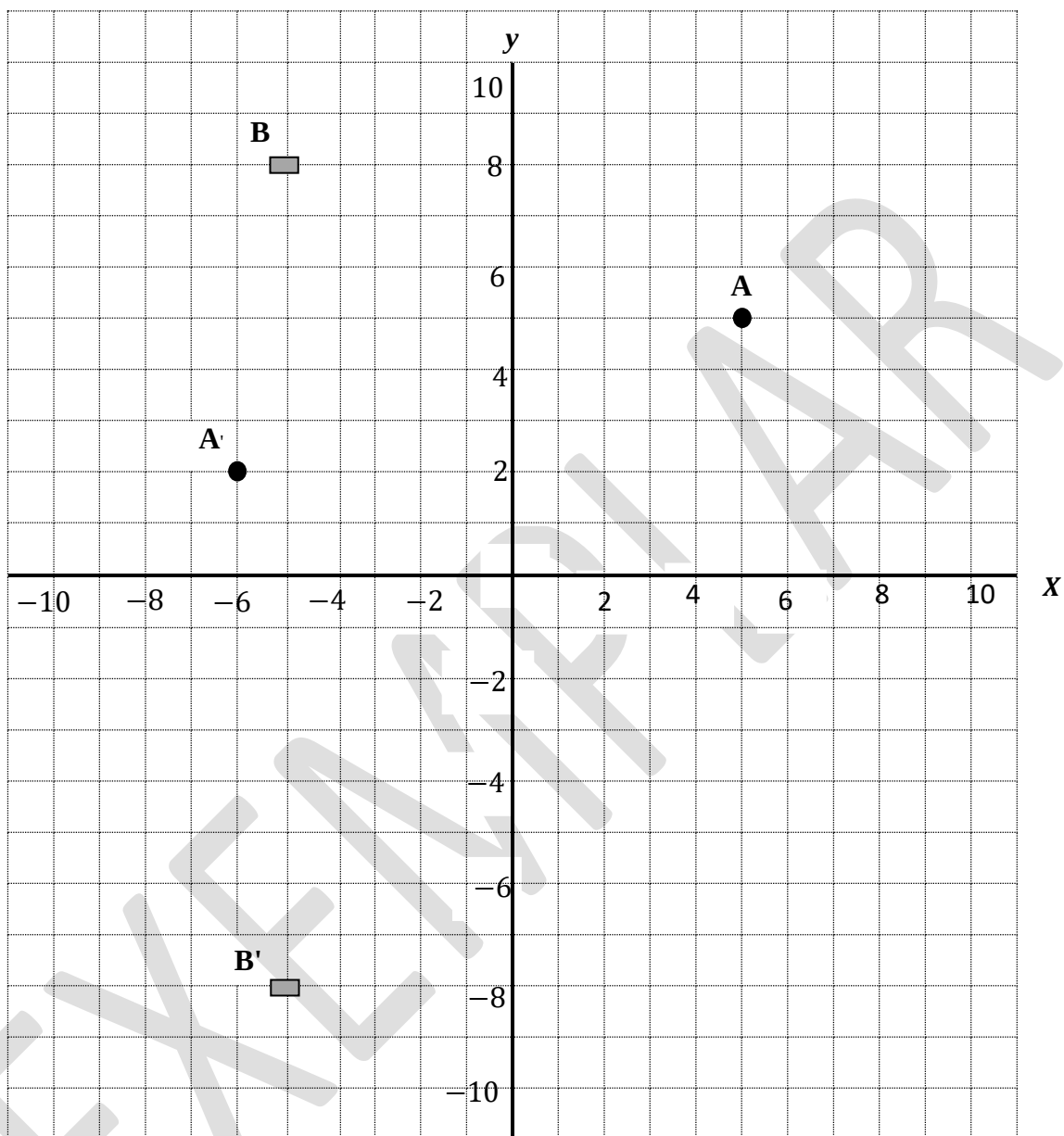
Bewering	Rede
$\hat{Y} = \underline{\hspace{2cm}}$	$\angle e$ teenoor gelyke sye
$2\hat{Y} = \underline{\hspace{2cm}}$	som van binne $\angle e$ van 'n Δ
$\underline{\hspace{2cm}}$	
$\therefore \hat{Y} = \underline{\hspace{2cm}}$	
In $\triangle DEF$ en $\triangle XYZ$:	
$\hat{D} = \underline{\hspace{1cm}},$	Deur berekening
$\hat{E} = \underline{\hspace{1cm}},$	
$\hat{F} = \underline{\hspace{1cm}}$	
$\therefore \triangle DEF \parallel \underline{\hspace{2cm}}$	$\underline{\hspace{2cm}}$

(5)
[25]

EXEMPLAR

VRAAG 4

4.1 Die diagram hieronder wys die translasie van voorwerpe **A** en **B** in die Cartesiese vlak.



4.1.1 Skryf die koördinate van voorwerp **A** neer.

$$A(x; y) = (_ ; _)$$

(1)

4.1.2 Beskryf in jou eie woorde die translasie van voorwerp **A** na sy afbeelding **A'**.

(2)

4.1.3 Skryf die koördinate van die afbeelding van **B** neer.

$B' (__ ; __)$
(1)

4.1.4 Beskryf in jou eie woorde die translasie van voorwerp **B** na sy afbeelding B'.

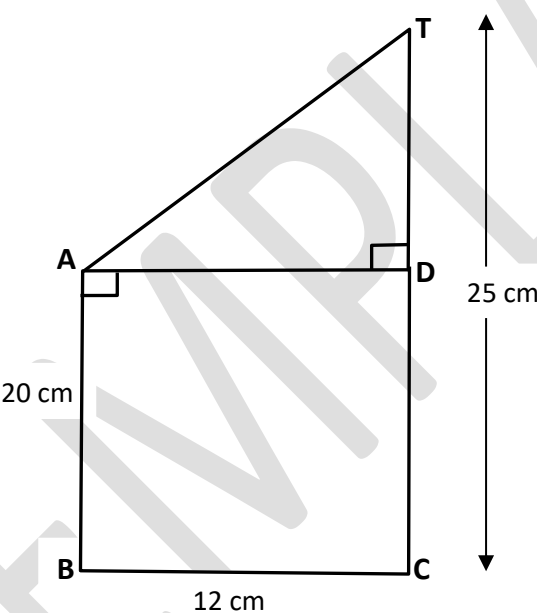
(2)

[6]

VRAAG 5

5.1 ΔTAD is ’n reghoekige driehoek wat grens aan reghoek ABCD.

AB = 20 cm, BC = 12 cm en TC = 25 cm.



5.1.1 Voltooi die tabel hieronder om die lengte van AT te bereken.

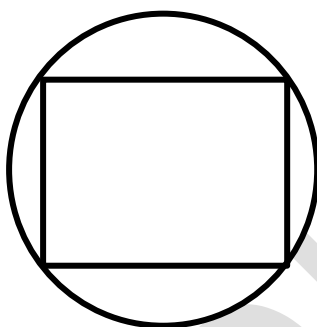
Bewering	Rede
In ΔTAD: AD =	
TD =	
AT ² =	Pythagoras
AT =	

(6)

5.1.2 Vervolgens, bereken die omtrek van ABCDT.

(2)

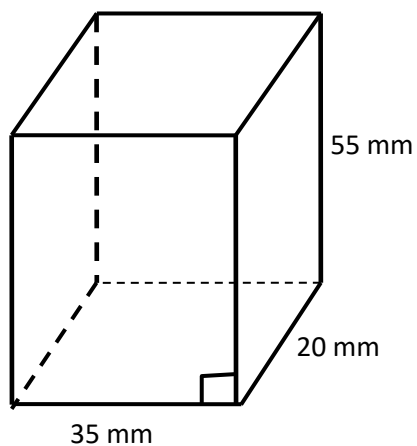
5.2 In die figuur hieronder, is al die hoekpunte van die vierkant op die omtrek van die sirkel. Die oppervlakte van die vierkant is 400 cm^2 .



Bereken die oppervlakte van die sirkel. Gebruik $\pi = 3,14$.

(6)

5.3 Hieronder is 'n reghoekige prisma met lengte 35 mm, breedte 20 mm en hoogte 55 mm.



Bereken die totale buite-oppervlakte van die reghoekige prisma.

(3)

5.4 Bereken die volume, korrek tot 1 desimale plek, van 'n kubus met lengtes van 13,5 cm.

(3)

[20]

TOTAAL: 75

EINDE



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	(10)										
	2.1.1	$\hat{B}_1 = \hat{B}\hat{C}\hat{D}$	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><td>Statement/Bewering</td><td>Reason/Rede</td></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														
$\hat{P}_1 = x$	vert. opp $\angle s$ / teenoorstaande $\angle e$ ✓														
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2.3	2.3.1	<table><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$B\hat{A}C = 54^{\circ} = \hat{E}_3$</td><td>corr. $\angle s$ & AC GEF/ ooreenkomstige $\angle e$ & AC GEF ✓</td></tr><tr><td>$\hat{E}_3 = 54^{\circ}$</td><td></td></tr><tr><td>$x = 180^{\circ} - 54^{\circ}$</td><td>$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓</td></tr><tr><td>$x = 126^{\circ}$ ✓</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>$\hat{E}_2 = 54^{\circ}$</td><td></td></tr><tr><td>$x = 180^{\circ} - 54^{\circ}$</td><td>$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓</td></tr><tr><td>$x = 126^{\circ}$ ✓</td><td></td></tr></table>	Statement/Bewering	Reason/Rede	$B\hat{A}C = 54^{\circ} = \hat{E}_3$	corr. $\angle s$ & AC GEF/ ooreenkomstige $\angle e$ & AC GEF ✓	$\hat{E}_3 = 54^{\circ}$		$x = 180^{\circ} - 54^{\circ}$	$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓	$x = 126^{\circ}$ ✓		OR/OF		Statement/Bewering	Reason/Rede	$B\hat{A}C = \hat{E}_2$	alt. $\angle s$ & AC GEF/ verw. $\angle e$ & AC GEF ✓	$\hat{E}_2 = 54^{\circ}$		$x = 180^{\circ} - 54^{\circ}$	$\angle s$ on a straight line/ $\angle e$ op 'n reguit lyn ✓	$x = 126^{\circ}$ ✓		1 mark for statement & reason/1 punt vir bewering & rede 1 mark for statement & reason/1 punt vir bewering & rede 1 mark for $x = 126^{\circ}$ / 1 punt vir $x = 126^{\circ}$	(3)												
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	2.3.2	<table><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$\hat{B}_1 = 63^{\circ}$</td><td>Vert. opp $\angle s$/ teenoorstaande $\angle e$ ✓</td></tr><tr><td>$x = 63^{\circ} + y$</td><td>Ext $\angle$ of Δ/ buite $\angle$ van Δ ✓</td></tr><tr><td>$y = 126^{\circ} - 63^{\circ} = 63^{\circ}$ ✓</td><td></td></tr><tr><td colspan="2">OR/OF</td></tr><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$\hat{B}_1 = 63^{\circ}$</td><td>Vert. opp $\angle s$/ teenoorstaande $\angle e$ ✓</td></tr><tr><td>$\hat{E}_1 = 63^{\circ} + y$</td><td>Ext $\angle$ of Δ/ buite $\angle$ van Δ ✓</td></tr><tr><td>$y = 126^{\circ} - 63^{\circ} = 63^{\circ}$ ✓</td><td></td></tr><tr><td colspan="2">OR/OF</td></tr><tr><th>Statement/Bewering</th><th>Reason/Rede</th></tr><tr><td>$\hat{B}_1 = 63^{\circ}$</td><td>Vert. opp $\angle s$/ teenoorstaande $\angle e$ ✓</td></tr><tr><td>$y + \hat{B}_1 + \hat{E}_2 = 180^{\circ}$</td><td>Sum of $\angle s$ of Δ/ som binne $\angle e$ van Δ</td></tr><tr><td>$y + 63^{\circ} + 54^{\circ} = 180^{\circ}$ ✓</td><td></td></tr><tr><td>$y = 180^{\circ} - 63^{\circ} - 54^{\circ}$</td><td></td></tr><tr><td>$y = 63^{\circ}$ ✓</td><td></td></tr><tr><td colspan="2">OR/OF</td></tr></table>	Statement/Bewering	Reason/Rede	$\hat{B}_1 = 63^{\circ}$	Vert. opp $\angle s$ / teenoorstaande $\angle e$ ✓	$x = 63^{\circ} + y$	Ext $\angle$ of Δ / buite $\angle$ van Δ ✓	$y = 126^{\circ} - 63^{\circ} = 63^{\circ}$ ✓		OR/OF		Statement/Bewering	Reason/Rede	$\hat{B}_1 = 63^{\circ}$	Vert. opp $\angle s$ / teenoorstaande $\angle e$ ✓	$\hat{E}_1 = 63^{\circ} + y$	Ext $\angle$ of Δ / buite $\angle$ van Δ ✓	$y = 126^{\circ} - 63^{\circ} = 63^{\circ}$ ✓		OR/OF		Statement/Bewering	Reason/Rede	$\hat{B}_1 = 63^{\circ}$	Vert. opp $\angle s$ / teenoorstaande $\angle e$ ✓	$y + \hat{B}_1 + \hat{E}_2 = 180^{\circ}$	Sum of $\angle s$ of Δ / som binne $\angle e$ van Δ	$y + 63^{\circ} + 54^{\circ} = 180^{\circ}$ ✓		$y = 180^{\circ} - 63^{\circ} - 54^{\circ}$		$y = 63^{\circ}$ ✓		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 $y = 63^{\circ}$ / 1 punt vir $y = 63^{\circ}$	
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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	Statement/Bewering	Reason/Rede	
	$\hat{C} = 40^\circ$ ✓		
	$\hat{B}_2 = \hat{F}_3$ ✓		
	$2\hat{F}_3 + 40^\circ = 180^\circ$	Sum int. $\angle$ s of Δ / som binne $\angle$ e van Δ ✓	
	$\therefore \hat{F}_3 = 70^\circ$ ✓		
	But $\hat{F}_3 = \hat{B}_1$ ✓		
	and $\hat{B}_1 = \hat{E}_2$	$\angle$ s opp. equal sides / $\angle$ e teenoor gelyke sye ✓	
	$\hat{F}_2 = 180^\circ - \hat{B}_1 - \hat{E}_2$	Sum int. $\angle$ s of Δ / som binne $\angle$ e van Δ ✓	
	$\hat{F}_2 = 180^\circ - 140^\circ$		
	$\hat{F}_2 = 40^\circ$ ✓		
			(8)

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

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																	
AB = AD	Given/Gegee ✓																	
BC = DC	Given/Gegee ✓																	
AC = AC	Common side/gemene sy ✓																	
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																	
and $\hat{B} = \hat{D}$	corr. ∠s ≡ Δs/ ooreenkomstige. ∠e ≡ Δe																	
$\therefore \hat{A}_1 + \hat{B} = A_2 + \hat{D}$ ✓																		
$\therefore \hat{C}_2 = \hat{C}_3$ ✓																		
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)														

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]

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 cm 1 mark for diagonal $= 28.28 \text{ cm}/$ 1 punt vir hoeklyn=28.28 cm 1 mark for radius $= 14.14 \text{ cm}/$ 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		$SA = 2(lb + bH + lH) \checkmark$ $= 2(35 \text{ mm} \times 20 \text{ mm} + 20 \text{ mm} \times 55 \text{ mm} + 35 \text{ mm} \times 55 \text{ mm}) \checkmark$ $= 2(700 \text{ mm}^2 + 1100 \text{ mm}^2 + 1925 \text{ mm}^2)$ $= 2(3725 \text{ mm}^2)$ $= 7450 \text{ mm}^2 \checkmark$	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		$V = l^3 \checkmark$ $= (13.5 \text{ cm})^3 \checkmark$ $= 2\,460.4 \text{ cm}^3 \checkmark$	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