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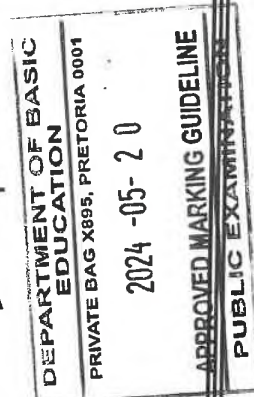


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**SENIOR CERTIFICATE EXAMINATIONS/
NATIONAL SENIOR CERTIFICATE EXAMINATIONS
SENIORSERTIFIKAAT-EKSAMEN/
NASIONALE SENIORSERTIFIKAAT-EKSAMEN**

TECHNICAL MATHEMATICS P2/TEGNIESE WISKUNDE V2

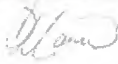
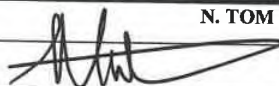
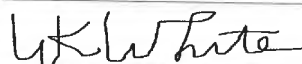
MAY/JUNE 2024

FINAL MARKING GUIDELINES/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 penaliserings vir afronding nie
NPU	No penalty for omitting units/Geen penaliserings vir eenhede weggelaat nie
R	Rounding/Afronding
RE	Reason/Rede
S	Simplification/Vereenvoudiging
SF	Substitution in correct formula/Vervanging in korrekte formule
ST	Statement / Bewering
ST/RE	Statement with reason/Bewering met rede
F	Correct formula/Korrekte formule

**These marking guidelines consist of 22 pages.
Hierdie nasienriglyne bestaan uit 22 bladsye.**

DATE APPROVED/DATUM GOEDGEKEUR	14 MAY 2024
EXTERNAL/EKSTERNE MODERATOR	INTERNAL /INTERNE MODERATORS
D. MARE	N. TOM
	
UMALUSI: Approved 14 May 2024 D MARE	W. WHITE
	

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NOTE:

- If a candidate answers a question **TWICE**, only mark the **FIRST** attempt.
- The method of Consistent Accuracy marking must be applied in all aspects of the marking guideline where indicated with the marking code **CA**.
- **Tolerance range is applicable in the following questions: #2.1.2; #6; #7.2 & #8.1.4**

LET WEL:

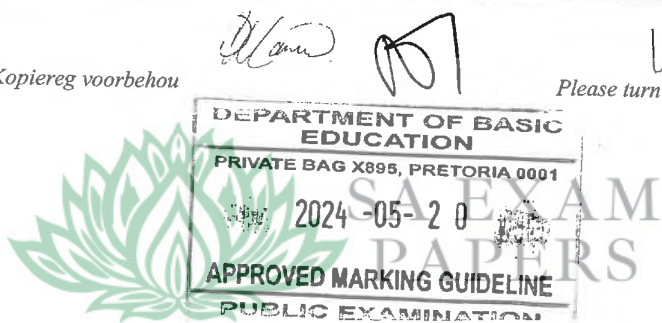
- Indien 'n kandidaat 'n vraag **TWEE** keer beantwoord, sien slegs die **EERSTE** poging na.
- Die metode van Volgehoue Akkuraatheid-nasien moet waar moontlik op alle aspekte van die nasienriglyne toegepas word soos aangedui deur die nasienkode **CA**.
- Toleransie wydte is van toepassing op die volgende vrae: #2.1.2; #6; #7.2 & #8.1.4

QUESTION/VRAAG 1

<p>1.1.1</p>	$m_{PQ} = \frac{-2 - (-6)}{-5 - (-1)} = \frac{-6 - (-2)}{-1 - (-5)}$ $= -1$	<p>✓ SF A</p> <p>✓ gradient/gradiënt CA</p> <p>AO: Full marks / volpunte</p> <p style="text-align: right;">(2)</p>
<p>1.1.2</p>	$N\left(\frac{x_R + x_Q}{2}; \frac{y_R + y_Q}{2}\right)$ $N\left(\frac{5 + (-1)}{2}; \frac{4 + (-6)}{2}\right)$ $N(2; -1)$ <p style="text-align: center;">OR/OF</p> $x_N = \frac{x_1 + x_2}{2}; y_N = \frac{y_1 + y_2}{2}$ $x_N = \frac{5 + (-1)}{2}; y_N = \frac{4 + (-6)}{2}$ $N(2; -1)$	<p>✓ x-value/waarde A</p> <p>✓ y-value /waarde A</p> <p style="text-align: center;">OR/OF</p> <p>✓ x-value/waarde A</p> <p>✓ y-value /waarde A</p> <p>AO: Full marks/ volpunte</p> <p style="text-align: right;">(2)</p>

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<p>1.1.3</p>	$y = -1x + c$ $4 = -1(5) + c$ $\therefore c = 9$ $\therefore y = -x + 9$ <p style="text-align: center;">OR/OF</p> $y - y_1 = m(x - x_1)$ $y - 4 = -1(x - 5)$ $y - 4 = -x + 5$ $\therefore y = -x + 9$	<p>✓ gradient/gradiënt CA ✓ substitution/vervanging (5; 4) A</p> <p>✓ equation/vergelyking CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ gradient/gradiënt CA ✓ substitution/vervanging (5; 4) A</p> <p>✓ equation/vergelyking CA</p> <p>AO: Full marks/ volpunte</p>
<p>1.2</p>	$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(-5 - (-1))^2 + (-2 - (-6))^2}$ $= 4\sqrt{2} \quad \text{OR/OF} \approx 5,66$ $SN = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(0 - 2)^2 + (1 - (-1))^2}$ $= 2\sqrt{2} \quad \text{OR/OF} \approx 2,83$ $\frac{PQ}{SN} = \frac{4\sqrt{2}}{2\sqrt{2}}$ $= 2$ <p style="text-align: center;">OR / OF</p> $m_{SN} = \frac{-1 - 1}{2 - 0}$ $m_{SN} = -1$ $m_{SN} = m_{PQ}$ $\therefore SN \parallel PQ$ $2SN = PQ \quad \left(\begin{array}{l} \text{midpoint theorem /} \\ \text{midpt stelling} \end{array} \right)$ $\frac{PQ}{SN} = 2$	<p>✓ SF A</p> <p>✓ value of/waarde van PQ A</p> <p>✓ value of /waarde van SN CA</p> $\frac{4\sqrt{2}}{2\sqrt{2}} \quad A$ <p style="text-align: center;">OR / OF</p> <p>✓ SF CA</p> <p>✓ gradient/gradiënt A</p> <p>✓ SN // PQ A</p> <p>✓ ST & RE A</p>
<p>[11]</p>		

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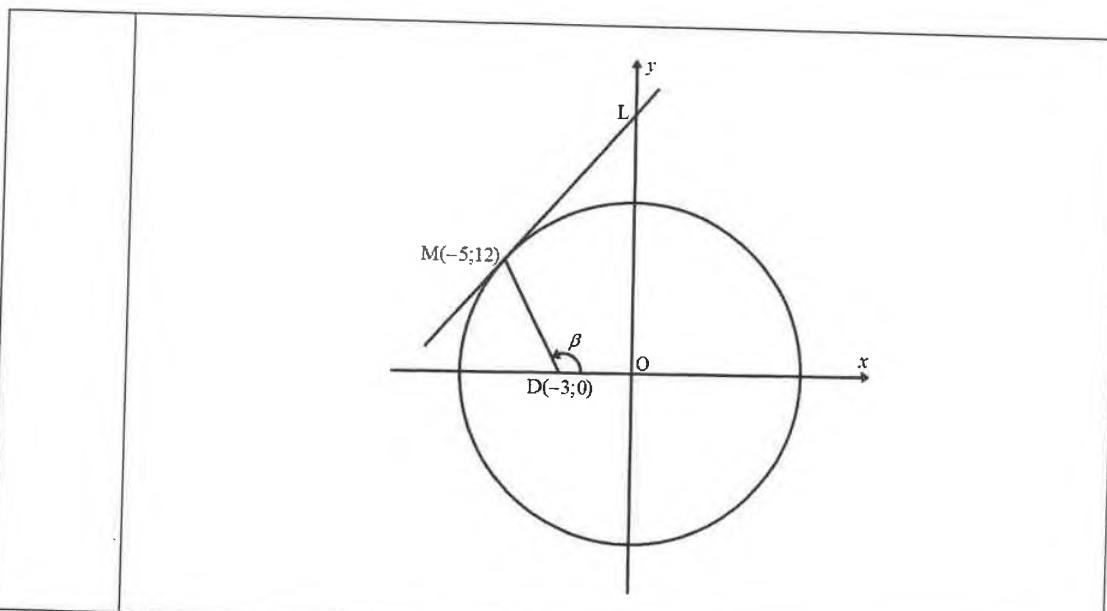
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QUESTION/VRAAG 2

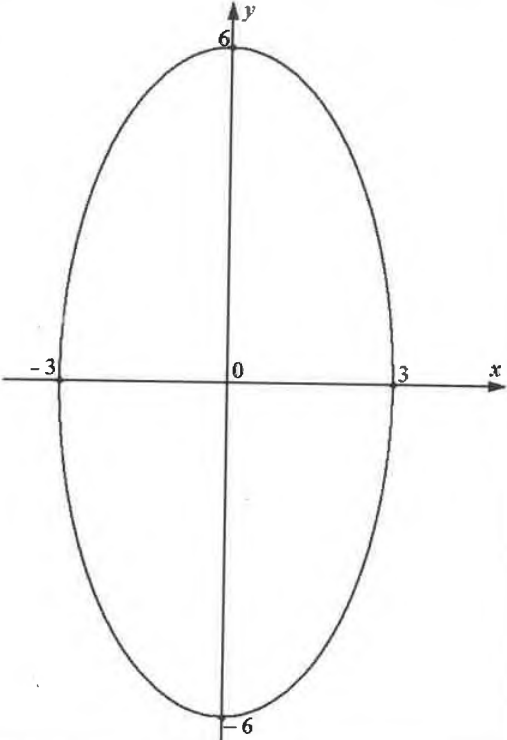


<p>2.1.1</p>	$x^2 + y^2 = r^2$ $(-5)^2 + (12)^2 = r^2$ $r^2 = 169$ $x^2 + y^2 = 169 \text{ OR / OF}$ $y = \pm\sqrt{169-x^2} \text{ OR / OF } x = \pm\sqrt{169-y^2}$	<p>✓ substitute/vervanging A</p> <p>✓ equation/vergelyking CA</p> <p>AO: full marks/ volpunte</p>
<p># 2.1.2</p>	$m_{OM} = -\frac{12}{5}$ $m_{\text{tang}} = \frac{5}{12}$ $y = mx + c \quad \text{OR/OF} \quad y - y_1 = m(x - x_1)$ $12 = \frac{5}{12}(-5) + c \quad \quad \quad y - (12) = \frac{5}{12}(x - (-5))$ $c = \frac{169}{12}$ $\therefore y = \frac{5}{12}x + \frac{169}{12}$ <p style="text-align: center;">OR/OF</p> $y \cdot y_1 + x \cdot x_1 = r^2$ $y(12) + x(-5) = 169$ $12y - 5x = 169$ $\therefore y = \frac{5}{12}x + \frac{169}{12}$	<p>✓ gradient/gradient A</p> <p>✓ gradient/gradient CA</p> <p>✓ substitution/vervanging (-5; 12) A</p> <p>✓ equation/vergelyking CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ F A</p> <p>✓ substitution/vervanging $r^2 = 169$ CA</p> <p>✓ substitution/vervanging (-5; 12) A</p> <p>✓ equation/vergelyking CA</p> <p style="text-align: right;">(4)</p>

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2.1.3	$L\left(0; \frac{169}{12}\right)$ <p style="text-align: center;">OR / OF</p> $L(0; 14,08)$	✓ x-coordinate/koördinaat A ✓ y- coordinate/koördinaat CA (2)
2.1.4	$m_{MD} = \frac{12-0}{-5-(-3)} = \frac{0-12}{-3-(-5)} = -6$ $\tan \beta = -6$ Ref/ Verw $\angle = 80,54^\circ$ $\therefore \beta = 99,46^\circ$	✓ gradient/gradiënt A ✓ SF CA ✓ reference angle/ verw.hk CA ✓ angle/hoek CA (4)
2.2		✓ both x-intercepts/ beide x-afsnitte A ✓ both y-intercepts beide y-afsnitte A ✓ elliptical shape/eliptiese vorm CA (3)
[15]		

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QUESTION/VRAAG 3

3.1.1	$\operatorname{cosec} P \times \tan Q$ $= \operatorname{cosec} 19^\circ \times \tan 61^\circ$ $= \frac{1}{\sin 119^\circ} \times \tan 61^\circ$ OR / OF $\frac{1}{\sin 61^\circ} \times \tan 61^\circ$ $\approx 2,06$	\checkmark substitution/vervanging A $\checkmark \frac{1}{\sin 119^\circ}$ OR / OF $\frac{1}{\sin 61^\circ}$ A $\checkmark 2,06$ CA AO: Full marks /volpunte (3)
3.1.2	$\cos^2(P + 2Q)$ $= \cos^2(119^\circ + 2 \times 61^\circ)$ $\approx 0,24$	\checkmark substitution/vervanging A $\checkmark 0,24$ CA AO: Full marks /volpunte (2)
3.2	$\frac{1}{2} \tan \theta = 2$ $\tan \theta = \frac{2}{1/2} = 4$ $r^2 = x^2 + y^2$ $r^2 = (1)^2 + (4)^2$ $= \sqrt{17}$ $\sin^2 \theta + \cos^2 \theta = \left(\frac{4}{\sqrt{17}}\right)^2 + \left(\frac{1}{\sqrt{17}}\right)^2$ $= \frac{16}{17} + \frac{1}{17}$ $= \frac{17}{17}$ $= 1$	\checkmark S A \checkmark substitution/vervanging A \checkmark r value/waarde CA \checkmark sin ratio/verh CA \checkmark cos ratio/verh CA \checkmark S (squaring/kwadring) CA (6)
3.3	$\sin x = \tan 318^\circ$ $\sin x = -0,9004040443$ Ref / Verw $\angle = 64,21^\circ$ $x = 180^\circ + 64,21^\circ$ or/of $x = 360^\circ - 64,21^\circ$ $x = 244,21^\circ$ or/of $x = 295,79^\circ$	\checkmark S A \checkmark reference angle/verw.hk CA $\checkmark 244,21^\circ$ CA $\checkmark 295,79^\circ$ CA (4)
		[15]

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QUESTION/VRAAG 4

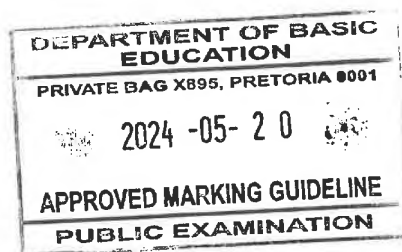
4.1.1	$\tan(\pi + A) = \tan A$	✓ $\tan A$ A (1)
4.1.2	$\frac{\tan(\pi + A) \cdot \cos(180^\circ - A) \cdot \sin(360^\circ - A)}{\sin(2\pi + A)}$ $= \frac{\tan A \cdot -\cos A \cdot -\sin A}{\sin A}$ $= \frac{\sin A}{\cos A} \cdot \frac{\cos A}{1}$ $= \sin A$ <p style="text-align: center;">OR/OF</p> $\frac{\tan(\pi + A) \cdot \cos(180^\circ - A) \cdot \sin(360^\circ - A)}{\sin(2\pi + A)}$ $= \frac{\tan A \cdot -\cos A \cdot -\sin A}{\sin A}$ $= \tan A \cdot \frac{\cos A}{\sin A} \cdot \sin A$ $= \tan A \cdot \cot A \cdot \sin A$ $= \tan A \cdot \frac{1}{\tan A} \cdot \sin A$ $= \sin A$	✓ $-\cos A$ ✓ $-\sin A$ A ✓ $\sin A$ ✓ I $\frac{\sin A}{\cos A}$ A ✓ $\sin A$ <p style="text-align: center;">OR / OF</p> ✓ $-\cos A$ ✓ $-\sin A$ A ✓ $\sin A$ A ✓ I $\frac{\cos A}{\sin A} = \cot A$ A ✓ $\sin A$ CA (5)
4.2	-1	✓ -1 A (1)
4.3	$\sin x + \cos^2 x \cdot \operatorname{cosec} x = \operatorname{cosec} x$ $\text{LHS / LK} = \sin x + \cos^2 x \cdot \frac{1}{\sin x}$ $= \frac{\sin^2 x + \cos^2 x}{\sin x}$ $= \frac{1}{\sin x}$ $= \operatorname{cosec} x = \text{RHS / RK}$ <p style="text-align: center;">OR/OF</p>	✓ I $\frac{1}{\sin x}$ A ✓ S CA ✓ I $\sin^2 x + \cos^2 x = 1$ A <p style="text-align: center;">OR / OF</p>

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	$\text{LHS / LK} = \sin x + \cos^2 x \cdot \frac{1}{\sin x}$ $= \sin x + (1 - \sin^2 x) \cdot \frac{1}{\sin x}$ $= \sin x + \frac{1}{\sin x} - \sin x$ $= \frac{1}{\sin x}$ $= \text{cosec } x = \text{RHS / RK}$	<p>✓ I $\frac{1}{\sin x}$ A</p> <p>✓ I $1 - \sin^2 x$ A</p> <p>✓ S A</p>
		(3)
		[10]



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QUESTION/VRAAG 5

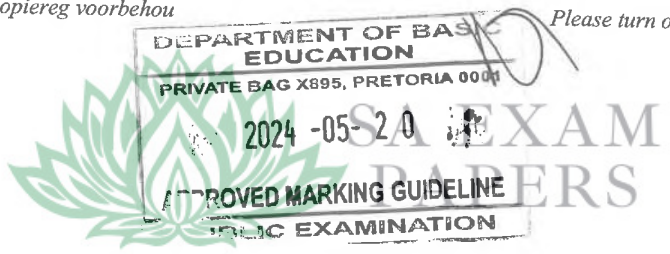
5.1	<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>f:</p> <ul style="list-style-type: none"> ✓ shape/vorm A ✓ x-intercepts / x- afsnitte A ✓ turning points/draaipunte A <li style="padding-left: 20px;">(45°; 1), (225°; -1) A ✓ y-intercept / y-afsnit A </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>g:</p> <ul style="list-style-type: none"> ✓ shape/vorm A ✓ x-intercepts/ x-afsnitte A ✓ turning points/draaipunte A <li style="padding-left: 20px;">(90°; -2), (270°; 2) A </div> </div>
5.2	90° ✓ x value/waarde CA
5.3	360° ✓ period/periode A
5.4	$-\frac{1}{2} \cos(x - 45^\circ) = \sin x$ $\cos(x - 45^\circ) = -2 \sin x$ <p>A on the graph / op die grafiek</p> <p>B on the graph / op die grafiek</p> ✓ S A ✓ A on the graph/op die grafiek CA ✓ B on the graph/ op die grafiek CA (3)
5.5	$x \in (45^\circ; 225^\circ)$ OR/ OF $45^\circ < x < 225^\circ$ OR/ OF $x > 45^\circ$ and/en $x < 225^\circ$ OR/ OF between/tussen 45° and/en 225° ✓ critical values/ kritiese waardes CA ✓ notation/ notasie A OR/OF ✓ critical values/kritiese waardes CA ✓ notation/notasie A (2)
[14]	

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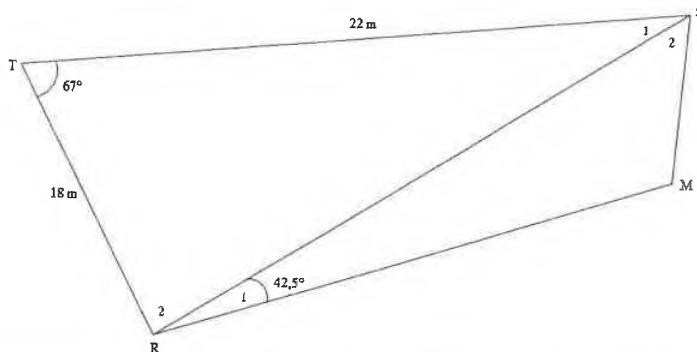
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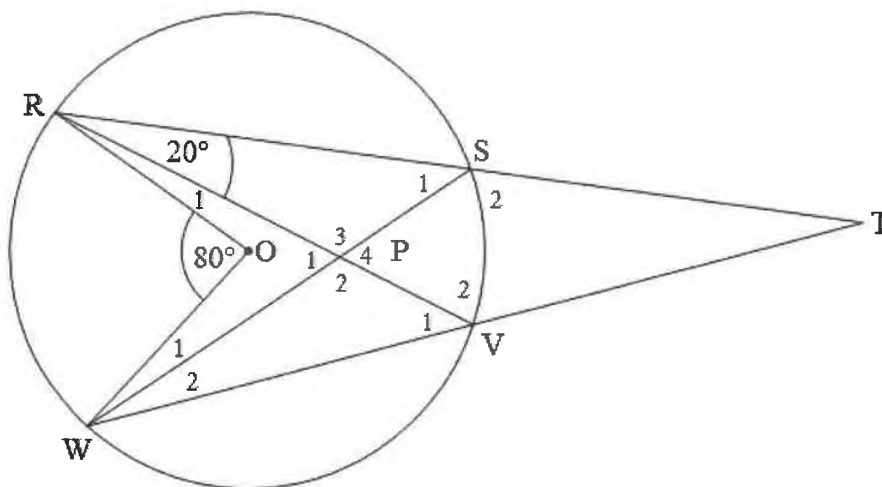


QUESTION/VRAAG 6

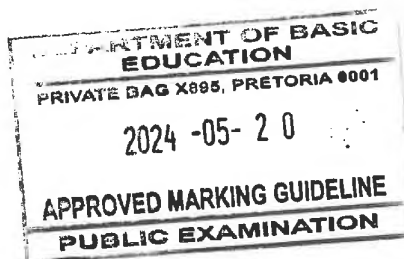


6.1.1	$SR^2 = TS^2 + TR^2 - 2TS \cdot TR \cos T$ $= (22)^2 + (18)^2 - 2(22)(18)\cos 67^\circ$ $= 498,5409462$ $SR \approx 22,33 \text{ m}$	✓ cos rule/reël A ✓ substitution/vervanging A ✓ length of/lengte van SR CA (3)
6.1.2	$\hat{M} = 180^\circ - 67^\circ = 113^\circ$	✓ size of/grootte \hat{M} A (1)
6.2.1	$\frac{SM}{\sin R_1} = \frac{SR}{\sin M}$	✓ sin rule/reël A (1)
6.2.2	$\frac{SM}{\sin 42,5^\circ} = \frac{22,33}{\sin 113^\circ}$ $SM = \frac{22,33 \sin 42,5^\circ}{\sin 113^\circ}$ $= 16,39 \text{ m}$	✓ substitution/vervanging CA ✓ length of/lengte van SM CA (2)
6.3	$\hat{S}_2 = 24,5^\circ$ <p>Area of/van $\Delta SMR = \frac{1}{2} SR \times SM \sin \hat{S}_2$</p> <p>OR/OF Area of/van $\Delta SMR = \frac{1}{2} m \times r \times \sin \hat{S}_2$</p> $\text{Area of/van } \Delta SMR = \frac{1}{2} (22,33)(16,39) \sin 24,5^\circ$ $= 75,89 \text{ m}^2$ $\text{Bags/sakke} = \frac{75,89}{15,178} = 5$ <p>5 bags will be required / sakke sal benodig word</p>	✓ size of \hat{S}_2 CA ✓ area rule/reël A ✓ substitution/vervanging CA ✓ area CA ✓ number of bags/aantal sakke CA (5)
		[12]

QUESTION / VRAAG 7



7.1.1	$\hat{V}_1 = 40^\circ$ (\angle at centre = $2 \times \angle$ at circum / <i>midpts</i> $\angle = 2 \times \text{omtreks} \angle$)	✓ ST ✓ RE	A A (2)
7.1.2	$\hat{T} = 20^\circ$ (ext \angle of Δ / <i>buite</i> \angle van Δ) OR / OF $\hat{V}_2 = 140^\circ$ (\angle s on straight line/ <i>Le op reguitlyn</i>) $\therefore T = 20^\circ$ (Int \angle s of Δ / <i>binne</i> \angle e van Δ)	✓ ST ✓ RE ✓ ST ✓ RE	CA A CA A (2)



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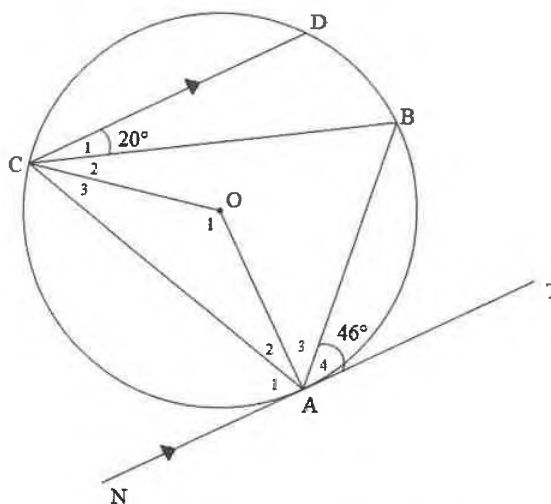


7.2	$\hat{S}_1 = 40^\circ$ $\left(\begin{array}{l} \angle \text{ at centre} = 2 \times \angle \text{ at circum} / \\ \text{midpts} \angle = 2 \times \text{omtreks} \angle \end{array} \right)$	✓ ST	CA
	OR/OF		
	$\hat{S}_1 = 40^\circ$ $\left(\begin{array}{l} \angle \text{ s on same segm} / \\ \angle \text{ e dies segm} \end{array} \right)$		
	$\therefore \hat{P}_4 = 60^\circ$ (ext \angle of Δ / buite \angle van Δ)	✓ ST	CA
	$\therefore \hat{P}_4 + \hat{T} \neq 180^\circ$	✓ RE	A
	\therefore STVP $\left(\begin{array}{l} \text{Not cyclic} / \\ \text{Nie siklies} \end{array} \right) \left(\begin{array}{l} \text{opp} \angle \text{ s NOT supp} / \\ \text{teenoorst} \angle \text{ e NIE sup pl} \end{array} \right)$	✓ RE	A
	OR/OF		
	OR/OF		
	$\hat{S}_1 = 40^\circ$ $\left(\begin{array}{l} \angle \text{ at centre} = 2 \times \angle \text{ at circum} / \\ \text{midpts} \angle = 2 \times \text{omtreks} \angle \end{array} \right)$	✓ ST	CA
	$\therefore \hat{P}_3 = 120^\circ$ $\left(\begin{array}{l} \text{Int} \angle \text{ s of} \Delta / \\ \text{Binne} \angle \text{ e van} \Delta \end{array} \right)$	✓ ST	CA
	$\therefore \hat{P}_3 \neq \hat{T}$	✓ RE	A
	\therefore STVP $\left(\begin{array}{l} \text{Not cyclic} / \\ \text{Nie siklies} \end{array} \right) \left(\begin{array}{l} \text{Ext} \angle \neq \text{opp int} \angle / \\ \text{Buite} \angle \neq \text{teenoorst binne} \angle \end{array} \right)$	✓ RE	A
OR/OF			
$\hat{S}_2 = 180^\circ - 40^\circ = 140^\circ$ $\left(\begin{array}{l} \angle \text{ s on a straight line} / \\ \angle \text{ e op'n reguitlyn} \end{array} \right)$	✓ ST	CA	
$\hat{V}_2 = 180^\circ - 40^\circ = 140^\circ$ $\left(\begin{array}{l} \angle \text{ s on a straight line} / \\ \angle \text{ e op'n reguitlyn} \end{array} \right)$	✓ ST	CA	
$\hat{S}_2 + \hat{V}_2 \neq 180^\circ$	✓ RE	A	
\therefore STVP $\left(\begin{array}{l} \text{Not cyclic} / \\ \text{Nie siklies} \end{array} \right) \left(\begin{array}{l} \text{Opp} \angle \text{ s not supp} / \\ \text{Teenoorst} \angle \text{ e nie supp} \end{array} \right)$	✓ RE	A	
OR/OF			
OR/OF			
$\hat{V}_2 = \hat{S}_2 = 180^\circ - 40^\circ = 140^\circ$ $\left(\begin{array}{l} \angle \text{ s on a straight line} / \\ \angle \text{ e op'n reguitlyn} \end{array} \right)$	✓ ST	CA	
$\hat{V}_1 \neq \hat{S}_2$ OR/OF $\hat{V}_2 \neq \hat{S}_1$	✓ ST	CA	
\therefore STVP $\left(\begin{array}{l} \text{Not cyclic} / \\ \text{Nie siklies} \end{array} \right) \left(\begin{array}{l} \text{Ext} \angle \neq \text{opp int} \angle / \\ \text{Buite} \angle \neq \text{teenoorst binne} \angle \end{array} \right)$	✓ RE	A	
		(3)	
		[7]	



QUESTION/VRAAG 8

8.1



8.1.1	$\hat{BCA} = 46^\circ$ (tan - chord / raaklyn - koord)	✓ ST ✓ RE	A A (2)
8.1.2	$\hat{OAT} = 90^\circ$ $\left(\begin{array}{l} \text{tan } \perp \text{ rad /} \\ \text{raaklyn } \perp \text{ rad} \end{array} \right)$ $\therefore \hat{A}_3 = 44^\circ$	✓ ST ✓ RE ✓ ST	A A CA (3)
8.1.3	$\hat{A}_1 = 66^\circ$ $\left(\begin{array}{l} \text{alt } \angle\text{s; } CD \parallel NT / \\ \text{verw } \angle\text{e; } CD \parallel NT \end{array} \right)$	✓ ST ✓ RE	CA A (2)
#	$\hat{B} = 66^\circ$ (tan - chord / raaklyn - koord)	✓ ST	CA
8.1.4	$\hat{O}_1 = 132^\circ$ $\left(\begin{array}{l} \angle \text{ at centre} = 2 \times \angle \text{ at circum /} \\ \text{midpts } \angle = 2 \times \text{omtreks } \angle \end{array} \right)$ OR / OF	✓ ST ✓ RE	CA A
	$\hat{A}_2 = 24^\circ$ $\left(\begin{array}{l} \text{tan } \perp \text{ rad /} \\ \text{raaklyn } \perp \text{ rad} \end{array} \right)$ OR/OF $\left(\begin{array}{l} \angle\text{s on str line /} \\ \angle\text{e op reguitlyn} \end{array} \right)$	✓ ST	CA
	$\therefore \hat{C}_3 = 24^\circ$ $\left(\begin{array}{l} \angle\text{s opp} = \text{sides /} \\ \angle\text{e teenoor} = \text{sye} \end{array} \right)$	✓ ST	CA
	$\therefore \hat{O}_1 = 132^\circ$ $\left(\begin{array}{l} \text{int } \angle\text{s of } \Delta / \\ \text{binne } \angle\text{e van } \Delta \end{array} \right)$	✓ ST	CA (3)

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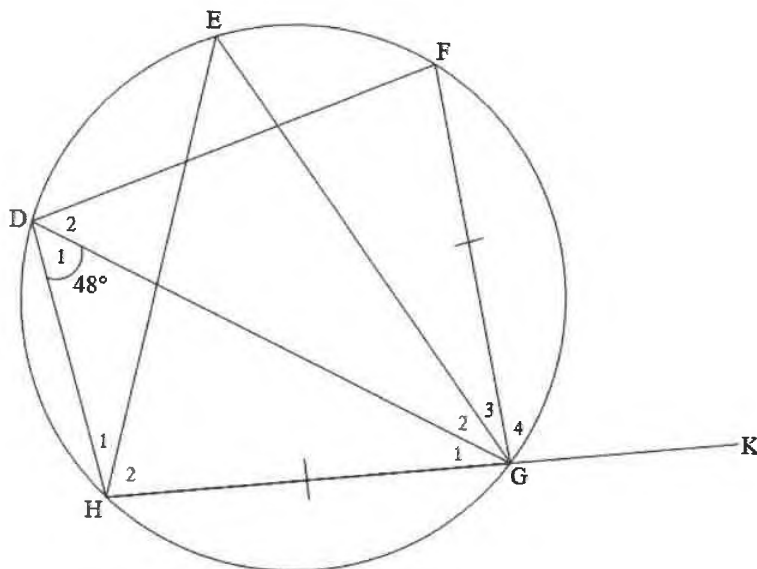
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8.2



8.2.1	$\hat{E} = 48^\circ$ (\angle s in the same segment / \angle e in dieselfde segment)	✓ ST ✓ RE	A A (2)
8.2.2	$\hat{D}_2 = 48^\circ$ (equal chords; equal \angle s / gelyke koorde; gelyke \angle e)	✓ ST ✓ RE	CA A (2)
8.2.3	$\hat{G}_4 = 96^\circ$ (ext \angle of cyclicquad / buite \angle van kdvh)	✓ ST ✓ RE	CA A (2)
			[16]

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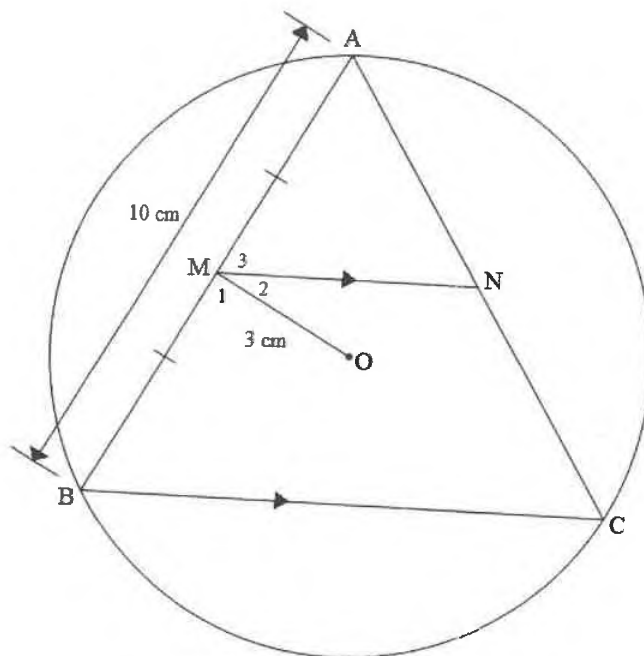
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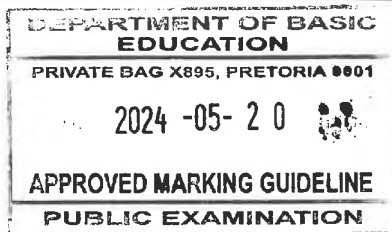
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QUESTION / VRAAG 9



9.1.1 a)	$\hat{M}_1 = 90^\circ$ (line from centre to midpt of chord/ <i>lyn vanaf midpt sirkel na midpt vankrd</i>)	✓ ST ✓ RE	A A (2)
9.1.1 b)	$MB = 5 \text{ cm}$ $OB^2 = OM^2 + MB^2$ (Pythagoras) $\therefore OB^2 = 3^2 + 5^2 = 34$ $\therefore OB = \sqrt{34} \approx 5,83 \text{ cm}$ <p style="text-align: center;">OR / OF</p> $MA = 5 \text{ cm}$ $OA^2 = OM^2 + MA^2$ (Pythagoras) $\therefore OA^2 = 3^2 + 5^2 = 34$ $\therefore OA = \sqrt{34} \approx 5,83 \text{ cm}$	✓ length of/lengte van MB ✓ Pythagoras ✓ length of/lengte van OB <p style="text-align: center;">OR / OF</p> ✓ length of/lengte van MA ✓ Pythagoras ✓ length of/lengte van OA	A A CA A A CA (3)
9.1.2	$BC = 2MN$ (Midpoint th / <i>Middelpt st</i>) $\therefore BC = 10,24 \text{ cm}$	✓ ST ✓ RE	A A (2)



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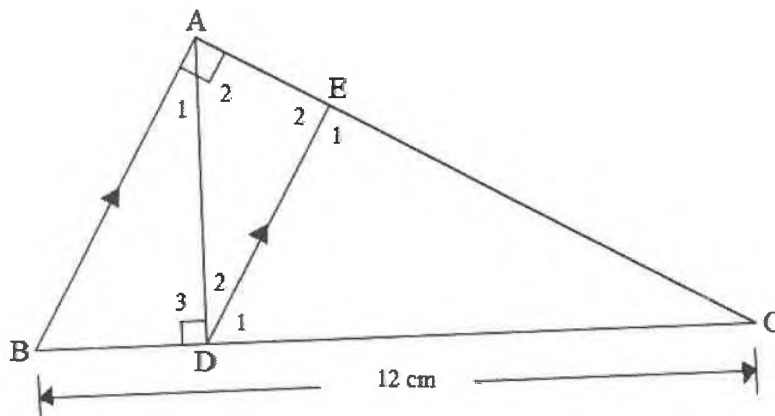
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9.2



9.2.1	<p>In ΔADC and ΔBAC: $\hat{A}DC = \hat{A} = 90^\circ$ (given/gegee) \hat{C} is common / gemeen $\therefore \Delta ADC \parallel \Delta BAC$ ($\angle\angle\angle$) OR / OF $\hat{A}_2 = \hat{B}$ (Int \angles of Δ / Binne \anglee van Δ)</p>	<p>✓ ST A ✓ ST A ✓ Concl/ Gevlgr OR/OF Indicating 3rd pair / dui 3^{de} paar A (3)</p>
9.2.2	<p>$\frac{DC}{AC} = \frac{AC}{BC}$ ($\Delta ADC \parallel \Delta BAC$) $\therefore AC^2 = DC \cdot BC$</p>	<p>✓ ST correct ratio / korrekte verh A (1)</p>
9.2.3 a)	<p>$\frac{DC}{BC} = \frac{CE}{AC}$ (Prop th/eweredig. st.; $DE \parallel AB$) OR / OF</p> <p>In ΔCED and ΔCAB:</p> <p>1) \hat{C} is common / gemeen 2) $\hat{E}_1 = \hat{B} \hat{A} C$ (corr/ooreenk \angles/e; $AB \parallel DE$) 3) $\hat{B} = \hat{D}_1$ (corr/ooreenk \angles/e; $AB \parallel DE$) $\Delta CED \parallel \Delta CAB$ ($\angle\angle\angle$) $\therefore \frac{DC}{BC} = \frac{CE}{AC}$</p>	<p>✓ ST A ✓ RE A OR/OF ✓ ST (proving similarity / bewys gelykvormigheid) A ✓ ST A (2)</p>

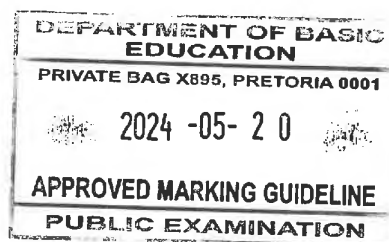
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9.2.3 b)	$\frac{DC}{12} = \frac{2}{3} \text{ (from/vanaf 9.2.3a)}$ $\therefore DC = \frac{2}{3} \times 12 = 8 \text{ cm}$	✓ substitution / <i>vervanging</i> CA ✓ ST CA (2)
9.2.3 c)	$\therefore AC^2 = 8 \times 12 = 96 \text{ cm}$ $\therefore AC \approx 9,80 \text{ cm}$	✓ substitution / <i>vervanging</i> CA ✓ ST CA (2)
		[17]



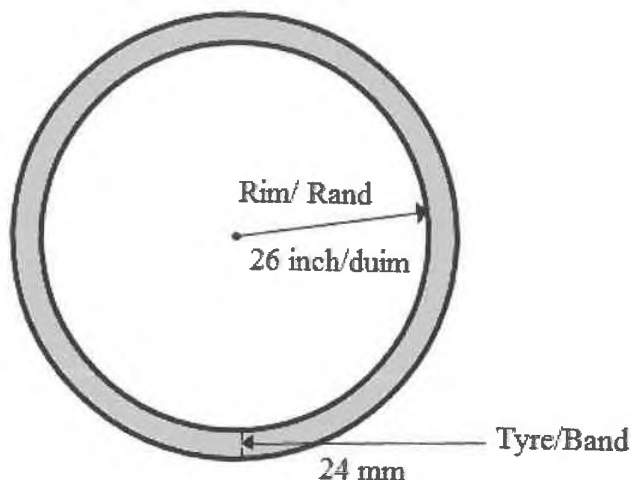
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QUESTION/VRAAG 10

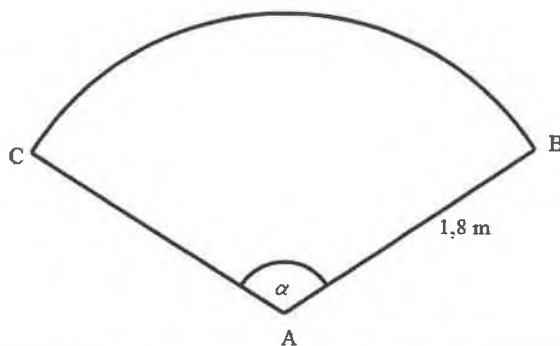
10.1



10.1.1	$26 \text{ inch/duim} = 26 \text{ inch/duim} \times \frac{0,0254 \text{ m}}{1 \text{ inch}} \approx 0,66 \text{ m}$	✓ answer/antwoord	A (1)
10.1.2	<p>Diameter/Middellyn</p> $= 0,66 \times 2 + 2 \times 24 \text{ mm} \times \frac{1 \text{ m}}{1000 \text{ mm}} \approx 1,37 \text{ m}$ <p style="text-align: center;">OR/OF</p> <p>Radius</p> $= 0,66 + 24 \text{ mm} \times \frac{1 \text{ m}}{1000 \text{ mm}} \approx 0,684 \text{ m}$ <p>Diameter/Middellyn = $2 \times 0,684 \approx 1,37 \text{ m}$</p>	<p>✓M</p> <p>✓ answer/antwoord</p> <p style="text-align: center;">OR/OF</p> <p>✓M</p> <p>✓ answer/antwoord</p> <p>AO: Full marks / volpunte</p>	<p>A</p> <p>CA</p> <p>A</p> <p>CA</p> <p>(2)</p>
10.1.3	$v = 60 \text{ km/h} = \frac{60 \text{ km}}{1 \text{ h}} \times \frac{1 \text{ h}}{3600 \text{ s}} \times \frac{1000 \text{ m}}{1 \text{ km}} = 16,67 \text{ m/s}$ $v = \pi Dn$ $\therefore 16,67 \text{ m/s} = \pi(1,37)n$ $\therefore n = \frac{16,67}{1,37\pi}$ $\therefore n \approx 3,87 \text{ rev/s}$ <p style="text-align: center;">OR/OF</p>	<p>✓ conversion/herleiding</p> <p>✓F</p> <p>✓SF</p> <p>✓ answer/antwoord</p> <p style="text-align: center;">OR/OF</p>	<p>A</p> <p>A</p> <p>CA</p> <p>CA</p>


$v = 60 \text{ km/h} = \frac{60 \text{ km}}{1 \text{ h}} \times \frac{1 \text{ h}}{3600 \text{ s}} \times \frac{1000 \text{ m}}{1 \text{ km}} = 16,67 \text{ m/s}$	✓ conversion/herleiding A
$w = \frac{v}{r}$	✓ F A
$\therefore w = \frac{16,67}{0,684} \approx 24,371$	✓ SF CA
$\therefore w = 2\pi n$	
$\therefore n = \frac{24,371}{2\pi} \approx 3,87 \text{ rev/s}$	✓ answer/antwoord CA
	(4)

10.2



Area of sector/van sektor = $\frac{r^2 \theta}{2}$	✓ F A
$2,5 = \frac{(1,8)^2 \alpha}{2}$	✓ SF A
$\alpha = \frac{2,5 \times 2}{3,24} = 1,5432 \text{ rad}$	✓ α in rad CA
$\therefore \alpha = 1,5432 \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}} \approx 88,42^\circ$	✓ α in degrees/grade CA
$\alpha < 90^\circ$ thus α is an acute angle/ $\alpha < 90^\circ$ dus is α 'n skerphoek	✓ conclusion/gevolgtrekking CA
OR/OF	OR / OF
Area of a sector/van 'n sektor = $\frac{\theta}{360^\circ} \times \pi r^2$	✓ F A
$2,5 = \frac{\alpha}{360^\circ} \times \pi (1,8)^2$	✓ SF A
$\alpha = \frac{2,5 \times 360^\circ}{3,24 \pi}$	✓ S CA
$\alpha \approx 88,42^\circ$	✓ α in degrees/grade CA
$\alpha < 90^\circ$ thus α is an acute angle/ $\alpha < 90^\circ$ dus is α 'n skerphoek	✓ conclusion/gevolgtrekking CA
	(5)

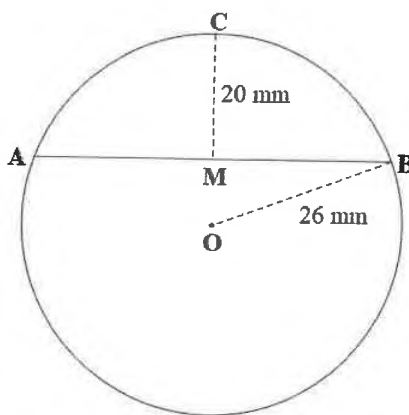
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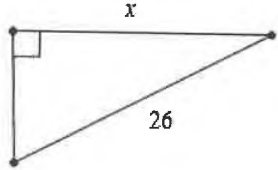

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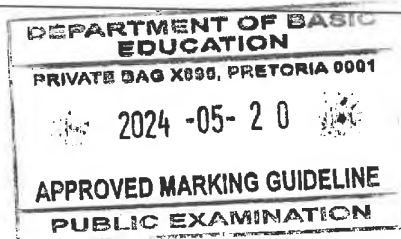
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10.3



	$4h^2 - 4dh + x^2 = 0$ $4(20)^2 - 4(52)(20) + x^2 = 0$ $\therefore x^2 = 2560$ $\therefore x \approx 50,6 \text{ mm OR/OF } \therefore x = 16\sqrt{10} \text{ mm}$ <p style="text-align: center;">OR / OF</p>  $x^2 = 26^2 - 6^2 \text{ (Pythagoras)}$ $x^2 = 640$ $\therefore x \approx 25,298\dots$ $AB = 2x$ $\therefore AB \approx 50,6 \text{ cm OR/OF } = 16\sqrt{10} \text{ mm}$	<ul style="list-style-type: none"> ✓F A ✓ diameter/middellyn A ✓SF CA ✓ answer/antwoord CA <p style="text-align: center;">OR / OF</p> <ul style="list-style-type: none"> ✓ $26 - 20 = 6 \text{ mm}$ A ✓ Pythagoras A ✓ value of/waarde van x CA ✓ length of/lengte van AB CA <p style="text-align: right;">(4) [16]</p>
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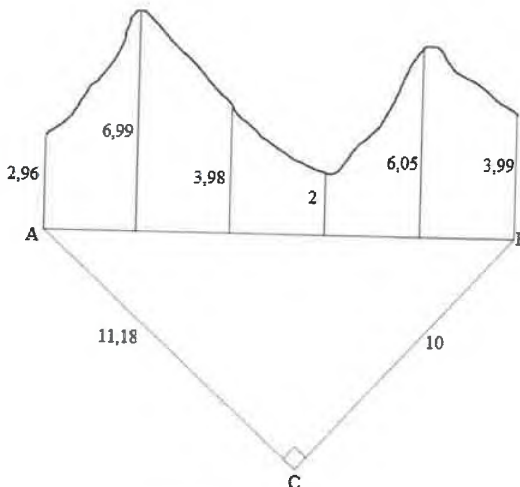
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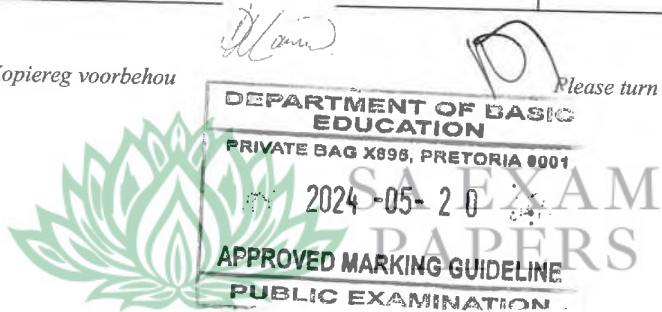
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QUESTION / VRAAG 11

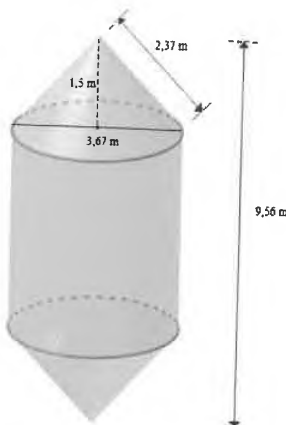
11.1



<p>11.1.1</p>	<p>$AB^2 = 11,18^2 + 10^2$ (Pythagoras) $AB \approx 15$ cm</p> <p style="text-align: center;">OR / OF</p> <p>$AB^2 = AC^2 + BC^2 - 2(AC)(BC)\cos C$ $= (11,18)^2 + (10)^2 - 2(11,18)(10)\cos 90^\circ$ $= 224,9924$ $AB \approx 15$ cm</p>	<p>✓ Substitute/vervang ✓ answer/antwoord R</p> <p style="text-align: center;">OR / OF</p> <p>✓ Substitute/vervang ✓ answer/antwoord R</p>	<p>A CA A CA (2)</p>
<p>11.1.2</p>	<p>width/wydte = $\frac{15}{5} = 3$ cm</p>	<p>✓ answer/antwoord</p>	<p>CA (1)</p>
<p>11.1.3</p>	<p>$Area = a \left(\frac{o_1 + o_n}{2} + o_2 + o_3 + \dots + o_{n-1} \right)$ $= 3 \left(\frac{2,96 + 3,99}{2} + 6,99 + 3,98 + 2 + 6,05 \right)$ $= 3(22,495)$ $\approx 67,49$ cm²</p> <p style="text-align: center;">OR / OF</p> <p>$Area = a(m_1 + m_2 + m_3 + \dots + m_n)$ $= 3 \left(\frac{2,96 + 6,99}{2} + \frac{6,99 + 3,98}{2} + \frac{3,98 + 2}{2} + \frac{2 + 6,05}{2} + \frac{6,05 + 3,99}{2} \right)$ $= 3(22,495)$ $\approx 67,49$ cm²</p>	<p>✓ F ✓ SF ✓ answer/antwoord OR / OF ✓ F ✓ SF ✓ answer/antwoord</p>	<p>A CA CA A CA CA (3)</p>

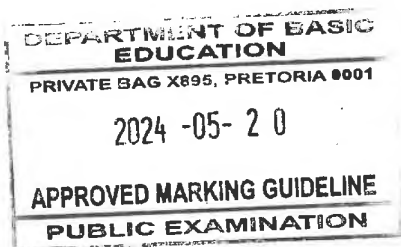


11.2



11.2.1 a)	r of cone / van keël = $\frac{367}{200} = 1,835$ m	✓ answer/antwoord	A (1)
11.2.1 b)	height of cylinder / hoogte van silinder = 6,56 m	✓ answer /antwoord	A (1)
11.2.2	Volume of cylinder/silinder = $\pi(1,835)^2(6,56)$ = 69,3946...	✓ SF	CA
	Volume of cones/keëls = $2 \times \frac{1}{3} \pi(1,835)^2(1,5)$ = 10,578...	✓ SF	CA
	∴ Volume container/houer $\approx 25,46 \pi \text{ m}^3$ OR/OF $\approx 79,97 \text{ m}^3$	✓ answer/antwoord	CA (3)
11.2.3	Total surface area / Totale buite opp = $2\pi r h + 2 \times \pi r \ell$ = $2\pi(1,835)(6,56) + 2 \times \pi(1,835)(2,37)$ $\approx 32,78\pi \text{ m}^2$ OR/OF $\approx 102,96 \text{ m}^2$ ∴ The material will not be sufficient to cover / Die materiaal sal nie voldoende wees nie	✓ F $2\pi r h$ ✓ F $2 \times \pi r \ell$ ✓ substitution/vervanging ✓ substitution/vervanging ✓ answer/antwoord ✓ conclusion/gevolgtrekking	A A CA CA CA CA (6) [17]

TOTAL/TOTAAL:150



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