



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE NASIONALE SENIOR SERTIFIKAAT

GRADE 12/GRAAD 12

TECHNICAL MATHEMATICS P2/TEGNIESE WISKUNDE V2 NOVEMBER 2022

FINAL MARKING GUIDELINES/FINALE NASIENRIGLYNE

MARKS/PUNTE: 150

CODE/KODE	EXPLANATION/VERDUIDELIKING	
A	Accuracy/Akkuraatheid	
AO	Answer only/Slegs antwoord	
CA	Consistent accuracy/Volgehoue akkuraatheid	
I	Identity/Identiteit	
M	Method/Metode	
NPR	No penalty for rounding/Geen penalisering vir afronding nie	
NPU		
R	Rounding/Afronding	
RE	Reason/Rede	
S	Simplification/Vereenvoudiging	
F Formula/Formule		
SF	Substitution in correct formula/Vervanging in korrekte formule	
ST/RE	Statement with reason/Bewering met rede	

These marking guidelines consist of 26 pages. Hierdie nasienriglyne bestaan uit 26 bladsve.

EXTERNAL/EKSTERNE MODERATORS	INTERNAL /INTERNE MODERATORS
M.A. HENDRICKS	N. TOM
MA HENDRICKS External Moderator UMALUSI	All
B.J SHABANGU	N.S MUTHIGE
B. J. Shabe	- 2 nothings
DATE APPROVED/DATUM GOEDGEKEUR	20 NOVEMBER 2022
DATE AT ING VEDIDATOM GOEDGEREUR	20 NOVEWBER 2022

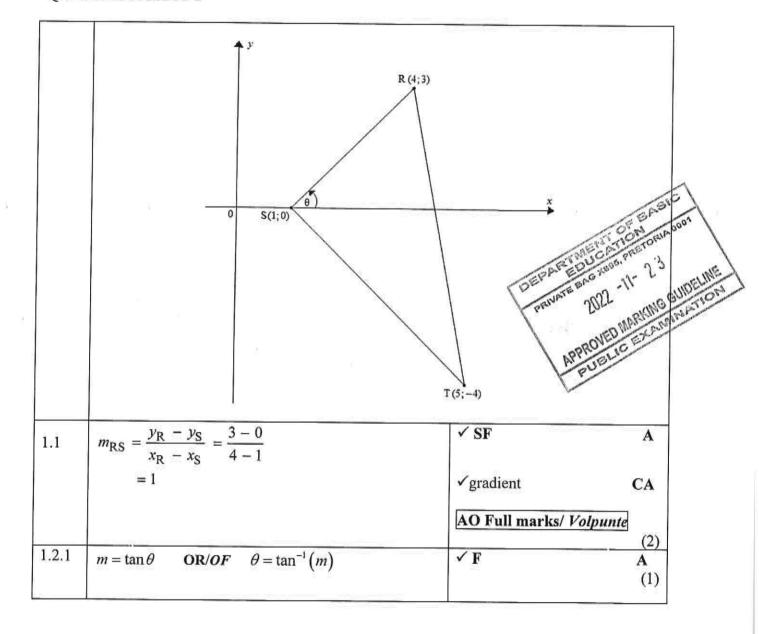
NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent Accuracy marking to be applied where indicated.
- Penalty for incorrect rounding only in QUESTION 10.2.3
- # Shows questions where Tolerance Range will be applied:. Q 3.3; Q 4.1.3; Q 10.1.2; Q10.2.3

LET WEL:

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.
- Volgehoue akkuraatheid-nasien moet toegepas word soos aangedui.
- Penalisering vir foutiewe afronding slegs in VRAAG 10.2.3
- # Toon vrae waar Toleransie wydte toegepas word:. V 3.3; V 4.1.3; V10.1.2; V 10.2.3

QUESTION/VRAAG 1



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✓ value of / waarde van θ
AO Full marks/ Volpunte

$= \sqrt{50} \text{ or / of } 5\sqrt{2}$ $= \sqrt{50} \text{ or / of } 5\sqrt{2}$ AO Full marks/ Volpunte				
$= \sqrt{50} \text{ or } / \text{ of } 5\sqrt{2}$ $= \sqrt{50} \text{ or } / \text{ of } 5\sqrt{2}$ $= (3; -2)$ $= (3; -2; -2)$ $= (3; -2; -2)$	1.3	AND SC 91 100 100 100 100 100 100 100 100 100	/ CF	.20
1.4 $M_{ST}\left(\frac{x_S + x_T}{2}; \frac{y_S + y_T}{2}\right)$ $= \left(\frac{5+1}{2}; \frac{-4+0}{2}\right)$ $= (3; -2)$			v SF	A
1.4 $M_{ST}\left(\frac{x_S + x_T}{2}; \frac{y_S + y_T}{2}\right)$ $= \left(\frac{5 + 1}{2}; \frac{-4 + 0}{2}\right)$ $= (3; -2)$ $= (3; -2)$ $1.5.1 Equal/ the same / gelyk / dieselfde 7 x-value/ waarde A A AO Full marks/ Volpunte CA From/vanaf Q1.1 y = 1x + c OR/OF y + 2 = 1(x - 3) -2 = 1 \times 3 + c y + 2 = x - 3 c = -5 y = x - 3 - 2 \therefore y = x - 5 \forall equation / vergelyking CA (3)$		$= \sqrt{50} \ or / of \ 5\sqrt{2}$	<u> </u>	CA
$= \left(\frac{5+1}{2}; \frac{-4+0}{2}\right)$ $= (3; -2)$ $= (3; -2)$ $1.5.1 \text{Equal/ the same / gelyk / dieselfde}$ $= (3; -2)$ $x \text{-value/ waarde} \qquad A$ $AO \text{ Full marks/ Volpunte}$ $CA \text{ From/vanaf Q1.1}$ $SF \text{ CA From/vanaf Q1.4}$ $CA \text{ From/vanaf Q1.4}$			AO Full marks/ Volpunte	(2)
= (3; -2) $= (3; -2)$ $x-value/ waarde$	1.4	$M_{ST}\left(\frac{x_S + x_T}{2}; \frac{y_S + y_T}{2}\right)$		
= (3; -2) $ y-value waarde AO Full marks Volpunte (2)$ 1.5.1 Equal/ the same / gelyk / dieselfde $ x $		$= \left(\frac{5+1}{2}; \frac{-4+0}{2}\right)$	250 % 200 5	
AO Full marks/ Volpunte (2)			- 1 1944 - 1886 1938 1935 1 1936 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	A
1.5.1 Equal/ the same / gelyk / dieselfde $ \begin{array}{cccccccccccccccccccccccccccccccccc$		=(3;-2)		
1.5.2 $m_{\parallel line/lyn} = 1$ $\sqrt{\text{gradient value/ waarde}}$ CA CA From/vanaf Q1.1 $\sqrt{\text{SF}}$ CA CA From/vanaf Q1.4 $\sqrt{\text{SF}}$ CA $\sqrt{\text{CA}}$ From/vanaf Q1.4 $\sqrt{\text{CA}}$ $\sqrt{\text{CA}}$ From/vanaf Q1.4 $\sqrt{\text{CA}}$ $\text{$	1.5.1	Equal/ the same / gelyk / dieselfde		A
$y = 1x + c OR/OF y + 2 = 1(x - 3)$ $-2 = 1 \times 3 + c y + 2 = x - 3$ $c = -5 y = x - 3 - 2$ $\therefore y = x - 5$ $Very equation / vergelyking CA$ (3)	1.5.2	$m_{\parallel line / lyn} = 1$		
$-2 = 1 \times 3 + c \qquad y + 2 = x - 3$ $c = -5 \qquad y = x - 3 - 2$ $\therefore y = x - 5$ $\text{CA From/vanaf Q1.4}$		y = 1x + c OP/OF $y + 2 = 1(x - 3)$		CA
$-2 = 1 \times 3 + c \qquad y + 2 = x - 3$ $c = -5 \qquad y = x - 3 - 2$ $\therefore y = x - 5$ $\checkmark \text{equation / vergelyking} \qquad \text{CA}$ (3)			■ PSH MSS *** Value 240 VA 144 VA 14	O/A
$\therefore y = x - 5$ <pre> <pre></pre></pre>		$-2 = 1 \times 3 + c$ $y + 2 = x - 3$	Andrew States and States States States	
v equation/vergelyking CA (3)		$c = -5 \qquad \qquad y = x - 3 - 2$		
		$\therefore y = x - 5$	✓ equation /vergelyking	CA
[13]				(3)
				[13]

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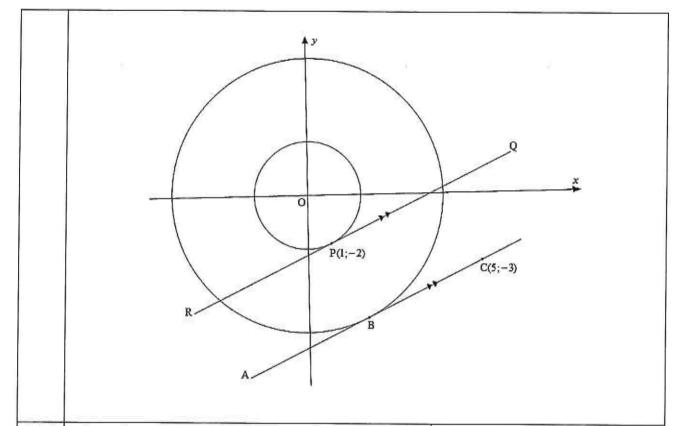


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QUESTION/VRAAG 2



2.1.1
$$x^{2} + y^{2} = r^{2}$$

 $(1)^{2} + (-2)^{2} = r^{2}$
 $r^{2} = 5$
 $\therefore x^{2} + y^{2} = 5$

$$x^{2} + y^{2} = (1)^{2} + (-2)^{2}$$
$$= 5$$

OR/OF

$$x^{2} + y^{2} = (1)^{2} + (-2)^{2}$$

 $= 5$
 $y = \pm \sqrt{5 - x^{2}}$ OR/OF $x = \pm \sqrt{5 - y^{2}}$

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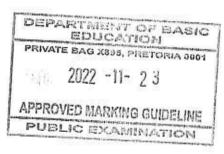
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2.1.2	$m_{\rm OP} = -2$	✓ gradient of/van OP	
HEICHON H	W-20	92-9 	(1)
2.1.3	Radius/Diameter is perpendicular to tangent Radius/middellyn is loodreg aan die raaklyn	✓ RE	A (1)
2.1.4	2 07/05	✓ gradient of/van RQ	CA
11	$\therefore m_{AC} = \frac{1}{2}$ $m_{AC} \times (-2) = -1$ $m_{AC} = \frac{1}{2}$	✓gradient of /van AC	CA
	2	AO Full marks/ Volpunte	(2)
	$y - (-3) = \frac{1}{2}(x - 5)$ OR /OF $-3 = \frac{1}{2}(5) + c$	✓ substitution/ vervanging	(2) CA
	$y = \frac{1}{2}x - \frac{5}{2} - 3$ $c = -3 - \frac{5}{2}$	✓ S	CA
	$y = \frac{1}{2}x - \frac{11}{2}$	✓equation/vergelyking	CA
2.2.1	$\frac{x^2}{6^2} + \frac{y^2}{4^2} = 1$	✓ standard form/standa	(3) nard A (1)
2.2.2	- 4 - 4	6 x	fsnitte CA
			(2)
			[12]



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$\approx 51,43^{\circ}$ $ A $	3.1.1	2 rad = 2 180° 360° OD (OF		
3.1.2 $\operatorname{cosec} P - \operatorname{cos} Q$ $= \operatorname{cosec} (51,43^{\circ}) - \operatorname{cos} (37^{\circ})$ $\approx 0,48$ OR/OF $\operatorname{cosec} P - \operatorname{cos} Q$ $= \operatorname{cosec} \left(\frac{2}{7}\pi\right) - \operatorname{cos} \left(37^{\circ} \times \frac{\pi}{180^{\circ}}\right)$ $\approx 0,48$ OR/OF $\operatorname{OR} AB$ OR/OF $\operatorname{OR} AB$ Substitution/vervanging $\operatorname{CA} AB$ NPR AO Full marks/ Volpunte $\operatorname{AO Full marks/ Volpunte}$ CA $\operatorname{AO Full marks/ Volpunte}$ CA $\operatorname{AO Full marks/ Volpunte}$ 3.2.2 $\operatorname{AO Full marks/ Volpunte}$ 3.2.2 $\operatorname{AO Full marks/ Volpunte}$ 3.3.2.2 $\operatorname{AO Full marks/ Volpunte}$ 3.4.3 $\operatorname{AO Full marks/ Volpunte}$ 3.6.4 $\operatorname{AO Full marks/ Volpunte}$ 3.7.5 3.8.2 $\operatorname{AO Full marks/ Volpunte}$ 3.9.2 3.1.2 $\operatorname{AO Full marks/ Volpunte}$ 3.1.3 3.1.4 $\operatorname{AO Full marks/ Volpunte}$ 3.1.5 3.1.5 $\operatorname{AO Full marks/ Volpunte}$ 3.1.6 3.1.7 3.1.8 3	3.1.1	$\frac{2}{7}\pi \text{ rad} = \frac{2}{7}\pi \times \frac{180^{\circ}}{\pi} = \frac{360^{\circ}}{7} \text{ OR/OF}$	/	
3.1.2 $ \cos \operatorname{cc} \operatorname{P} - \cos \operatorname{Q} $ $ \cos \operatorname{CA} $		≈ 51,43°	v angle in degrees/noek in grade	Α
3.1.2 $ \cos \operatorname{CP} - \cos \operatorname{Q} $ $ $			NPR	
$= \csc (51,43^{\circ}) - \cos (37^{\circ})$ $\approx 0,48$ OR/OF $\cos CP - \cos Q$ $= \csc \left(\frac{2}{7}\pi\right) - \cos \left(37^{\circ} \times \frac{\pi}{180^{\circ}}\right)$ $\approx 0,48$ OR/OF $0R/OF$ Substitution/vervanging CA Y substitution/vervanging CA NPR AO Full marks/ Volpunte (2) Y substitution/vervanging CA Y substitution/vervanging CA Y substitution/vervanging AO Full marks/ Volpunte CA Y correct value of/ korrekte waarde van k CA AO Full marks/ Volpunte (3) 3.2.2 $\sqrt{5} \cot \theta + 1$ OR/OF $\sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1$	2 1 2	anger P. ang O.		(1)
	3.1.2	The state of the s		
OR/OF $cosec P - cos Q$ $= cosec \left(\frac{2}{7}\pi\right) - cos\left(37^{\circ} \times \frac{\pi}{180^{\circ}}\right)$ $\approx 0,48$ NPR $AO Full marks/ Volpunte$ $(2$ $3.2.1 \left(-\sqrt{5}\right)^{2} + k^{2} = 3^{2}$ $\therefore k^{2} - 4 = 0 OR/OF k^{2} = 4$ $(k-2)(k+2) = 0 k = \pm 2$ $k = 2 \text{ or } / \text{ of } k = -2$ $\therefore k = 2$ $AO Full marks/ Volpunte$ $V \text{ substitution} / \text{ vervanging } A$ $V \text{ factors or square root } / \text{ faktore of } V \text{ vierkantswortel } CA$ $V \text{ correct value of } / \text{ korrekte } V \text{ waarde } V \text{ vanded } V \text{ of } V of $			✓ substitution/vervanging	CA
$\cos \operatorname{cosec} P - \cos Q$ $= \operatorname{cosec} \left(\frac{2}{7}\pi\right) - \operatorname{cos} \left(37^{\circ} \times \frac{\pi}{180^{\circ}}\right)$ $\approx 0,48$ $3.2.1 \left(-\sqrt{5}\right)^{2} + k^{2} = 3^{2}$ $\therefore k^{2} - 4 = 0 \operatorname{OR}/OF k^{2} = 4$ $(k-2)(k+2) = 0 k = \pm 2$ $\therefore k = 2 \operatorname{or}/of k = -2$ $\therefore k = 2$ $3.2.2 \sqrt{5} \cot \theta + 1 OR/OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1$ $\cos \operatorname{Solution}/\operatorname{vervanging} CA$ $\text{Substitution}/\operatorname{vervanging} A$ $\text{Substitution}/ver$		≈ 0,48	V S	CA
$= \csc\left(\frac{2}{7}\pi\right) - \cos\left(37^{\circ} \times \frac{\pi}{180^{\circ}}\right)$ $\approx 0,48$ $ AO Full marks/ Volpunte S S CA NPR AO Full marks/ Volpunte S S CA NPR AO Full marks/ Volpunte S S CA NPR AO Full marks/ Volpunte S S CA NPR AO Full marks/ Volpunte S S CA NPR AO Full marks/ Volpunte S S CA S S C$		OR/OF	OR/OF	
		cosec P - cos Q		
		$= \csc\left(\frac{2}{\pi}\pi\right) - \cos\left(37^{\circ} \times \frac{\pi}{10^{\circ}}\right)$	✓ substitution/vervanging	CA
3.2.1 $(-\sqrt{5})^2 + k^2 = 3^2$ $\therefore k^2 - 4 = 0$ OR/OF $k^2 = 4$ $(k-2)(k+2) = 0$ $k = \pm 2$ k=2 or / of $k=-2\therefore k=2 OR/OF \sqrt{5}\left(\frac{1}{\tan\theta}\right) + 1 Substitution/vervanging A factors or square root /faktore of vierkantswortel Vierkantswortel CA AO Full marks/ Volpunte$				CA
3.2.1 $ (-\sqrt{5})^2 + k^2 = 3^2 $ $\therefore k^2 - 4 = 0 $ $(k-2)(k+2) = 0$ $k = 2 \text{ or } / \text{ of } k = -2$ $\therefore k = 2 $ $ OR/OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1 $		≈ 0,48	NPR	
3.2.1 $ (-\sqrt{5})^2 + k^2 = 3^2 $ $\therefore k^2 - 4 = 0 $ $(k-2)(k+2) = 0$ $k = 2 \text{ or } / \text{ of } k = -2$ $\therefore k = 2 $ $ 0R/OF k^2 = 4 $ $(k-2)(k+2) = 0 k = \pm 2$ $k = 2 \text{ or } / \text{ of } k = -2$ $\therefore k = 2 $ $ 0R/OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1 $ $ 3.2.2 \sqrt{5} \cot \theta + 1 OR/OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1 $ $ 3.2.2 \sqrt{5} \cot \theta + 1 OR/OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1 $			AO Full montre/ Volumente	
3.2.1 $ (-\sqrt{5})^2 + k^2 = 3^2 $ $ \therefore k^2 - 4 = 0 $ $ (k-2)(k+2) = 0 $ $ k = 2 \text{ or } / \text{ of } k = -2 $ $ \therefore k = 2 $ $ 3.2.2 $ $ \sqrt{5} \cot \theta + 1 $ $ OR / OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1 $ $ \sqrt{5} \text{ substitution} / \text{vervanging} $ $ \sqrt{5} \text{ factors or square root } / \text{faktore of vierkants wortel} $ $ \sqrt{5} \text{ correct value of } / \text{korrekte} $ $ waarde van k $ $ CA $ $ AO \text{ Full marks} / \text{Volpunte} $ $ (3)$			AO Fun marks/ Volpunie	(2)
$k = 2 \text{ or } / \text{ of } k = -2$ $\therefore k = 2$ $AO \text{ Full marks} / \text{ Volpunte}$ $3.2.2$ $\sqrt{5} \cot \theta + 1$ $OR / OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1$ (3)	3.2.1	$(5)^2 + k^2 - 3^2$	✓ substitution/vervanging	
$k = 2 \text{ or } / \text{ of } k = -2$ $\therefore k = 2$ $AO \text{ Full marks} / \text{ Volpunte}$ $3.2.2$ $\sqrt{5} \cot \theta + 1$ $OR / OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1$ (3)	2.10.4.2	$(-\sqrt{3}) + k = 3$ $k^2 + 4 = 0$ $OP/OF k^2 = 4$	✓ factors or square root /faktore o	f
$k = 2 \text{ or } / \text{ of } k = -2$ $\therefore k = 2$ $AO \text{ Full marks} / \text{ Volpunte}$ $3.2.2$ $\sqrt{5} \cot \theta + 1$ $OR / OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1$ (3)	i i	(k-2)(k+2)=0 $k=+2$		CA
$\therefore k = 2$ $\frac{\text{AO Full marks/ Volpunte}}{\text{AO Full marks/ Volpunte}}$ $3.2.2 \sqrt{5} \cot \theta + 1 \qquad OR / OF \sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1$		k = 2 or / of k = -2	L'agreet value of/ kowakta	
3.2.2 $\sqrt{5} \cot \theta + 1$ OR/OF $\sqrt{5} \left(\frac{1}{\tan \theta}\right) + 1$ (3)			677 - 375	CA
3.2.2 $\sqrt{5}\cot\theta + 1 \qquad OR/OF \sqrt{5}\left(\frac{1}{\tan\theta}\right) + 1$			0.0000000000000000000000000000000000000	157.T
$3.2.2 \int \cot \theta + 1 \qquad OR / OF \int \left(\frac{1}{\tan \theta}\right) + 1$		= = £ 35	AO Full marks/ Volpunte	(2)
$\sqrt{5} \cot \theta + 1$ OR/OF $\sqrt{5} \left(\frac{1}{\tan \theta} \right) + 1$	3.2.2	F (1)		(3)
$= \sqrt{5} \left(-\frac{\sqrt{5}}{2} \right) + 1 \qquad \sqrt{5} \left(-\frac{1}{-\frac{\sqrt{5}}{2}} \right) + 1$ $= -\frac{5}{2} + 1$ $= 3$ CA $< S$ CA		$\sqrt{5} \cot \theta + 1$ $OR / OF \sqrt{5} \left(\frac{1}{\tan \theta} \right) + 1$	1	
$ = \sqrt{5} \left(-\frac{\sqrt{5}}{2} \right) + 1 $ $ = -\frac{5}{2} + 1 $ $ = 3 $ $ \sqrt{5} \left[-\frac{1}{-\frac{\sqrt{5}}{2}} \right] + 1 $ $ \sqrt{5} \left[$				
$= \sqrt{3} \left(-\frac{1}{2} \right) + 1 \qquad \sqrt{3} \left(-\frac{\sqrt{5}}{2} \right) + 1$ $= -\frac{5}{2} + 1$		$-\sqrt{5}\left(\sqrt{5}\right)$		
$= -\frac{5}{2} + 1$ S CA		$=\sqrt{3}\left(-\frac{1}{2}\right)+1$ $\sqrt{3}\left(-\frac{1}{\sqrt{5}}\right)+1$	✓ substitution/vervanging	CA
$= -\frac{5}{2} + 1$		$\left(-{2}\right)$	264 - 5381	
		5 _ 1	✓ S	CA
3		2 7 1	<u>□</u>	5.5°
		$=-\frac{3}{2}$		۸.
2 V S		2	V S	CA (3)

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-Shiblese

3.3	$3 \tan x = -0,531 \tan x = -0,177$	√ S	A
	Ref/ $verw. \angle \approx 10,04^{\circ}$	✓ ref. Angle/verw. hoek	CA
	$x \approx 180^{\circ} - 10,04^{\circ} \text{ or/of } x \approx 360^{\circ} - 10,04^{\circ}$ $\therefore x \approx 169,96^{\circ}$ $\therefore x \approx 349,96^{\circ}$	✓ both quadrants/beide kwadr	A
	$\mathbf{OR} / \mathbf{OF}$ $3 \tan x = -0,531$	OR/OF ✓ S	A
	$\tan x = -0,177$	✓ S	CA
	$x = 180^{\circ} - \tan^{-1} 0.177$ OR/OF $x = 360^{\circ} - \tan^{-1} 0.177$ $\therefore x \approx 169,96^{\circ}$ $x \approx 349,96^{\circ}$	✓ both quadrants/beide kwadr ✓ both values of/beide wrde v	A
			(4
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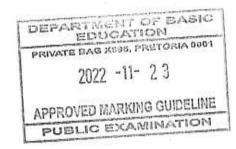
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4.1.1	alia w	[/ 1 1 . 1 . L . :	_
4.1.1	$-\sin \alpha$	✓ reduction/ reduksie	A (1)
4.1.2	$(\tan \alpha)^2 + \tan^2 \alpha$ OP(OF) $\sin^2 \alpha$	$\checkmark - \tan \alpha$	(1) A
BENTATORS	$(-\tan \alpha)^2 = \tan^2 \alpha$ OR/OF $\frac{\sin^2 \alpha}{\cos^2 \alpha}$		
	$\cos^- \alpha$	$\checkmark \tan^2 \alpha = \frac{\sin^2 \alpha}{\cos^2 \alpha}$	A
		AO Full marks/ Volpunte	
			(2)
4.1.3	$\sin(360^{\circ} - \alpha) \cdot \tan(180^{\circ} - \alpha) \cdot \csc(2\pi - \alpha)$	CA From Q4.1.1 and Q4.1.2	
	$\cos(360^{\circ} + \alpha) \cdot \csc(180^{\circ} - \alpha) \cdot \tan^{2}(\pi - \alpha)$	CA Vanuit V4.1.1 en V4.1.2	
	Control and Application Control and Application Control and Contro		
	$(-\sin\alpha) \cdot (-\tan\alpha) \cdot (-\csc\alpha)$	$\checkmark -\tan \alpha$	A
	$= \frac{(-\sin\alpha) \cdot (-\tan\alpha) \cdot (-\csc\alpha)}{(\cos\alpha) \cdot (\csc\alpha) \cdot (\tan^2\alpha)}$	$\sqrt{-\csc\alpha}$	A
	Carran, Crassan, Charles	$\checkmark \cos \alpha$	
	ı	√ cosecα	A A
			**
	$-\sin \alpha$	$\sqrt{1 \sin \alpha}$	
	$= \frac{-\sin\alpha}{(\cos\alpha) \cdot \left(\frac{\sin\alpha}{\cos\alpha}\right)}$	$\sqrt{1} \frac{\sin \alpha}{\cos \alpha}$	A
	$(\cos \alpha) \cdot (\frac{\cos \alpha}{\cos \alpha})$		
	$-\sin \alpha$		
	$={\sin \alpha}$	¥	
	=-1	✓ -1	CA
	20 00 N A NO		C.1.
	OR/OF	OR/OF	
	sin (260%) ton (180%)		
	$\frac{\sin(360^{\circ} - \alpha) \cdot \tan(180^{\circ} - \alpha) \cdot \csc(2\pi - \alpha)}{(360^{\circ} - \alpha) \cdot \cot(2\pi - \alpha)}$		
	$\cos(360^{\circ} + \alpha) \cdot \csc(180^{\circ} - \alpha) \cdot \tan^{2}(\pi - \alpha)$		
	(-sin a) (-tan a) (-sassas)	$\checkmark -\tan \alpha$	A
	$= \frac{(-\sin\alpha)\cdot(-\tan\alpha)\cdot(-\csc\alpha)}{(\cos\alpha)\cdot(\csc\alpha)\cdot(\tan^2\alpha)}$	√-cosecα	A
	$(\cos \alpha) \cdot (\csc \alpha) \cdot (\tan^{-} \alpha)$	√ cos α	A
		✓ cosec α	Ā
	(, , , ,) (, , ,) (,)	4 *	
	$=\frac{(-\tan\alpha)(-\tan\alpha)(-1)}{2}$	\checkmark I $\tan \alpha$	A
	$ (\tan^2 \alpha)$		<u>, , </u>
	= -1	V - I	CA
			(6)
			(0)



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Technical Mathematics/P2/Tegniese Wiskunde/V2 9 NSC/NSS-FINAL Marking Guidelines/FINALE Nasienriglyne

4.2	$\cos^2 x$	✓ I	A (1)
4.3	$\csc x - \sin x = \cot x \cdot \cos x$		(1)
8	LHS/ $LK = \csc x - \sin x$ $= \frac{1}{\sin x} - \sin x$ $= \frac{1 - \sin^2 x}{\sin x}$	\checkmark I $\frac{1}{\sin x}$ \checkmark S	A CA
	$\sin x$ $= \frac{\cos^2 x}{\sin x}$ $= \frac{\cos x}{\sin x} \cdot \cos x$ $= \cot x \cdot \cos x = RHS / RK$	$\checkmark I \cos^2 x$ $\checkmark I \frac{\cos x}{\sin x}$	A A
	OR/OF $RHS/RK = \cot x \cdot \cos x$ $\cos x$	OR / OF	
	$= \frac{1}{\sin x} \cdot \cos x$	$\checkmark I \qquad \frac{\cos x}{\sin x}$	A
	$= \frac{1 - \sin^2 x}{\sin x}$	\checkmark S \checkmark I $1-\sin^2 x$	CA ₁
	$=\cos \cot x - \sin x$	\checkmark I $\frac{1}{\sin x}$	A
	$= LHS / LK$ OR/OF $LHS/LK = \csc x - \sin x$	OR/OF	
	$= \frac{1}{\sin x} - \sin x$ $= \frac{1 - \sin^2 x}{1 - \sin^2 x}$	$\checkmark \mathbf{I} \frac{1}{\sin x}$	A
	$ \sin x \\ = \frac{\cos^2 x}{\sin x} $	✓ s	CA
	$RHS/RK = \cot x \cdot \cos x \qquad \qquad = \frac{\cos x}{\sin x} \cdot \cos x$	$\checkmark \mathbf{I} \cos^2 x$	A
	$= \frac{\cos^2 x}{\sin x} = LHS/LK$	$\checkmark \mathbf{I} \frac{\cos x}{\sin x}$	A
			(4) [14]

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QUESTION/VRAAG 5

5.1.1	360°	✓ period/ periode A (1)
5.1.2	1	✓ amplitude A (1)
5.2	30 60 90 120 130 180 210 240 0 300 0 315 1.5	f: y shape/vorm y-intercept/ afsnt x intercepts/ afsnt end point/ eindpunt (360°; 0,5) A g: y shape/vorm y-intercept/ afsnt x x-intercepts/ afsnt A y x-intercepts/ afsnt A (7)
5.3	$x \in (180^{\circ}; 360^{\circ})$ OR/OF $180^{\circ} < x < 360^{\circ}$	✓ Critical values/kritiese waardes CA ✓ correct notation/korrekte notasie CA (2)

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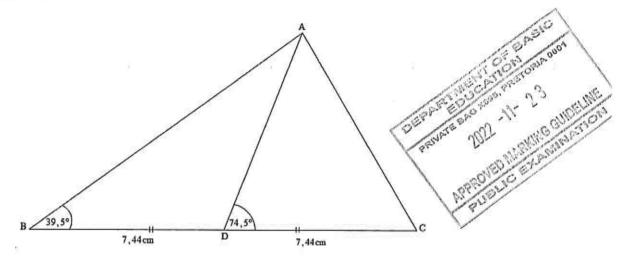
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QUESTION/VRAAG 6



6.1.1	$\hat{BAD} = 74,5^{\circ} - 39,5^{\circ} = 35^{\circ}$	✓ size/ grootte A (1)
6.1.2	$A\hat{D}B = 180^{\circ} - 74,5^{\circ} = 105,5^{\circ}$ OR/OF $A\hat{D}B = 180^{\circ} - 39,5^{\circ} - 35^{\circ} = 105,5^{\circ}$	✓ size/ grootte OR/OF ✓ size/ grootte A (1)
6.2.1	$\frac{AB}{\sin BDA} = \frac{BD}{\sin BAD} \mathbf{OR/OF} \frac{d}{\sin BDA} = \frac{BD}{\sin A}$ $\frac{d}{\sin BDA} = \frac{BD}{\sin 35^{\circ}}$ $\mathbf{OR/OF}$	✓ Complete sine rule/voltooi sinus- reël A (1)
6.2.2	In $\triangle ABD$: $\frac{AB}{\sin 105,5^{\circ}} = \frac{7,44}{\sin 35^{\circ}}$ $AB = \frac{7,44\sin 105,5^{\circ}}{\sin 35^{\circ}}$ $\approx 12,5 \text{ cm}$ OR/OF In $\triangle ADB$: $\frac{AD}{\sin 39,5^{\circ}} = \frac{7,44}{\sin 35^{\circ}}$ $AD = \frac{7,44\sin 39,5^{\circ}}{\sin 35^{\circ}} \approx 8,25 \text{ cm}$	✓ SF ✓ length of/ lengte van AB CA OR/OF ✓ length of/ lengte van AD CA
	$AB^{2} = AD^{2} + BD^{2} - 2 \times AD \times BD \times \cos D$ $AB^{2} = 8,25^{2} + 7,44^{2} - 2 \times 8,25 \times 7,44 \times \cos 105,5^{\circ}$ $AB \approx 12,5 \text{ cm}$	✓ length of/ lengte van AB

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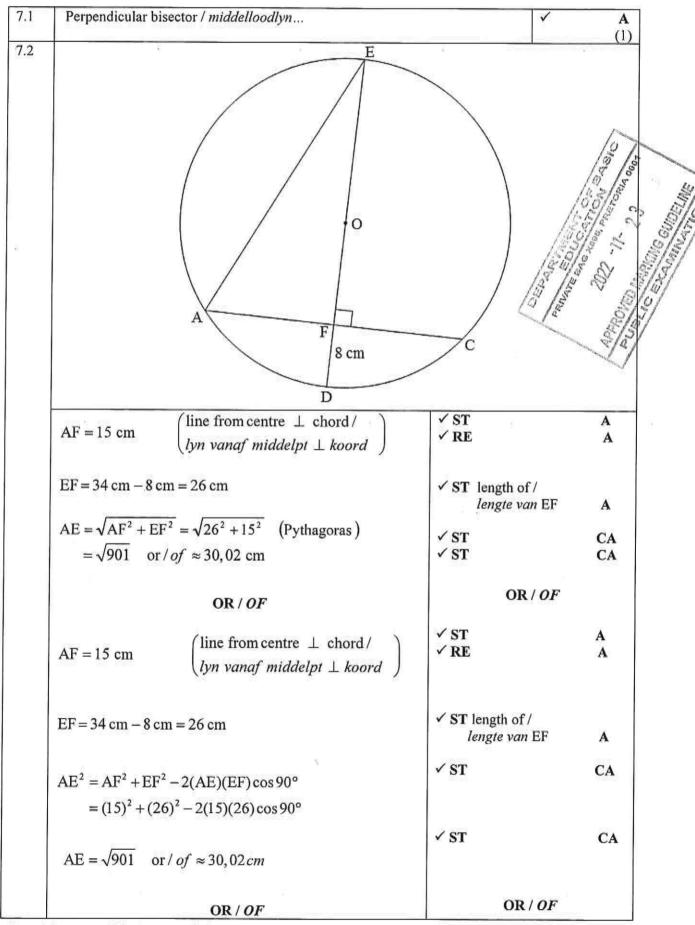
	NSC/NSS –FINAL Marking Guidelines/FINALE	(2
6.3	In ΔABC:	
	$AC^2 = BC^2 + AB^2 - 2BC \times AB\cos B$	✓ M cosine rule/reël A
	$=14,88^2+12,5^2-2(14,88)(12,5)\cos 39,5^\circ$	✓ SF CA
	= 90,62005498	✓ length of/ lengte van AC CA
	∴ AC ≈ 9,52 cm	OR / OF
	OR / OF	
	In $\triangle ABD$: $\frac{AD}{\sin 39,5^{\circ}} = \frac{7,44}{\sin 35^{\circ}}$	✓ length of AD A
	$AD = \frac{7,44 \sin 39,5^{\circ}}{\sin 35^{\circ}} \approx 8,25 \text{ cm}$	Z 3 2 3 3 3 1 7 3 1
	∴ In ΔADC:	✓ M cosine rule/reël
ź	$AC^{2} = AD^{2} + DC^{2} - 2 AD \times DC \times \cos D$ $AC^{2} = 8,25^{2} + 7,44^{2} - 2 \times 8,25 \times 7,44 \times \cos 74,5^{\circ}$ $AC^{2} = 90,60991695$	✓ length of/ lengte van AC
	∴ AC≈ 9,52 cm	(3
5.4	Area of/Oppervlakte van $\triangle ABC = \frac{1}{2}AB \times BC \sin B$	✓ M area rule/ oppervlakte reël A
	$=\frac{1}{2}(12,5)(14,88)\sin 39,5^{\circ}$	✓ SF CA
	$\approx 59,16 \text{ cm}^2$	✓ Area / oppervlakte CA
	OR/OF	OR/OF
PROVED MARKING GUIDELINE PUBLIC EXAMINATION	Height/Hoogte = 12,5 sin 39,5° \approx 7,95 = $\frac{1}{2}bh = \frac{1}{2}AC \times h$	✓ M area rule/ oppervlakte reël A
MARKIN	$= \frac{1}{2}bh = \frac{1}{2}AC \times h$ $\approx \frac{1}{2}(14,88)(7,95)$	✓ SF CA
PPROVED II	≈ 59,16 cm	✓ Area / oppervlakte CA (3)
14 LL		[11

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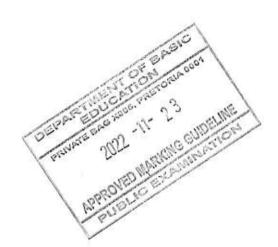
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[6]

	NSC/NSS -FINAL Marking Guidelines/FINAL	LE Nasienriglyne	
AF = 15 cm	$\begin{pmatrix} \text{line from centre } \perp \text{ chord} / \\ \textit{lyn vanaf middelpt } \perp \textit{koord} \end{pmatrix}$	✓ ST ✓ RE	A A
$EF = 34 \text{ cm} - 8$ $\tan E = \frac{AF}{FE} = \frac{1}{2}$		✓ ST length of	' / lengte van EF A
$\hat{E} \approx 29,98^{\circ}$ $\sin E = \frac{AF}{AE}$		✓ ST	CA
$AE \approx \frac{AE}{\sin 29.9}$ $\approx 30,02 \text{ c}$		✓ ST	CA
			(5



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8.1	Interior opposite angle / teenoorstaande binnehoek	~	A (1)
8.2	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	22° N	(1)
8.2.1 a)	$\hat{A}_2 = 30^{\circ}$ $\begin{pmatrix} \angle s \text{ in the same segment } / \\ \angle e \text{ in dieselfde segment} \end{pmatrix}$	✓ ST ✓ RE	A A (2)
8.2.1 b)	$\hat{C}_1 = 52^{\circ}$ (ext \angle of \triangle / buite \angle van \triangle)	✓ ST ✓ RE	CA A (2)
8.2.1 c)	$\hat{C}_3 = 96^{\circ}$ $\begin{pmatrix} \text{ext } \angle \text{ of cyclic quad } / \\ \text{buite } \angle \text{ van kdvh} \end{pmatrix}$	✓ ST ✓ RE	CA A (2)
8.2.2	$\hat{M}_3 = 82^\circ \qquad (\text{ext} \angle \text{ of } \Delta \text{ / buite } \angle \text{ van } \Delta)$	✓ ST	CA
	$\hat{M}_3 + \hat{N} = 82^\circ + 22^\circ = 104^\circ \neq 180^\circ$ \therefore MCND is NOT cyclic / NIE siklies NIE	✓ RE	A
	(opp∠s NOT suppl/ teenoorst ∠e NIE suppl)	OR/OF	7
	OR/OF	✓ ST	CA
	From/vanaf Q/V8.2.1 b) $\hat{C}_1 = 52^\circ \neq M\hat{D}N = 128^\circ$	✓ RE	A
PUBLIC EXAMINATION	∴ MCND is NOT cyclic / NIEsiklies NIE $\begin{pmatrix} \text{ext } \angle \neq \text{ int opp } \angle / \\ \text{buite } \angle e \neq \text{ teen.binne } \angle \end{pmatrix}$	OR/OF	7
Ann	OR/OF	✓ ST ✓ RE	CA A
BLIC EX	$\hat{M}_2 = 98^{\circ} \neq \hat{N} = 22^{\circ}$	OV S ection s	(2)
PUBL	MCND is NIE cyclic / NIE siklies NIE $\begin{pmatrix} \text{ext } \angle \neq \text{ int opp } \angle / \\ \text{buite } \angle e \neq \text{ teen.binne } \angle \end{pmatrix}$		÷

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8.3	T 60°		
8.3.1	OBT = 90°	✓ OB̂T	A
	$O \hat{C} T = 90^{\circ}$ $tan/raaklyn \perp rad$	✓OĈT ✓ RE	A
8.3.2 a)	$\hat{BOC} = 120^{\circ}$ (sum of int $\angle s$ of a quad /	/ om	
	(som vd binne ∠e van'n vhk)	✓ ST ✓ RE	A A
	$\hat{A} = 60^{\circ}$ $\begin{pmatrix} \angle \text{at centre} = 2 \times \angle \text{ at circum /} \\ midpts \angle = 2 \times omtreks \angle \end{pmatrix}$	✓ ST ✓ RE	CA A
	OR/OF TBOC is cyclic/siklies CONVERSE opp ∠s of cyclic quad / OMGEKEERDE teenoorst ∠e van kdvh.	OR∕ <i>OF</i>	, A
	$B\hat{O}C = 120^{\circ} \begin{pmatrix} \text{opp } \angle \text{s of cyclic quad } / \\ teenoorst \angle e \ van \ kdvh \end{pmatrix}$	✓ ST	A
	$\hat{A} = 60^{\circ}$ $\left(\angle \text{ at centre } = 2 \times \angle \text{ at circum } / \right)$ $\left(\frac{1}{midpts} \angle = 2 \times omtreks \angle \right)$	✓ ST ✓ RE	CA A
			(4)
8.3.2 b)	$\hat{E} = 120^{\circ}$ $\begin{pmatrix} \text{opp } \angle \text{s of cyclic quad} \\ teenoorst \ \angle e \ van \ kdvh \end{pmatrix}$ OR/OF	✓ ST ✓ RE OR/ OF	CA A
	reflex /inspringend $\hat{BOC} = 240^{\circ}$ (Revolution /omwenteling)	✓ RE	A
	$\hat{E} = 120^{\circ}$ $\begin{pmatrix} \angle \text{ at centre} = 2 \times \angle \text{ at circm} \\ midpts \angle = 2 \times omtreks \angle \end{pmatrix}$	✓ ST	CA
			(2) [18]
			Lioi

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QUESTION/VRAAG9

9.1	In proportion/ Proportionally / In verhouding/ eweredig	~	A (1)
9.2	A 31 cm 48 cm 55 cm		N N
9.2.1	 Both pairs of opposite sides are equal / beide pare teenoorst sye is gelyk Both pairs of opposite angles are equal / beide pare teenoorst hoeke is gelyk Diagonals bisect each other / Hoeklyne halveer mekaar 	✓ RE ✓ RE Any two / enige	A A twee (2)
9.2.2	$\frac{AD}{DB} = \frac{AE}{EC} \qquad \left(\begin{array}{c} \text{prop th / ewer st; DE } \parallel BC \text{ OR / } OF \\ \text{line } \parallel \text{ one side of } \Delta \text{ / lyn} \parallel \text{ een sy van } \Delta \end{array} \right)$ $\therefore \frac{AD}{44} = \frac{31}{48}$	✓ ST ✓RE	A
	$\therefore AD = \frac{341}{12} \text{or/} of \approx 28,42 \text{ cm}$	✓ ST	A
	$\frac{AD}{AD} = \frac{AE}{AE}$ (prop th /ewer st; DE BC OR/OF)	OR/OF	
	AB AC (line one side of $\Delta / lyn eensy van \Delta$) $\frac{AD}{AD + 44} = \frac{31}{79}$ $79 AD = 31 AD + 1364$ $48 AD = 1364$	✓ ST ✓RE	A
	$AD = \frac{1364}{48}$ or $/ of \approx 28,42 \text{ cm}$	✓ ST	CA
			(3)



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9.2.3 $\frac{BF}{FG} = \frac{AE}{FG}$ (prop th / ewer st; FE AB OR / OF	
FC EC (line one side of $\Delta / lyn een sy van \Delta$)	
BF 31	✓ ST proportion/eweredig
$\frac{\mathrm{BF}}{55} = \frac{31}{48}$	A
$BF = \frac{31 \times 55}{48} = \frac{1705}{48}$	✓ ST value of/
	waarde van BF CA
$DE = \frac{1705}{48}$ or $/of \approx 35,52 \text{ cm}$	✓ ST value of/
48	waarde van DE CA
OR/OF	onyon
BC = AC (prop th / ewer st; FE AB OR/OF	OR/OF
$\overline{FC} = \overline{EC} \qquad \text{line } \text{ one side of } \Delta / lyn een sy van } \Delta$	✓ ST
	proportion/eweredig
$\frac{BC}{55} = \frac{79}{48}$	A
$\therefore BC = \frac{4345}{3}$	
$\therefore BC = {48}$	
. DE 1705	✓ ST value of/
$\therefore BF = \frac{1705}{48} cm$	waarde van BF C
DE 1705	✓ ST value of/
$\therefore DE = \frac{1705}{48} \text{or } / of \approx 35,52 \text{ cm}$	waarde van DE CA
OR / OF	OR / OF
$\frac{DE}{DC} = \frac{AE}{AC}$ ($\Delta' s/e$)	20022-00 N - 202 DB
$\frac{DE}{BC} = \frac{AE}{AC} \qquad (\parallel \Delta' s/e)$	✓ ST
DE31	proportion/eweredig
$\frac{1}{DE+55} = \frac{1}{79}$	✓ SF CA
79DE = 31DE + 1705	1645E 555E
48DE = 1705	✓ ST value of/
DE = $\frac{1705}{100}$ or $f \approx 35,52$ cm	waarde van DE CA
$DE = \frac{1703}{48} \text{or/of} \approx 35,52 \text{ cm}$	(3

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750	NSC/NSS -FINAL Marking Guidelines/FII	VALE Nasiem	iglyne	
9.3	C F	7 cm	E Star Star B	120000 120000 120000
9.3.1	In ΔEBF and/en ΔECB:			
	É is common / gemeen		✓ ST	A
	EBF = ECB (tan - chord / raaklyn - koord)		✓ ST	A
	$\therefore \hat{BFE} = \hat{CBE} \text{ (int } \angle s \text{ of } \Delta / \text{ binne } \angle e \text{ van } \Delta \text{)}$		✓RE ✓ ST / RE	A A
			SITRE	A
	$\therefore \triangle EBF \parallel \triangle ECB \qquad (\angle \angle \angle)$			
	OR / OF		OR / OF	
	In \triangle EBF and/en \triangle ECB:		✓ ST	A
	E is common / gemeen		0.8500	1000
3	$E \hat{B} F = E \hat{C} B$ (tan - chord / raaklyn - koord)	9	✓ ST ✓RE	A
	∴ΔEBF ΔECB (∠∠∠)		✓ ST/RE	A (4)
9.3.2	$\frac{EB}{E} = \frac{EF}{E}$		✓ ST proportion/ eweredigheid	.0
10 020402	EC EB $\therefore EB^2 = EF \times EC$		ewereaigneia	A
	EB = EI × EC			(1)
9.3.3	from/vanuit 9.3.2 $\therefore 7^2 = (CF + 5).5$	✓ ST EC =	= CF + 5	A
	$\therefore 7^2 = (CF + 5).5 \qquad \therefore 49 = 5CF + 25$	STATE OF THE PARTY	titution/ vervanging	CA
	$\therefore \text{CF} + 5 = \frac{49}{5}$ $OR/OF \therefore 5\text{CF} = 24$			
	$\therefore CF = 4.8 \text{ cm}$ $\therefore CF = \frac{24}{5}$	✓ ST lengt	h of CF/	
	\therefore CF = 4,8 cm	lengte va		CA
	OR/OF		OR / OF	
	$\therefore 7^2 = EC \times 5$	✓ ST 7 ² =		A
	$\therefore EC = 9,8$	✓ ST leng		CA
	$\therefore CF = EC - 5$	175) energy (UA.
	= 9,8-5 = 4,8 cm	✓ ST lengt lengte va		CA
				(3) [17]
				1~1

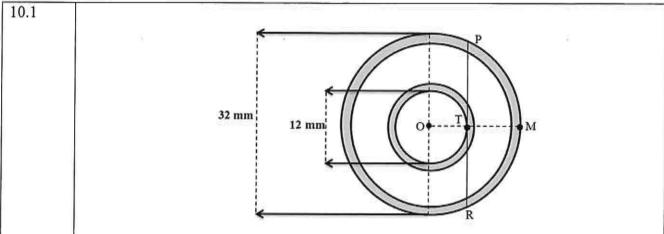
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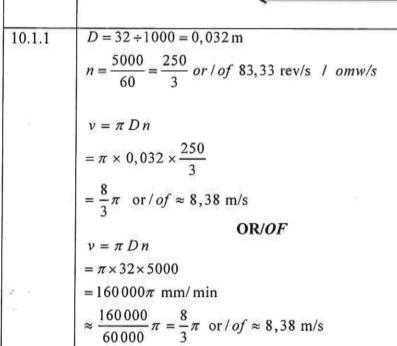
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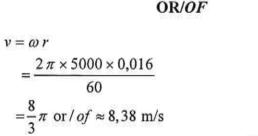
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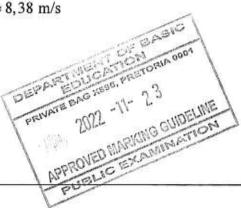


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✓ M both Conversions/ beide herleidings

✓F A

√SF CA

√circ.velocity/ omtrksnelhdCA

OR/OF

√F A

✓SF CA

✓ M both Conversion/ beide herleidings

✓circ.velocity/ omtrksnelhdCA

OR/OF

✓F A

✓SF CA

✓M both Conversion/ beide herleidings

√circ.velocity/ omtrksnelhdCA

NPU/NPR

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NSC/NSS-FINAL Marking Guidelines/FINALE Nasienriglyne 10.1.2 Radius of the larger circle/ Radius van die grootter sirkel = 16mm √both Radii/beide radiusse A Radius of the smaller circle/ Radius van die kleiner sirkel = 6 mm TM = OM - OT $TM = \frac{32-12}{2}$ OR/OF =16-6 $=10 \,\mathrm{mm}$ $=10 \,\mathrm{mm}$ √length/lengte CA $h=10 \,\mathrm{mm}$ and/en $d=32 \,\mathrm{mm}$ $4h^2 - 4dh + x^2 = 0$ √F A $4(10)^2 - 4(32)(10) + x^2 = 0$ ✓SF CA $400-1280+x^2=0$ $x^2 = 880$ $x = 4\sqrt{55}$ or $log of \approx 29,66 \,\mathrm{mm}$ $PR = 4\sqrt{55}$ or $/of \approx 29,66 \,\mathrm{mm}$ ✓Length/lengte CA OR/OF OR/OF Using the half chord of / Gebruik halfkoord van RO $OP^{2} = OT^{2} + PT^{2}$ $16^2 = (6)^2 + PT^2$ ✓both Radii/beide radiusse A $PT^2 = 220$ ✓ Pythagoras $PT = \sqrt{220}$ ✓ SF CA $PR = 2 \times \sqrt{220}$ ✓ Length of/Lengte van PT CA PR ≈ 29,66 mm ✓ length/lengte CA OR / OF OR/OF ✓ Height / Hoogte A Height of major segment = 22 mm $4h^2 - 4dh + x^2 = 0$ VF. A $4(22)^2 - 4(32)(22) + x^2 = 0$ ✓SF CA $x^2 = 880$ VS CA $x = 4\sqrt{55}$ or $/of \approx 29,66$ mm $PR = 4\sqrt{55} \quad \text{or } / of \approx 29,66 \,\text{mm}$ ✓ Length/lengte CA OR/OF OR/OF

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	$\cos P \hat{O} T = \frac{6}{16}$	✓ trig ratio / verh	A
al .	$\hat{POT} = \cos^{-1}\left(\frac{6}{16}\right)$	✓ size of / grootte van ∠	CA
	24 COUNTY #5	✓ trig ratio / verh	CA
	≈ 67,98°	ting ratio / vern	CA
	$\therefore \tan 67,98^\circ = \frac{\text{PT}}{6}$		
	PT = 6 tan 67,98°		
	≈ 14,83	✓ Length/lengte PT	CA
	PR ≈ 2(14,83) ≈ 29,66 mm		
	≈ 29,66 mm	✓Length/lengte PR	CA
	\$ 7,39	NPU/NPR	(5)
10.2		c	
9	222° F θ E	G	
0.2.1	$222^{\circ} \times \frac{\pi}{180^{\circ}} = \frac{37}{30} \pi$ or $/of \approx 3.87$ rad.	✓Conversion/ herleiding	A
		NPR NPU AO Full marks/ Volpunte	
0.2.2	$A = \frac{\theta}{360^{\circ}} \pi r^2$	✓Formula/ formule	(1) A
	$=\frac{222^{\circ}}{360^{\circ}}\pi(50)^{2}$	√SF	CA
	360° " (30) ≈ 4843,29 mm²	✓ Area of sector/	CA
	~ 4045,27 IIIII	oppervlakte van sektor	CA
	OR/OF	OR/OF	
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	$A = \frac{r^2 \theta}{2}$	✓ Formula/ formule	A
	$a = \frac{(50)^2 \left(\frac{37}{30}\pi\right)}{2}$	✓SF	CA
	$= \frac{2}{2}$ $= \frac{4625}{3}\pi \text{or/of} \approx 4843,29 \text{ mm}^2$	✓ Area of sector/ oppervlakte van sektor	CA
	\mathbf{OR}/\mathbf{OF} $\mathbf{S} = r\theta$	OR/OF	
	$=(50)\left(\frac{37}{30}\pi\right)$		
	$=\frac{185}{3}\pi \text{ or/}of \approx 193,73\text{mm}$	✓arc length/ booglengte	CA
	$A = \frac{rs}{2}$	✓Formula/ formule	A
	$=\frac{(50)\left(\frac{185}{3}\pi\right)}{2}$		
X	$=\frac{4625}{3}$	✓Area of sector/	
	≈ 4843,29mm ²	oppervlakte van sektor	CA NPU (3)

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	$BC^2 = BG^2 - CG^2$		
	BC $^2 = (360)^2 - (130)^2$	✓ length/ lengte BG	A
	BC = $70\sqrt{23} \approx 335,71 \text{mm}$	✓ length / lengte BC	CA
	$s = r\theta$	✓F	A
	$=(50)\left(\frac{37}{30}\pi\right)$	✓SF	CA
	$AE = \frac{185}{3}\pi \text{ or } / \text{ of } \approx 193,73 \text{ mm}$	$\sqrt{\frac{185}{3}}\pi$	CA
	LENGTH OF BELT/ LENGTE VAN BAND	✓M	A
	$= AE + AB + BC + CD + BD + BE$ $= \frac{185}{3}\pi + 30\sqrt{19} + 70\sqrt{23} + 503 + 70\sqrt{23} + 30\sqrt{19}$		
	≈1629,68 mm	✓ length/lengte	CA
	OR/OF	OR / OF	
	$\frac{AB}{DB} = \frac{AF}{DG}$	✓ Similarity/gelykvorm ✓ Proportion/ verhoudi	
	$\frac{30\sqrt{19}}{\text{DB}} = \frac{50}{130}$	✓ SF	A
	DB ≈ 339,99	✓ length / lengte DB	CA
	LENGTH OF BELT/LENGTE VAN BAND	e 960	
	$= AE + 2 \times AB + 2 \times BC + CD$	✓M	A
	$= \frac{185}{3}\pi + 2 \times 30\sqrt{19} + 2 \times 339,99 + 503$	✓SF	CA
	≈ 1638, 25 mm	✓ length/lengte	CA
	l .		
		Penalty for rounding/ Penalisering vir afronding	

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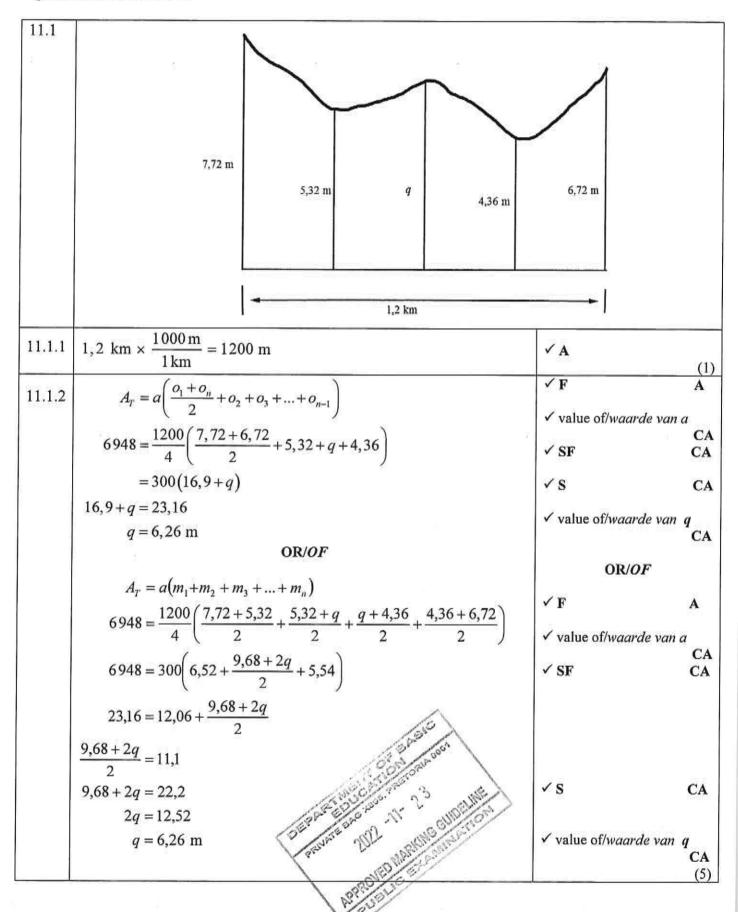
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B. J. Shall



11.2.1	$A_{cylinder/silinder} = 2\pi r^2 + 2\pi rh$	√formula/formule A
	$= 2\pi (1.5 \mathrm{m})^2 + 2\pi (1.5 \mathrm{m})(10)$	✓SF A
7.	$=108,38 \mathrm{m}^2$	✓ value of/ waarde van A
	$cost/koste = R 8,93 \times 108,38 \text{ m}^2$	CA
	= R 967,83 < R1000	✓Cost not exceeding R1000/ Koste nie meer as R1000 CA NPR (4)
11.2.2	Airspace for cylindrical tank/ lugruimte vir silindriese tenk = 70,69 m ³ - 68 m ³	
	$= 2,69 \mathrm{m}^3$	✓ M
	percentage/ persentasie = $\frac{2,69 \text{ m}^3}{70,69 \text{ m}^3} \times 100 = 3,81\%$	✓percentage/persentasie CA
	Airspace for car tank/ lugruimte vir kar tenk = $55 \ell - 52 \ell$ = 3ℓ	✓ M A
	percentage / $persentasie = \frac{3}{55} \times 100 = 5,45\%$	✓ percentage/persentasie CA
	The car fuel tank has a bigger percentage airspace/ die kar brandstoftenk het 'n groter persentasie lugruimte.	✓ conclusion/ gvltgtrekng CA
	OR / <i>OF</i>	OR / OF
	percentage/ persentasie = $\frac{68 \text{ m}^3}{70,69 \text{ m}^3} \times 100\% = 96,19\%$	✓ M A ✓ percentage/persentasie CA
	percentage / $persentasie = \frac{52}{55} \times 100\% = 94,55\%$	✓ M A ✓ percentage/persentasie CA
	The car fuel tank has a bigger percentage airspace/ die kar brandstoftenk het n groter persentasie lugruimte.	✓ conclusion/ gvltgtrekng CA
		(5) [15

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