



education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/ *PROVINSIALE ASSESSERING*

GRADE/GRAAD 11

MATHEMATICS P2/WISKUNDE V2

NOVEMBER 2024

MARKING GUIDELINES/ NASIENRIGLYNE

MARKS/PUNTE: 150



Testpapers.co.za

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of Marking Guidelines. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

NOTA:

- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van Nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat NIE.*

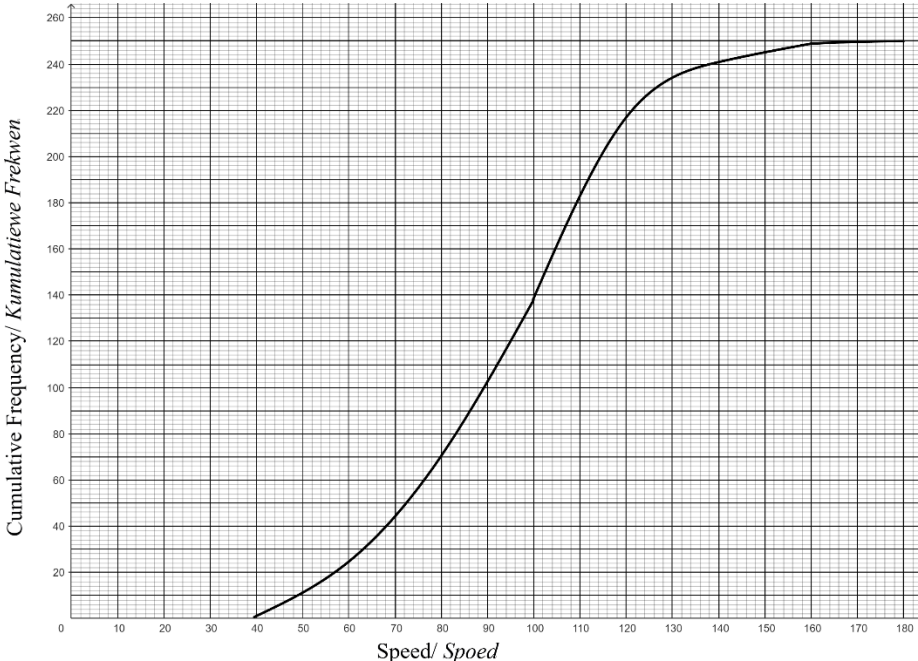
GEOMETRY / MEETKUNDE	
S	A mark for correct statement (A statement mark is independent of a reason)
	'n Punt vir 'n korrekte bewering ('n Punt vir 'n bewering is onafhanklik van die rede)
R	A mark for the correct reason. (A reason mark may only be awarded if the statement is correct)
	'n Punt vir 'n korrekte rede ('n Punt word slegs vir die rede toegeken as die bewering korrek is)
S/R	Award a mark if statement AND reason are both correct
	Ken 'n punt toe as die bewering EN rede beide korrek is

QUESTION/VRAAG 1

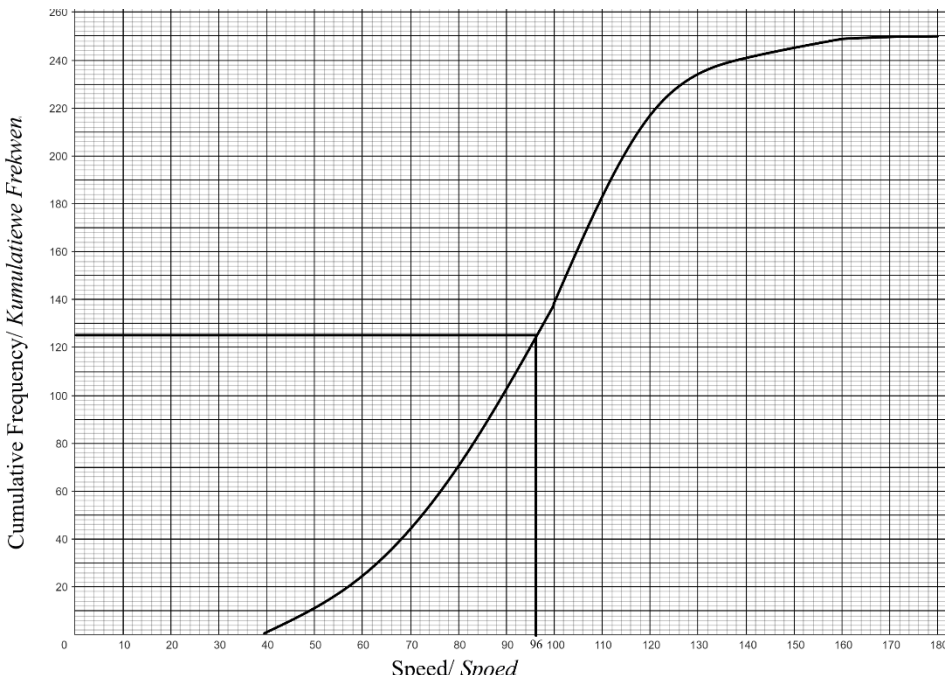
18, 26, 25, 18, 16, 12, 10, 8, 18, 17, 8

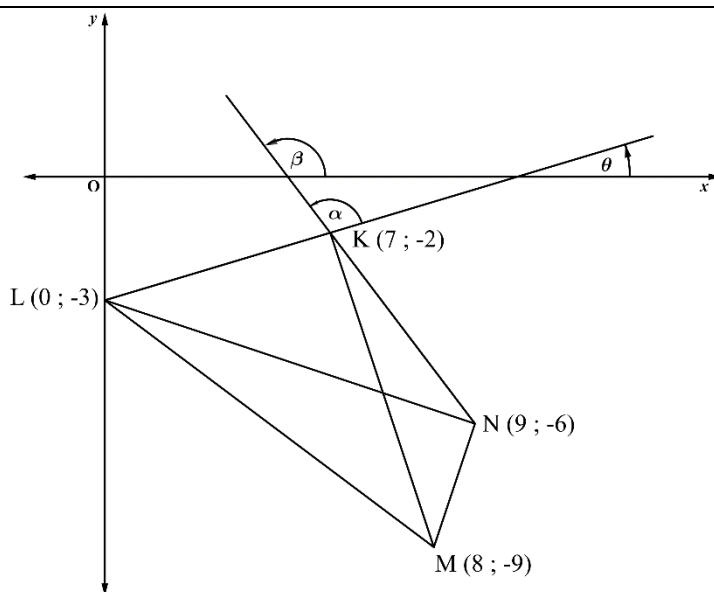
1.1	Mean/ <i>Gemiddeld</i> = $\frac{176}{11}$ = 16	✓ sum/ <i>som</i> ✓ answer/ <i>antwoord</i> answer only: full marks (2)
1.2	$\sigma = 5,83$	✓ $\sigma = 5,83$ (1)
1.3	Interval = $16 + 5,83$ = 21,83 $\therefore$ 2 of the taxis are overloaded/ <i>van die taxi's was oorlaai.</i>	✓ interval ✓ answer/ <i>antwoord</i> (2)
1.4.1	Skewed to the left. / <i>Skeef na links.</i> $\bar{x} < Q_2$	✓ answer/ <i>antwoord</i> (1)
1.4.2	75%	✓ answer/ <i>antwoord</i> (1)
1.4.3	$x, 8, 8, 10, 12, 13, 16, 17, 18, 18, 18, 18, y, 20, 25, 26$ $Q_3 = 19$ $\therefore \frac{3(16+1)}{4} = 12,75^{th}$ position/ <i>posisie</i> Between/ <i>tussen</i> 12^{th} and/ <i>en</i> 13^{th} position/ <i>posisie</i> $\frac{18 + y}{2} = 19$ $\therefore y = 20$ New/ <i>nuwe</i> $\bar{x}$: $\frac{247+x}{16} = 16$ $\therefore x = 9$	✓ $Q_3: \frac{3(16+1)}{4} = 12,75^{th}$ position/ <i>posisie</i> ✓ $y = 20$ ✓ $\bar{x}: \frac{247+x}{16} = 16$ ✓ $x = 9$ (4)
		[11]

QUESTION/VRAAG 2

2.1	SPEED (d) (in km/h)	FREQUENCY (number of vehicles)	CUMULATIVE FREQUENCY	✓ 25, 71, 138 ✓ 217, 241, 249, 250 (2)
	$40 < d \leq 60$	25	25	
	$60 < d \leq 80$	46	71	
	$80 < d \leq 100$	67	138	
	$100 < d \leq 120$	79	217	
	$120 < d \leq 140$	24	241	
	$140 < d \leq 160$	8	249	
	$160 < d \leq 180$	1	250	
2.2	250 vehicles/ voertuie			✓ answer (1)
2.3				✓ Grounding/ <i>grond</i> (40;0) ✓ Using upper intervals/ <i>gebruik boonste</i> <i>intervalle</i> ✓ End at/ <i>eindig by</i> (180;250) ✓ shape/ <i>vorm</i> (4)

QUESTION/VRAAG 3

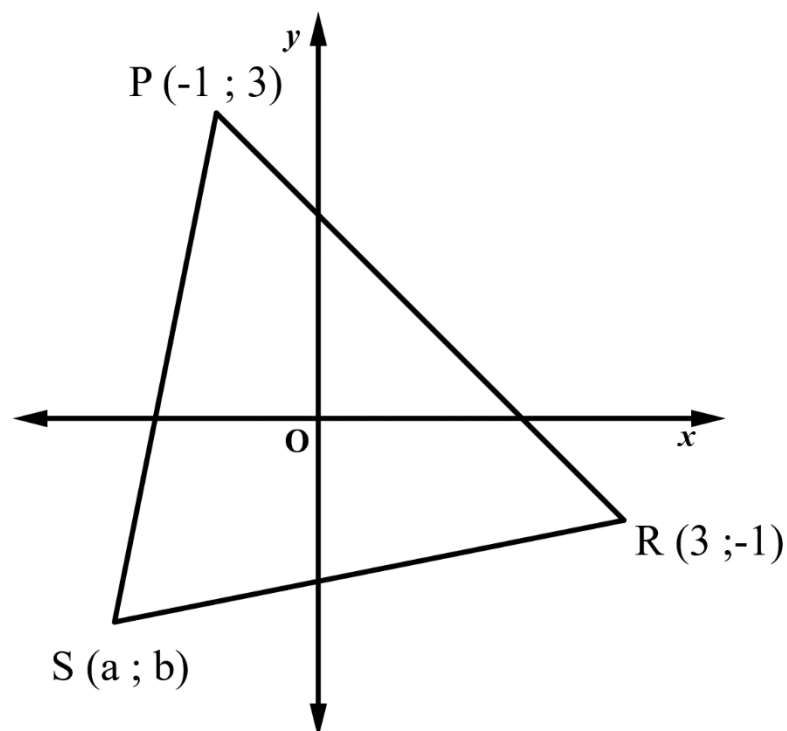
2.4	Median at/ <i>mediaan by</i> 125	✓✓ answer
	 ∴ 96 km/h Accept/ <i>aanvaar</i> (90 - 100)	(2)
		[9]



3.1	$m_{KN} = \frac{-6 - (-2)}{9 - 7}$ $m_{KN} = -2$	✓correct substitution into gradient formula <i>korrekte vervanging in gradiënt formule</i> ✓ $m_{AC} = 2$ (2)
3.2	$y - y_1 = m(x - x_1)$ $y - (-2) = -2(x - 7)$ $y + 2 = -2x + 14$ $y = -2x + 12$ OR/OF $y = -2x + c$ $-2 = -2(7) + c$ $c = 12$ $y = -2x + 12$	✓subst./vervang (7 ; -2) ✓ $y = -2x + 12$ (2)

3.3	$\tan \beta = m_{KN}$ $= -2$ $\beta = 180^\circ - 63,43^\circ$ $\beta = 116,57^\circ$	$\checkmark \tan \beta = -2$ $\checkmark \text{Ref } \angle / \text{Verw } \angle = 63,43^\circ$ $\checkmark \beta = 116,57^\circ$ (3)
3.4	$m_{KL} = \frac{-2 - (-3)}{7 - 0}$ $m_{KL} = \frac{1}{7}$ $\tan \theta = \frac{1}{7}$ $\theta = 8,13^\circ$ $\alpha = 116,57^\circ - 8,13^\circ$ [ext $\angle$ of Δ / buite $\angle$ van Δ] $\alpha = 108,44^\circ$	$\checkmark m_{KL} = \frac{1}{7}$ $\checkmark \tan \theta = \frac{1}{7}$ $\checkmark \theta = 8,13^\circ$ $\checkmark \alpha = 108,44^\circ$ (4)
3.5	$m_{KM} = \frac{-9 - (-2)}{8 - 7}$ $m_{KM} = -7$ $m_{KL} = \frac{1}{7}$ $-7 \times \frac{1}{7} = -1$ $\therefore m_{KM} \times m_{KL} = -1$ $\therefore KL \perp KM$	$\checkmark m_{KM} = -7$ $\checkmark -7 \times \frac{1}{7} = -1$ (2)
3.6	$m_{LN} = \frac{-6 - (-3)}{9 - 0}$ $m_{LN} = -\frac{1}{3}$ $m_{MN} = \frac{-9 - (-6)}{8 - 9}$ $m_{MN} = 3$ $3 \times -\frac{1}{3} = -1$ $\therefore m_{LN} \times m_{MN} = -1$ $\therefore LN \perp NM$ $\therefore \hat{LNM} = 90^\circ$ But/ maar $KL \perp KM$ $\therefore \hat{LKM} = 90^\circ$ $\therefore \hat{LKM} = \hat{LNM} = 90^\circ$ $\therefore$ KLMN is cyclo quadrilateral/ koordevierhoek ...[converse $\angle$ s in the same segment/omgekeerde $\angle$ e in dieselfde segment] OR/OF [line substend equal $\angle$ s / lyn onderspan gelyke $\angle$ e]	$\checkmark m_{LN} = -\frac{1}{3}$ $\checkmark m_{MN} = 3$ $\checkmark \hat{LNM} = 90^\circ$ $\checkmark \hat{LNM} = \hat{LKM} = 90^\circ$ $\checkmark$ reason/rede (5)
		[18]

QUESTION/VRAAG 4

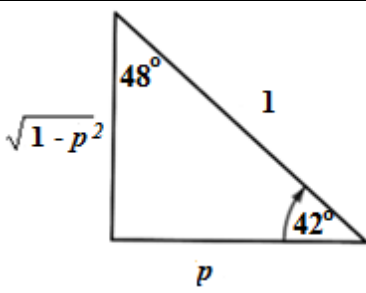


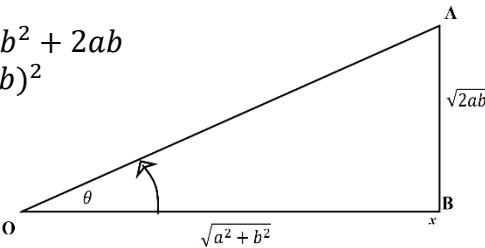
4.1	$T\left(\frac{-1+3}{2}; \frac{3-1}{2}\right)$ $T(1; 1)$	$\checkmark x = 1$ $\checkmark y =$ (2)
4.2	$d_{PR} = \sqrt{(-1-3)^2 + (3-(-1))^2}$ $d_{PR} = 4\sqrt{2}$	$\checkmark$ correct subst in distance formula/ korrekte vervanging in afstandsformule. $\checkmark d_{PR} = 4\sqrt{2}$ (2)
4.3	$m_{PR} \times m_2 = -1$ $(-1) \times (m_2) = -1$ $\therefore m_2 = 1$ $y - y_1 = m(x - x_1)$ $y - (1) = 1(x - 1)$ $y - 1 = x - 1$ $y = x$ OR/OF $y = 1x + c$ $1 = 1(1) + c$ $c = 0$ $y = x$	$\checkmark m_{ST} = 1$ $\checkmark$ subst./vervang (1 ; 1) $\checkmark y = x$ (3)
4.4	Subst/ vervang (a ; b) in $y = x$ $y = x$ $\therefore a = b$	$\checkmark$ Subst/ vervang (a ; b) in $y = x$ (1)

4.5	$Area \Delta PRS = \frac{1}{2} PR \cdot TS$ $12 = \frac{1}{2} \times 4\sqrt{2} \times \sqrt{(a-1)^2 + (b-1)^2}$ $3\sqrt{2} = \sqrt{(a-1)^2 + (b-1)^2}$ $18 = (a-1)^2 + (b-1)^2$ but/ maar $a = b$ $\therefore 18 = (a-1)^2 + (a-1)^2$ $18 = 2(a-1)^2 \quad \text{or/of} \quad 0 = a^2 - 2a + 1 - 9$ $9 = (a-1)^2 \quad 0 = a^2 - 2a - 8$ $a-1 = \pm\sqrt{9} \quad 0 = (a-4)(a+2)$ $\quad \quad \quad a = 4 / a = -2$ but/ maar $a < 0$ $\therefore a-1 = -3$ $\therefore a = -2$ $\therefore S(-2; -2)$	✓ Subst. in Area formula/ vervang in Opp formule ✓ square both sides/ kwadreer beide kante ✓ Subst/ vervang $a = b$ ✓ $a - 1 = -3$ or/of $a = -2$ ✓ S(-2 ; -2) (5)
		[13]

QUESTION/VRAAG 5

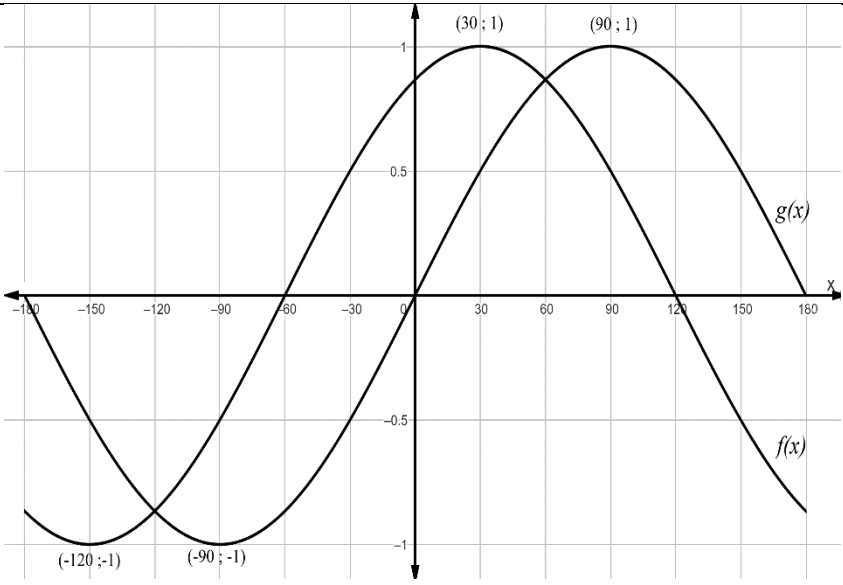
5.1		
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	$(12)^2 + y^2 = (13)^2$ $y^2 = 25$ $y = 5$ $\frac{3 \cos(360^\circ - \theta) + 2 \sin(360^\circ - \theta)}{\frac{1}{5} \tan(180^\circ + \theta)}$ $= \frac{3 \cos \theta - 2 \sin \theta}{\frac{1}{5} \tan \theta}$ $= \frac{3\left(\frac{12}{13}\right) - 2\left(\frac{5}{13}\right)}{\frac{1}{5}\left(\frac{5}{12}\right)}$ $= \frac{\frac{36}{13} - \frac{10}{13}}{\frac{1}{12}}$ $= \frac{26}{13} \times \frac{12}{1}$ $= 24$	$\checkmark y = 5$ $\checkmark 3 \cos \theta$ $\checkmark -2 \sin \theta$ $\checkmark \frac{1}{5} \tan \theta$ $\checkmark 3\left(\frac{12}{13}\right) - 2\left(\frac{5}{13}\right)$ $\checkmark \frac{1}{5}\left(\frac{5}{12}\right)$ $\checkmark \text{answer/antwoord}$ (7)
5.2	$\frac{\tan 135^\circ \cdot \sin 210^\circ}{\cos 660^\circ + \cos 180^\circ}$ $= \frac{(-\tan 45^\circ) \cdot (-\sin 30^\circ)}{\cos 60^\circ - 1}$ $= \frac{(-1)\left(-\frac{1}{2}\right)}{\left(\frac{1}{2}\right) - 1}$ $= -1$	$\checkmark -\tan 45^\circ$ $\checkmark -\sin 30^\circ$ $\checkmark \cos 60^\circ$ $\checkmark -1$ $\checkmark \frac{(-1)\left(-\frac{1}{2}\right)}{\left(\frac{1}{2}\right) - 1}$ $\checkmark \text{answer/antwoord}$ (6)
5.3		
5.3.1	$\cos 138^\circ$ $= -\cos 42^\circ$ $= -p$	$\checkmark -\cos 42^\circ$ $\checkmark -p$ (2)

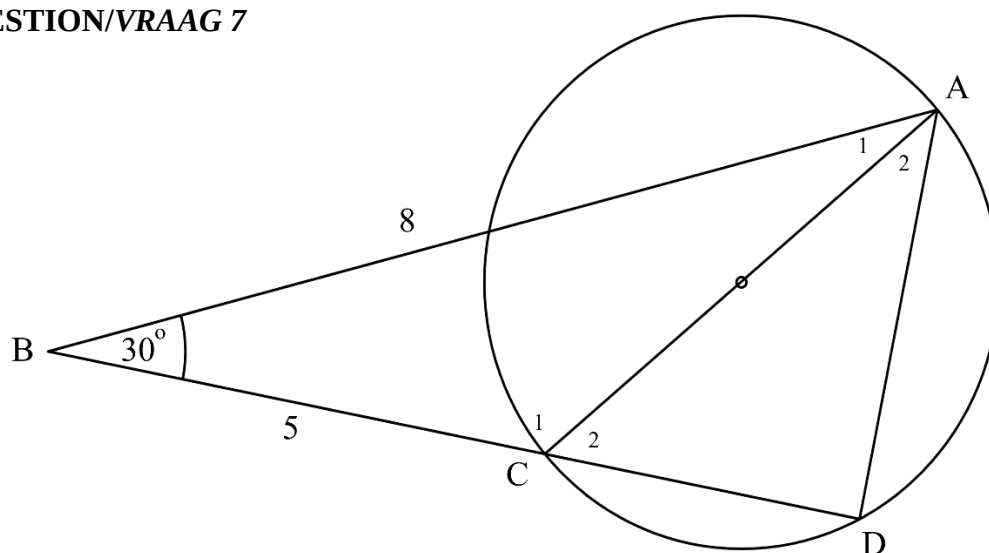
5.3.2	$3\sin 48^\circ$ $= 3p$	$\checkmark\checkmark 3p$ (2)
5.3.3	$\sin(-2202^\circ)$ $= \sin(-42^\circ)$ $= -\sin 42^\circ$ $= -\sqrt{1-p^2}$	$\checkmark \sin(-42^\circ)$ $\checkmark$ diagram $\checkmark -\sqrt{1-p^2}$ (3)
5.4	$\frac{\sin x}{1+\cos x} + \frac{1}{\tan x} = \frac{1}{\sin x}$ LH: $\frac{\sin x}{1+\cos x} + 1 \div \left(\frac{\sin x}{\cos x}\right)$ $= \frac{\sin x}{1+\cos x} + 1 \times \left(\frac{\cos x}{\sin x}\right)$ $= \frac{\sin^2 x + \cos x(1+\cos x)}{\sin x(1+\cos x)}$ $= \frac{\sin^2 x + \cos x + \cos^2 x}{\sin x(1+\cos x)}$ $= \frac{1+\cos x}{\sin x(1+\cos x)}$ $= \frac{1}{\sin x}$ LH = RH	$\checkmark \tan x = \frac{\sin x}{\cos x}$ $\checkmark \frac{1}{\tan x} = \frac{\cos x}{\sin x}$ $\checkmark$ numerator/ noemer $\sin x(1+\cos x)$ $\checkmark \sin^2 x + \cos x + \cos^2 x$ $\checkmark \sin^2 x + \cos^2 x = 1$ $\checkmark \frac{1+\cos x}{\sin x(1+\cos x)}$ (6)
5.5	$\tan^2 \theta = \frac{2ab}{a^2+b^2}$ $\therefore \tan \theta = \sqrt{\frac{2ab}{a^2+b^2}} \dots (0^\circ < \theta < 90^\circ)$ But/ maar $OA^2 = OB^2 + AB^2$ $= a^2 + b^2 + 2ab$ $= (a+b)^2$ $\therefore OA = a+b$ $\therefore \sin \theta = \frac{\sqrt{2ab}}{a+b}$ 	$\checkmark \tan^2 \theta = \frac{2ab}{a^2+b^2}$ $\checkmark \tan \theta = \sqrt{\frac{2ab}{a^2+b^2}}$ $\checkmark$ Pythagoras $\checkmark OA = a+b$ $\checkmark \sin \theta = \frac{\sqrt{2ab}}{a+b}$ (5)
		[31]

QUESTION/VRAAG 6

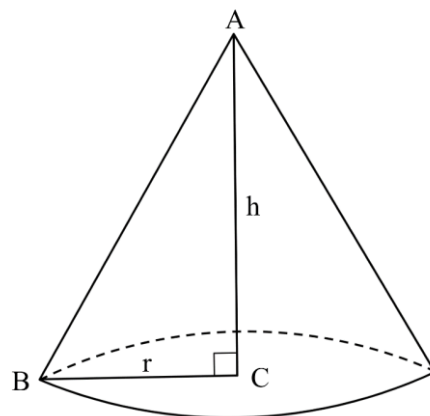
6.1	$\cos(x-30^\circ) = \sin x$ $\cos(x-30^\circ) = \cos(90^\circ - x)$ I $x-30^\circ = 90^\circ - x + k.360^\circ; k \in \mathbb{Z}$ $2x = 120^\circ + k.360^\circ; k \in \mathbb{Z}$ $x = 60^\circ + k.180^\circ; k \in \mathbb{Z}$ $x \in \{-120^\circ; 60^\circ\}$ OR/OF	$\checkmark \sin x = \cos(90^\circ - x)$ $\checkmark x-30^\circ = 90^\circ - x + k.360^\circ$ $\checkmark x = 60^\circ + k.180^\circ$ $\checkmark k \in \mathbb{Z}$ $\checkmark x \in \{-120^\circ; 60^\circ\}$ OR/OF $\checkmark \cos(x-30^\circ) = \sin(120^\circ - x)$
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	$\cos(x - 30^\circ) = \sin x$ $\sin(90^\circ - x + 30^\circ) = \sin x$ I $120^\circ - x = x + k \cdot 360^\circ; k \in \mathbb{Z}$ $-2x = -120^\circ + k \cdot 360^\circ; k \in \mathbb{Z}$ $x = 60^\circ + k \cdot 180^\circ; k \in \mathbb{Z}$ $x \in \{-120^\circ; 60^\circ\}$	II $120^\circ - x = 180^\circ - x + k \cdot 360^\circ; k \in \mathbb{Z}$ No solution/ <i>geen oplossing</i>	$\checkmark 120^\circ - x = x + k \cdot 360^\circ$ $\checkmark x = 60^\circ + k \cdot 180^\circ$ $\checkmark k \in \mathbb{Z}$ $\checkmark x \in \{-120^\circ; 60^\circ\}$	(5)
6.2		for/vir $f(x)$: $\checkmark$ Shape/vorm $\checkmark$ intercepts with axes/ <i>afsnitte met asse</i> $\checkmark$ Turning points/ <i>draaipunte</i> for/vir $g(x)$ $\checkmark$ shape/vorm $\checkmark$ intercepts with axes/ <i>afsnitte met asse</i> and turning points/ <i>draaipunte</i>		(5)
6.3	$f(x) \leq g(x)$ $60^\circ \leq x \leq 180^\circ$ OR/OF $x \in [60^\circ; 180^\circ]$		$\checkmark$ interval $\checkmark$ notation/ <i>notasie</i>	(2)
				[12]

QUESTION/VRAAG 7



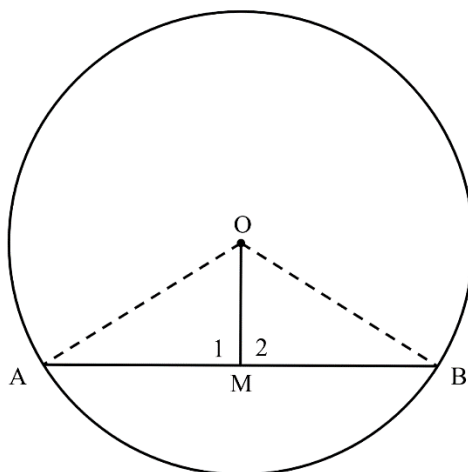
7.1	$AC^2 = AB^2 + BC^2 - 2(AB)(BC)\cos\hat{B}$ $AC^2 = 8^2 + 5^2 - 2(8)(5)\cos 30^\circ$ $AC = \sqrt{19,71796\dots}$ $AC = 4,44$	✓ subst. correctly into cos rule/ <i>vervang korrek in cos-reël.</i> ✓ $AC = \sqrt{19,71796}$ (2)
7.2.1	$\frac{\sin \hat{A}_1}{5} = \frac{\sin 30^\circ}{4,44}$ $\sin \hat{A}_1 = \frac{5 \sin 30^\circ}{4,44}$ $\hat{A}_1 = 34,27^\circ$	✓ subst. correctly into sin rule/ <i>vervang korrek in sin-reël.</i> ✓ $\hat{A}_1 = 34,27^\circ$ (2)
7.2.2	$\hat{C}_2 = 30^\circ + 34,27^\circ$ext angle of Δ / <i>buite hoek van Δ</i> $\hat{C}_2 = 64,27^\circ$	✓ $\hat{C}_2 = 64,27^\circ$ (1)
7.2.3	$\hat{D} = 90^\circ$ [$\angle$ in semi circle/ $\angle$ in halwe sirkel] $\sin 64,27^\circ = \frac{AD}{4,44}$ $AD = 4$	✓ $\hat{D} = 90^\circ$ ✓ $\sin 64,27^\circ = \frac{AD}{4,44}$ ✓ $AD = 4$ (3)
		[8]

QUESTION/VRAAG 8

8.1	$2\pi r = 245$ $\therefore r = \frac{245}{2\pi}$ $r = 39 \text{ m}$ In $\triangle ABC$: $\frac{h}{r} = \tan 50^\circ$ $\therefore h = 39 \cdot \tan 50^\circ$ $\therefore h = 46,5 \text{ m}$	$\checkmark r = 39 \text{ m}$ $\checkmark \frac{h}{r} = \tan 50^\circ$ $\checkmark h = 46,5 \text{ m}$ (3)
8.2	$Volume = \frac{1}{3} \pi r^2 h$ $= \frac{1}{3} \pi (39)^2 \cdot 46,5$ $= 74065 \text{ m}^3$	$\checkmark \frac{1}{3} \pi r^2 h$ $\checkmark \frac{1}{3} \pi (39)^2 \cdot 46,5$ $\checkmark 74065 \text{ m}^3$ (3)
		[6]

QUESTION/VRAAG 9

9.1



NOTE: If candidate fails to draw the construction or indicate the construction, it is an

immediate BREAK DOWN. 0/5 marks.

NOTA: Indien kandidaat nie die konstruksie teken of aandui dat 'n konstruksie plaasvind nie,

is dit 'n onmiddellike "BREAK DOWN" en daar word nie verder gemerk nie. 0/5 punte.

9.1	Construction: Connect AO and OB <i>Konstruksie: Verbind AO en OB</i> In $\triangle AOM$ and $\triangle BOM$: $AO = BO$ (Radii) $OM = OM$ (Common side/ <i>Gemeenskaplike sy</i>) $AM = MB$ (Given/ <i>Gegee</i>) $\therefore \triangle AOM \equiv \triangle BOM$ (S S S) $\therefore \hat{M}_1 = \hat{M}_2$ But/ <i>maar</i> $\hat{M}_1 + \hat{M}_2 = 180^\circ$ (AMB is a straight line/ <i>'n reguitlyn</i>) $\therefore \hat{M}_1 = \hat{M}_2 = 90^\circ$ $\therefore OM \perp AB$	✓ construction/ <i>konstruksie</i> ✓S ✓R ✓S/R ✓S/R ✓S/R (5)
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QUESTION/VRAAG 10

9.2		
9.2.1	$OD \perp AB$ [line from center to midpoint of chord/ lyn vanaf mid.punt van sirkel na middelpunt van koord.] $OD^2 = OB^2 - DB^2$ Pythagoras $OD^2 = 20^2 - 12^2$ $OD = \sqrt{256}$ $OD = 16$ $\therefore DE = 20 - 16$ $= 4 \text{ mm}$	$\checkmark$ S&R $\checkmark OD^2 = 20^2 - 12^2$ $\checkmark OD = 16$ $\checkmark DE = 4 \text{ mm}$ (4)
9.2.2	$FD = 20 + 16$ $FD = 36 \text{ mm}$ $FB^2 = 36^2 + 12^2$ Pythagoras $FB = \sqrt{1440}$ $FB = 37,95 \text{ mm}$	$\checkmark FD = 36 \text{ mm}$ $\checkmark FB^2 = 36^2 + 12^2$ $\checkmark FB = 37,95 \text{ mm}$ (3)
		[12]

