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Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL/*NASIONALE* SENIOR CERTIFICATE/*SERTIFIKAAT*

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2026

**MATHEMATICS P2/*WISKUNDE V2*
MARKING GUIDELINE/*NASIENRIGLYN***

MARKS/*PUNTE*: 150

This marking guideline consists of 17 pages.
Hierdie nasienriglyn bestaan uit 17 bladsye.



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**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 a question, mark the crossed-out version.
- Consistency accuracy applies in ALL aspects of the marking guideline. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

GEOMETRY	
S	A mark for a correct statement. (A statement mark is independent of a reason).
R	A mark for the correct reason. (A reason mark may be awarded if the statement is correct).
S/R	Award a mark if a statement and a reason are both correct.

NOTA

- *As 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n poging van 'n vraag doodgetrek het en dit nie oorgedoen nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyn toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Om antwoorde/waardes te aanvaar om 'n probleem op te los, word NIE aanvaar NIE.*

MEETKUNDE	
S	'n Punt vir korrekte stelling. (<i>n Stelling punt is onafhanklik van die rede.</i>)
R	'n Punt vir 'n korrekte rede. (<i>n Punt word slegs vir die rede toegeken as die bewering korrek is.</i>)
S/R	'n Punt word toegeken as die bewering en rede beide korrek is.



QUESTION/VRAAG 1



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1.1	Median / <i>Mediaan</i> = 34	✓ answer / <i>antwoord</i>	(1)
1.2	$Q_3 = 60$ in both classes / <i>in albei klasse</i>	✓ answer / <i>antwoord</i>	(1)
1.3	$90 - 6 = 84$	✓ 84	(1)
1.4	CLASS A performed better than CLASS B. Range for CLASS A is less than range for CLASS B. <i>KLAS A het beter as KLAS B presteer. Omvang vir KLAS A is kleiner as die omvang van KLAS B.</i>	✓ CLASS A / <i>KLAS A</i> ✓ Reason / <i>Rede</i>	(2)
1.5	CLASS B / <i>KLAS B</i>	✓ answer / <i>antwoord</i>	(1)
1.6	Positively skewed OR skewed to the right <i>Positief skeef OF Skeef na regs</i>	✓ answer / <i>antwoord</i>	(1)
1.7	$\frac{80}{100} \times 20 = 16$ $\therefore 4$ learners qualified for awards <i>4 leerders het vir toekennings gekwalifiseer</i> OR/OF $\frac{20}{100} \times 20 = 4$ $\therefore 4$ learners qualified for the awards <i>4 leerders het vir toekennings gekwalifiseer</i>	✓ method / <i>metode</i> ✓ answer / <i>antwoord</i> OR/OF ✓ method / <i>metode</i> ✓ answer / <i>antwoord</i>	(2)
			[9]



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QUESTION/VRAAG 2

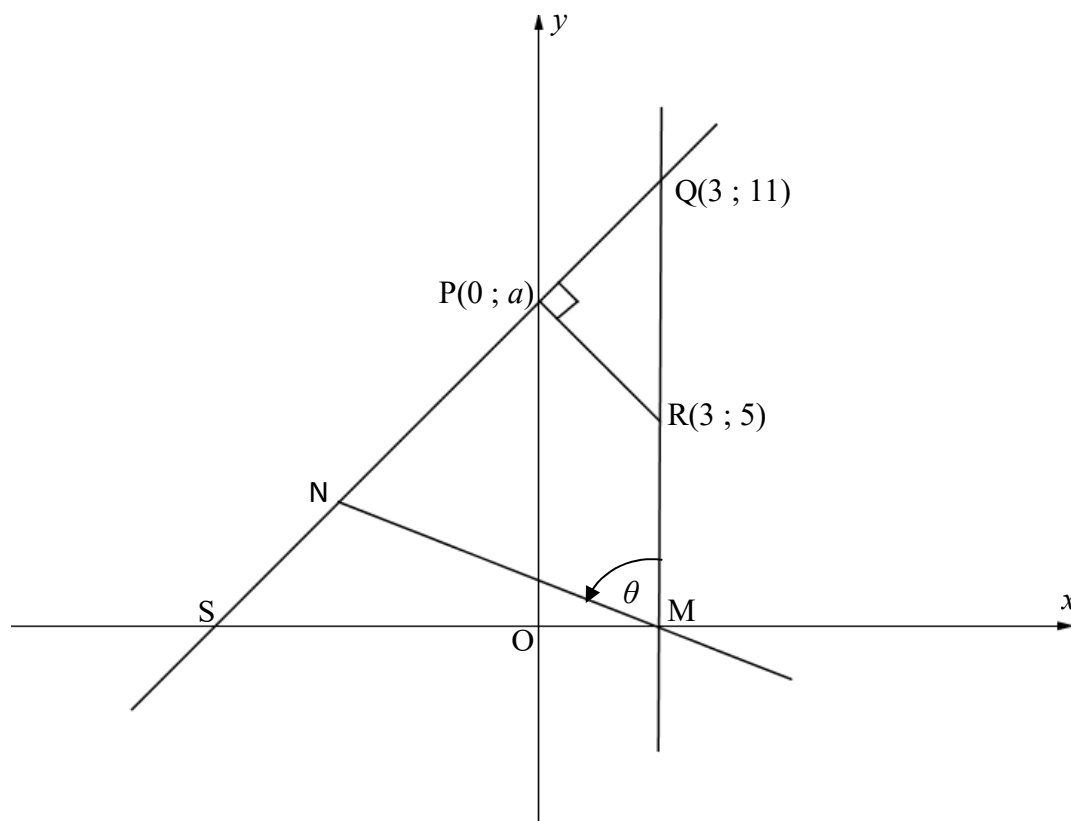
2.1	Ages in years Ouderdom in jare	Frequency Frekwensie	Cummulative Frequency Kummulatiewe Frekwensie	✓ first 3 correct <i>eerste 3 korrek</i> (2, 3, 4) ✓ second 3 correct <i>tweede 3 korrek</i> (6, 7, 4)	(2)
	$10 < x \leq 19$	1	1		
	$20 < x \leq 29$	2	3		
	$30 < x \leq 39$	3	6		
	$40 < x \leq 49$	4	10		
	$50 < x \leq 59$	6	16		
	$60 < x \leq 69$	7	23		
	$70 < x \leq 79$	4	27		
	$80 < x \leq 89$	1	28		
2.2	Mean / Gemiddelde $= \frac{14,5 \times 1 + 24,5 \times 2 + 34,5 \times 3 + 44,5 \times 4 + 54,5 \times 6 + 64,5 \times 7 + 74,5 \times 4 + 84,5 \times 1}{28}$ $= \frac{1506}{28}$ $= 53,79$			✓ method / <i>metode</i> ✓ 1506 ✓ answer/ <i>antwoord</i>	(3)
2.3	$60 < x \leq 69$			✓ answer/ <i>antwoord</i>	(1)
2.4	Cummulative Frequency graph/ Ogive Kummulatiewefrekwesie-grafiek / Ogief 			✓ grounding <i>anker</i> ✓ plot against the upper limit <i>afsteek teen</i> <i>boonste limiet</i> ✓ shape / <i>vorm</i>	(3)
2.5	18 people / <i>persone</i>				(1)
					[10]



QUESTION/VRAAG 3



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3.1	$M(3;0)$	✓ answer / antwoord	(1)
3.2	$QM = 11$ units / eenhede	✓ answer / antwoord	(1)
3.3	$m_{PQ} = \frac{11-a}{3-0} = \frac{11-a}{3}$	✓ correct substitution korrekte vervanging ✓ answer / antwoord	(2)
3.4	$m_{PQ} \times m_{PR} = -1$ [product of gradients of $\perp$ lines] [produk van gradiënte van $\perp$ lyne] $\frac{11-a}{3} \times \frac{5-a}{3} = -1$ $55 - 11a - 5a + a^2 = -9$ $a^2 - 16a + 64 = 0$ $(a-8)^2 = 0$ $\therefore a = 8$	✓ $m_{PQ} \times m_{PR} = -1$ ✓ correct substitution korrekte vervanging ✓ simplification / vereenvoudiging ✓ standard form / standaardvorm ✓ factors / faktore	(5)



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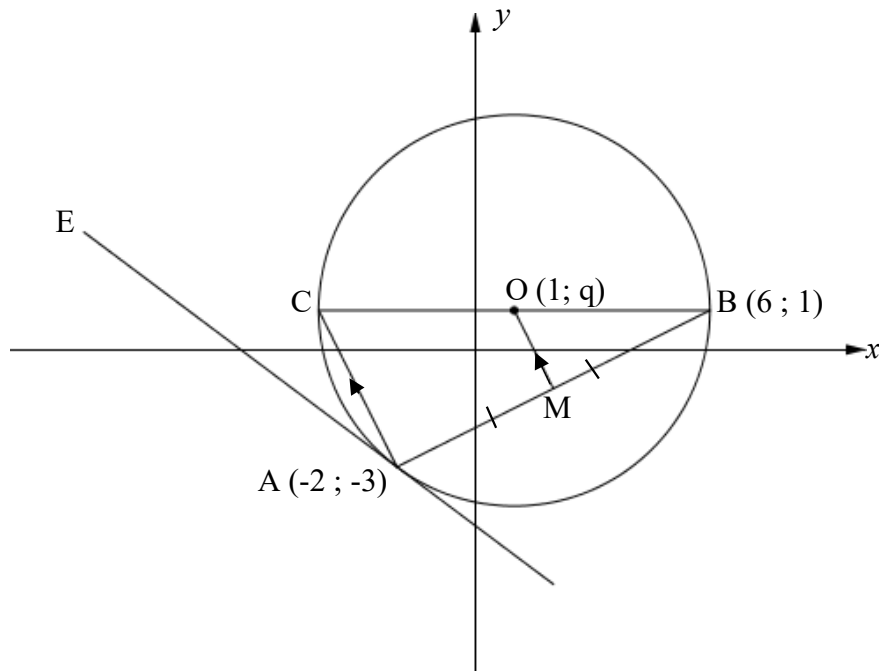
3.5	$m_{SQ} = \frac{11-8}{3} = 1$ $11 = 1(3) + c$ or / of $y - 11 = 1(x - 3)$ $8 = c$ $y = x + 8$ $y = x + 8$	✓ m_{SQ} ✓ substituting m_{SQ} and $P(0 ; 8)$ or $Q(3 ; 11)$ vervanging m_{SQ} en $P(0 ; 8)$ of $Q(3 ; 11)$ ✓ answer / antwoord	(3)
3.6	$x + 8 = 0$ $x = 8$ $S(-8; 0)$ $SM = 11$ units / eenhede $\therefore \triangle SMQ$ is isosceles ($SM = MQ$) $\triangle SMQ$ is gelykbenig ($SM = MQ$)	✓ $y = 0$ ✓ correct x-value / korrekte x-waarde ✓ $SM = 11$	(3)
3.7	$y = mx + 1$ $0 = m(3) + 1$ $m = -\frac{1}{3}$ $\tan \alpha = -\frac{1}{3}$ $\alpha = 161,57^\circ$ $\theta = 161,57^\circ - 90^\circ$ [$QM \parallel y$ -axis / as] $= 71,57^\circ$	✓ substitute / vervang $M(3;0)$ ✓ m_{MN} ✓ inclination of MN / inklinasie van MN ✓ answer / antwoord	(4)
3.8	Area of $\triangle MQN = \frac{1}{2} \times MN \times MQ \times \sin \theta$ $45,38 = \frac{1}{2} \times MN \times 11 \times \sin 71,57^\circ$ $MN = 8,70$	✓ correct formula of $\triangle MQN$ korrekte formule van $\triangle MQN$ ✓ correct substitution / korrekte vervanging ✓ answer / antwoord	(3)
			[22]



QUESTION/VRAAG 4



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4.1	$AB = \sqrt{(-2-6)^2 + (-3-1)^2}$ $= \sqrt{80} = 4\sqrt{5}$	✓ correct substitution <i>korrekte vervanging</i> ✓ answer / antwoord	(2)
4.2	$OM = \sqrt{5}$ [Midpoint Thm / Middelpunt Stelling]	✓ answer / antwoord	(1)
4.3	$\angle OMB = 90^\circ$ [line from centre to the midpoint] [lyn vanaf middelpunt]	✓ answer / antwoord	(1)
4.4	$OB^2 = OM^2 + MB^2$ [Pyth Thm / Pyth Stelling] $(1-6)^2 + (q-1)^2 = (\sqrt{5})^2 + (2\sqrt{5})^2$ $25 + (q-1)^2 = 25$ $q-1 = 0$ $q = 1$	✓ correct subst. into Pyth <i>korrekte verv. in Pyth</i> ✓ simplification <i>vereenvoudiging</i> ✓ answer / antwoord	(3)
4.5	$m_{AO} = \frac{1+3}{1+2}$ $= \frac{4}{3}$	✓ correct substitution <i>korrekte vervanging</i> ✓ answer / antwoord	(2)
4.6	$(x-1)^2 + (y-1)^2 = 25$	✓ LHS / LK ✓ RHS / RK	(2)



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4.7	$m_{AE} = -\frac{3}{4} \quad [\tan \perp \text{rad}] / [\text{raaklyn} \perp \text{radius}]$ $y + 3 = -\frac{3}{4}(x + 2)$ $y = -\frac{3}{4}x - \frac{9}{2}$	✓ m_{AE} ✓ substituting / vervanging m_{AE} and / en A(2 ; -3) ✓ answer / antwoord	(3)
4.8	$-\frac{9}{2} < t < 8$	✓ correct c.v's. korrekte k/w's ✓ correct notation korrekte notasie	(2)
4.9	$\left(-\frac{22}{3}; 1\right)$ $r_{\text{new/nuwe}}^2 = \left(-\frac{22}{3} - 1\right)^2 + (1 - 1)^2$ $r_{\text{new/nuwe}} = \frac{25}{3}$ $r_{\text{old/oud}} = 5$ $r_{\text{old/oud}} > r_{\text{new/nuwe}}$ $\therefore \left(-\frac{22}{3} - 1\right)$ lies outside the circle / lê buite die sirkel	✓ $r_{\text{new/nuwe}}$ ✓ $r_{\text{old/oud}} > r_{\text{new/nuwe}}$ ✓ conclusion / gevolgtrekking	(3)
			[19]



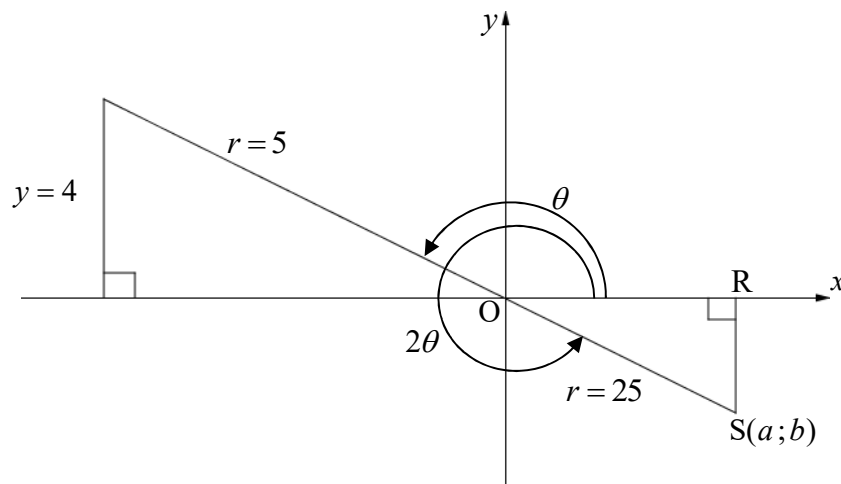
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QUESTION/VRAAG 5



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5.1	5.1.1	$x = -\sqrt{5^2 - 4^2} = -3$ $\cos \theta = -\frac{3}{5}$	✓ correct x-value <i>korrekte x-waarde</i> ✓ answer / <i>antwoord</i>	(2)
	5.1.2	$\cos(90^\circ - \theta) = \sin \theta$ $= \frac{4}{5}$	✓ $\sin \theta$ ✓ answer / <i>antwoord</i>	(2)
	5.1.3	$\sin 2\theta = \frac{b}{25}$ $2 \sin \theta \cos \theta = \frac{b}{25}$ $2\left(\frac{4}{5}\right)\left(-\frac{3}{5}\right) = \frac{b}{25}$ $b = -24$ $a = \sqrt{(25)^2 - (-24)^2} = 7$ $\therefore S(7; -24)$	✓ correct ratio <i>korrekte verhouding</i> ✓ identity / <i>identiteit</i> ✓ correct substitution <i>korrekte vervanging</i> ✓ value of b / <i>waarde van b</i> ✓ value of a / <i>waarde van a</i>	(5)
5.2		$\frac{\cos(\theta - 360^\circ) \cdot \sin(180^\circ + \theta)}{\cos^2 \theta + \sin \theta \cos(90^\circ + \theta) + \sin^2 \theta}$ $= \frac{(\cos \theta)(-\sin \theta)}{1 + \sin \theta(-\sin \theta)}$ $= -\frac{\sin \theta \cos \theta}{1 - \sin^2 \theta}$ $= -\frac{\sin \theta \cos \theta}{\cos^2 \theta}$ $= -\tan \theta$	✓ $\cos \theta$ ✓ $-\sin \theta$ ✓ $\sin^2 \theta + \cos^2 \theta = 1$ ✓ $-\sin \theta$ ✓ $\cos^2 \theta$ ✓ answer / <i>antwoord</i>	(6)
				[15]



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QUESTION/VRAAG 6

6.1.1	$\begin{aligned} \text{LHS/LK} &= \frac{16 \sin^2 A \cdot \cos A}{2 \sin^3 A - \sin 2A \cos A} \\ &= \frac{8 \cdot 2 \sin A \cdot \sin A \cdot \cos A}{2 \sin^3 A - 2 \sin A \cdot \cos A \cdot \cos A} \\ &= \frac{8 \sin A \cdot \sin 2A}{2 \sin A (\sin^2 A - \cos^2 A)} \\ &= \frac{4 \sin 2A}{-\cos 2A} \\ &= -4 \tan 2A \end{aligned}$	$\checkmark 2 \sin A \cos A$ $\checkmark \sin 2A$ $\checkmark$ common factor <i>gemene faktor</i> $\checkmark -\cos 2A$	(4)
6.1.2	$A \in [-90^\circ; 90^\circ]$, but/maar $A \neq -45^\circ$ and/en $A \neq 45^\circ$	$\checkmark A \neq -45^\circ \quad \checkmark A \neq 45^\circ$	(2)
6.2	$\begin{aligned} \sin(30^\circ - 2x) &= -\sin^2 x + \cos^2 x \\ \sin(30^\circ - 2x) &= \cos 2x \\ \sin 30^\circ \cos 2x - \sin 2x \cos 30^\circ &= \cos 2x \\ \frac{1}{2} \cos 2x - \frac{\sqrt{3}}{2} \sin 2x - \cos 2x &= 0 \\ -\frac{1}{2} \cos 2x - \frac{\sqrt{3}}{2} \sin 2x &= 0 \\ \frac{\sqrt{3}}{2} \sin 2x &= -\frac{1}{2} \cos 2x \\ \tan 2x &= -\frac{1}{\sqrt{3}} \\ 2x &= 150^\circ + 180^\circ \cdot k, \quad k \in \mathbb{Z} \\ x &= 75^\circ + 90^\circ k \end{aligned}$	$\checkmark \cos 2x$ $\checkmark$ expansion / <i>uitbreiding</i> $\checkmark$ simplification <i>vereenvoudiging</i> $\checkmark$ equating / <i>gelykstel</i> $\checkmark \tan 2x = -\frac{1}{\sqrt{3}}$ $\checkmark$ $2x = 150^\circ + 180^\circ \cdot k, \quad k \in \mathbb{Z}$ $\checkmark x = 75^\circ + 90^\circ k$	(7)
[13]			



QUESTION/VRAAG 7



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7.1	$-3 \leq y \leq -1$	✓ correct critical values <i>korrekte kritieke waardes</i> ✓ correct notation <i>korrekte notasie</i>	(2)
7.2		✓ intercepts with the axes <i>afsnitte met die asse</i> ✓ turning points <i>draaipunte</i> ✓ shape / vorm	(3)
7.3.1	$x = -60^\circ$ and/en $x = 0^\circ$	✓✓ each x-value <i>elke x-waarde</i>	(2)
7.3.2	$2 - 4 \cos^2 \frac{1}{2}x = \sqrt{3} \sin x - \cos x$ $-2 \left(2 \cos^2 \frac{1}{2}x - 1 \right) = \sqrt{3} \sin x - \cos x$ $\cos x = -\frac{\sqrt{3}}{2} \sin x + \frac{1}{2} \cos x$ $\frac{\sqrt{3}}{2} \sin x = \frac{1}{2} \cos x - \cos x$ $\frac{\sqrt{3}}{2} \sin x = -\frac{1}{2} \cos x$ $\tan x = \frac{-1}{\sqrt{3}}$ $x = 150^\circ + 180^\circ \cdot k, k \in \mathbb{Z}$ or / of $x = 330^\circ + 180^\circ \cdot k$	✓ common factor <i>gemene faktor</i> ✓ identity/ $\cos x$ <i>identiteit / $\cos x$</i> ✓ $\tan x = \frac{-1}{\sqrt{3}}$ ✓ answers / <i>antwoorde</i>	(4)
7.3.3	$-10^\circ < x < 170^\circ$	✓✓ answer / <i>antwoord</i>	(2)
			[13]



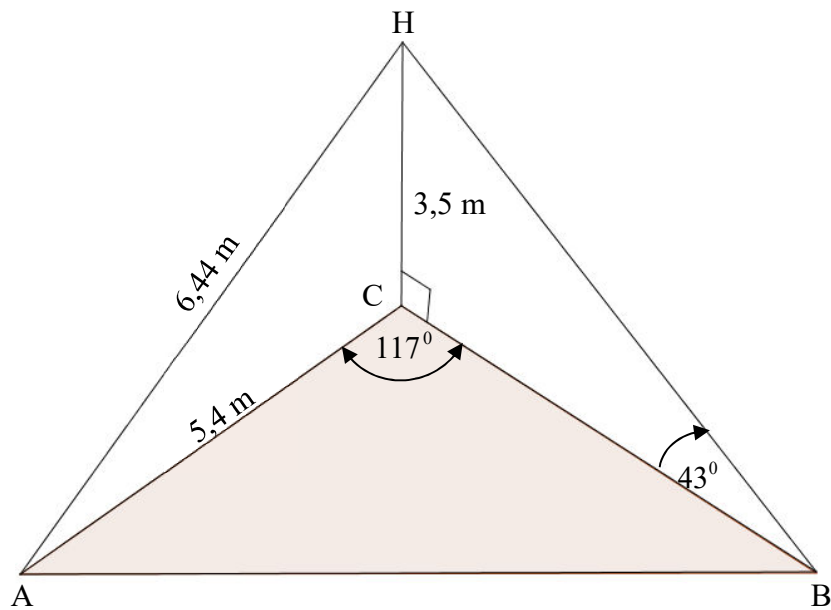
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QUESTION/VRAAG 8



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8.1	$\tan 43^\circ = \frac{3,5}{BC}$ $BC = 3,75$	✓ correct substitution <i>korrekte vervanging</i> ✓ BC	(2)
8.2	$HB = \sqrt{(3,75)^2 + (3,5)^2}$ [PythThm / Stelling] $= 5,13$ $HB^2 = AH^2 + AB^2 - 2 \cdot AH \cdot AB \cdot \cos \hat{HAB}$ $(5,13)^2 = (6,44)^2 + (7,85)^2 - 2(6,44)(7,85)\cos A$ $\cos A = 0,7593780908$ $\hat{HAB} = 40,59^\circ$	✓ HB ✓ correct application of cosine rule <i>korrekte toepassing van kosinusreël</i> ✓ correct substitution <i>korrekte vervanging</i> ✓ correct ratio of cos A <i>korrekte verhouding van cos A</i> ✓ answer / antwoord	(5)
8.3	$\text{Area } \Delta HAB = \frac{1}{2} \times AH \times AB \times \sin 40,59^\circ$ $= \frac{1}{2} \times 6,44 \times 7,85 \times \sin(40,59^\circ)$ $= 16,45 \text{ cm}^2$	✓ correct application in area rule in ΔHAB <i>korrekte toepassing van oppervlakte-reël</i> ✓ correct substitution <i>korrekte vervanging</i> ✓ answer / antwoord	(3)
			[10]



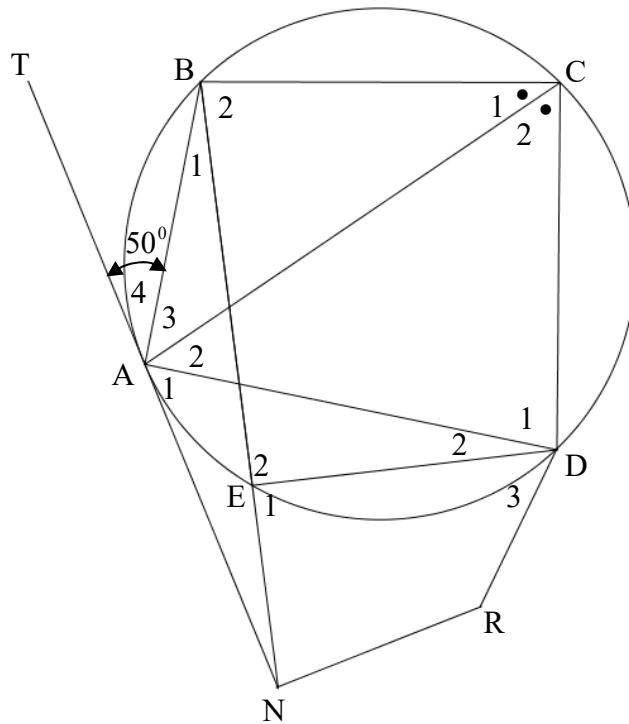
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QUESTION/VRAAG 9



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9.1	$\hat{C}_1 = \hat{A}_4 = 50^\circ$ [tan chord theo] / [raaklyn – koord stelling] $\hat{C}_2 = \hat{C}_1 = 50^\circ$ [given] / [gegee] $\hat{A}_1 = \hat{C}_2 = 50^\circ$ [tan chord theo] / [raaklyn – koord stelling]	✓ S ✓ R ✓ S ✓ S/R	(4)
9.2	$\hat{E}_1 = \hat{C} = 100^\circ$ [ext $\angle$ of a cyclic quad] / [buite $\angle$ van koordevh] $\hat{C}_1 = \hat{C}_2$ [given] / [gegee] $\therefore \hat{E}_1 = 2\hat{C}_2 = 100^\circ$ $\therefore \hat{E}_1 = 2\hat{A}_1 = 100^\circ$ $\therefore E$ is the centre of the circle passing through A, N, R and D [converse $\angle$ at centre = $2 \times$ $\angle$ at circumf] <i>E is die middelpunt van die sirkel wat deur A, N, R en D gaan.</i> [omgekeerde middelpunts $\angle = 2 \times$ omtreks $\angle$]	✓ S ✓ R ✓ $\hat{E}_1 = 2\hat{A}_1 = 100^\circ$ ✓ R	(4)
9.3	$\hat{R} = 130^\circ$ [opp $\angle$ s of a cyclic quad] / [teenoorst. $\angle$ e van koordevh]	✓ S R ✓	(2)
9.4	Chords subt. = $\angle$ s / Koorde onderspan = $\angle$ e	✓ R	(1)
			[11]



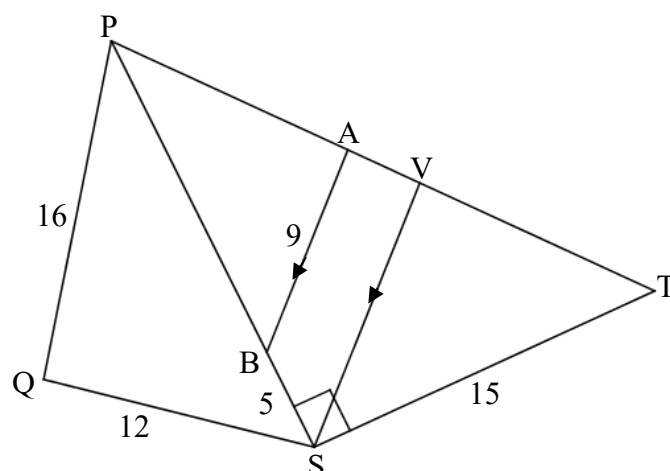
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QUESTION/VRAAG 10



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10.1	$\frac{PB}{BS} = \frac{PA}{AV} \quad [\text{line} \parallel \text{to one side of a } \Delta] / [\text{lyn} \parallel \text{aan een sy van } \Delta]$ $\frac{PB}{5} = \frac{3}{1}$ $PB = 15$ OR/OF $\frac{PS}{BS} = \frac{PV}{AV} \quad [\text{line} \parallel \text{to one side of a } \Delta] / [\text{lyn} \parallel \text{aan een sy van } \Delta]$ $\frac{PS}{5} = \frac{4}{1}$ $PS = 20$ $\therefore PB = 15$ OR/OF $\frac{PB}{PS} = \frac{PA}{PV} \quad [\text{line} \parallel \text{to one side of a } \Delta] / [\text{lyn} \parallel \text{aan een sy van } \Delta]$ $\frac{PB}{PB+5} = \frac{3}{4}$ $4PB = 3PB + 15$ $PB = 15$	✓ S ✓ R ✓ PB OR/OF ✓ S ✓ R ✓ PB OR/OF ✓ S ✓ R ✓ PB	(3)
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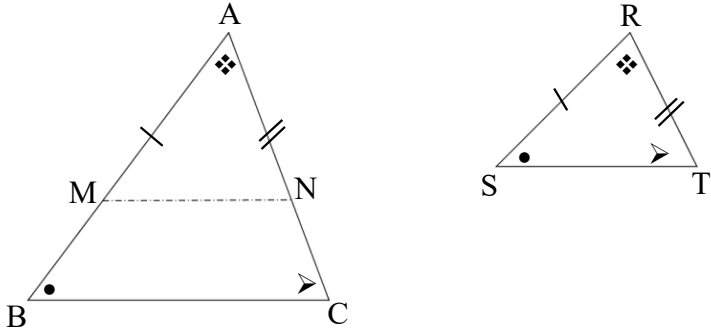
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10.2	$\triangle PAB \parallel \triangle PVS$ $\frac{PB}{PS} = \frac{AB}{VS} \quad [\parallel \Delta s/e]$ $\frac{15}{20} = \frac{9}{VS}$ $VS = 12$ In $\triangle PQS$ and $\triangle SVT$ / In $\triangle PQS$ en $\triangle SVT$ $\frac{PQ}{SV} = \frac{16}{12} = \frac{4}{3}$ $\frac{QS}{VT} = \frac{12}{9} = \frac{4}{3}$ $\frac{PS}{ST} = \frac{20}{15} = \frac{4}{3}$ $\therefore \triangle PQS \parallel \triangle SVT \quad [\text{corresp sides have } = \text{ratios}]$ $[\text{ooreenk. sye het } = \text{verhoudings}]$	$\checkmark S \quad \checkmark R$ $\checkmark$ substitution / <i>vervang</i> $\checkmark VS$ $\checkmark$ all 3 equal ratios <i>al 3 gelyke verhoudings</i> $\checkmark R$	(6) [9]
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QUESTION/VRAAG 11

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11.1	 Constructions. Put point M on AB and N on AC such that $AM = RS$ and $AN = RT$ Proof: In $\triangle AMN$ & $\triangle RST$ $AM = RS$ [constructions] $AN = RT$ [constructions] $\hat{BAC} = \hat{SRT}$ [given] $\therefore \triangle AMN \equiv \triangle RST$ [SAS] $\therefore \hat{AMN} = \hat{RST}$ [$\equiv \Delta s$] $\therefore \hat{AMN} = \hat{B}$ $\therefore MN \parallel BC$ [corresp. $\angle s =$] $\therefore \frac{AB}{AM} = \frac{AC}{AN}$ [line $\parallel$ to one side of a Δ] $\frac{AB}{RS} = \frac{AC}{RT}$	✓ complete constructions ✓ all 3 statements ✓ R for congruency ✓ R for $MN \parallel BC$ ✓ S ✓ R	
	<i>Konstruksies. Plaas punt M op AB en N op AC sodat $AM = RS$ en $AN = RT$</i> <i>Bewys: In $\triangle AMN$ & $\triangle RST$</i> $AM = RS$ [konstruksie] $AN = RT$ [konstruksie] $\hat{BAC} = \hat{SRT}$ [gegee] $\therefore \triangle AMN \equiv \triangle RST$ [SAS] $\therefore \hat{AMN} = \hat{RST}$ [$\equiv \Delta e$] $\therefore \hat{AMN} = \hat{B}$ $\therefore MN \parallel BC$ [ooreenk. $\angle s =$] $\therefore \frac{AB}{AM} = \frac{AC}{AN}$ [lyn $\parallel$ aan een sy van 'n Δ] $\frac{AB}{RS} = \frac{AC}{RT}$	✓ volledige konstruksies ✓ al 3 stellings ✓ R vir kongruensie ✓ R vir $MN \parallel BC$ ✓ S ✓ R	(6)



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Additional Notes June Maths P2 2026

1.2	Positively skewed OR $Q_3 = 60$	✓ Answer/ <i>Antwoord</i>	(1)
1.4	CLASS A performed better than CLASS B . Median of CLASS A is higher than median of CLASS B .	✓ CLASS A ✓ Reason/ <i>Rede</i>	(2)
1.7	No learner was awarded in CLASS A OR zero	✓✓ Answer/ <i>Antwoord</i> (Any relevant explanation is acceptable.)	(2)
2.2	Answer ONLY full marks		(3)
2.5	Accept $[17 - 19]$	✓ Answer/ <i>Antwoord</i>	(1)
3.4	Alternate solution $PQ^2 + PR^2 = QR^2$ $(3-0)^2 + (11-a)^2 + (0-3)^2 + (a-5)^2 = 6^2$ $9 + 121 - 22a + a^2 + 9 + a^2 - 10a + 25 = 36$ $2a^2 - 32a + 128 = 0$ $a^2 - 16a + 64 = 0$ $(a-8)^2 = 0$ $\therefore a = 8$	✓ Application of Pyth ✓ correct substitution ✓ simplification ✓ standard form ✓ factors	(5)
3.5	Alternate solution $\tan \hat{MSQ} = m_{PS} = 1$ $\hat{MSQ} = 45^\circ$ $\hat{SQM} = 45^\circ$ [$\angle s$ in $\triangle SMQ$] $\therefore SM = MQ$ [$sides\ opp = \angle s$]	✓ $\tan \hat{MSQ} = m_{PS}$ ✓ $\hat{MSQ}$ ✓ $\hat{SQM}$	(3)





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3.8	Alternate solution $x + 8 = -\frac{1}{3}x + 1$ $x = -\frac{21}{4}$ $y = -\frac{11}{4}$ $MN^2 = \left(-\frac{21}{4} - 3\right)^2 + \left(-\frac{11}{4} - 0\right)^2$ $= 8,70$	✓ Equating equations ✓ coordinates of N ✓ answer	(3)
4.4	$m_{AB} = \frac{1+3}{6+2} = \frac{1}{2}$ $M\left(\frac{6+2}{2}; \frac{1+3}{2}\right)$ $M(2; -1)$ $OM : -1 = -2(2) + c$ $3 = c$ $\therefore y = -2x + 3$ $q = -2(1) + 3$ $= 1$	✓ midpoint of AB ✓ equation of OM ✓ q	(3)
4.9	$\left(-\frac{22}{3}; 1\right)$ $r_{new}^2 = \left(-\frac{22}{3} - 1\right)^2 + (1 - 1)^2$ $r_{new} = \frac{25}{3}$ $r_{old} = 5$ $\therefore r_{new} > r_{old}$ $\therefore \left(-\frac{22}{3}; 1\right) \text{ lies outside the circle}$ OR $C(-4; 1)$	✓ r_{new} ✓ $r_{new} > r_{old}$ OR $r_{old} < r_{new}$ ✓ conclusion OR ✓ $C(-4; 1)$ ✓ invalid explanation	(3)



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	Point $\left(-\frac{22}{3}; 1\right)$ lies on the same straight line as B, O and C $x = -\frac{22}{3}$ lies on the left of C outside the circle	✓ conclusion	
6.1.2	$A \neq -45^\circ$ or $A \neq 45^\circ$ or $A \neq 0^\circ$	✓✓ any 2	(2)
6.2	$\sin(30^\circ - 2x) = -\sin^2 x + \cos^2 x$ $\sin(30^\circ - 2x) = \cos 2x$ $\sin(30^\circ - 2x) = \sin(90^\circ - 2x)$ $30^\circ - 2x = 180^\circ - 90^\circ + 2x + 360^\circ \cdot k, k \in \mathbb{Z}$ $-4x = 60^\circ + 360^\circ \cdot k$ $x = -15^\circ - 90^\circ \cdot k$ OR $30^\circ - 2x = 90^\circ - 2x + 360^\circ \cdot k$ no solution	✓ identity ✓ co-ratio ✓ both quads ✓ $-4x = 60^\circ + 360^\circ \cdot k$ ✓ $x = -15^\circ - 90^\circ \cdot k$ ✓ no solution ✓ $k \in \mathbb{Z}$	(7)
7.2	Correcting MG $2 - 4\cos^2 \frac{1}{2}x = \sqrt{3} \sin x - \cos x$ $2\left(1 - 2\cos^2 \frac{1}{2}x\right) = \sqrt{3} \sin x - \cos x$ $-\cos x = \frac{\sqrt{3}}{2} \sin x - \frac{1}{2} \cos x$ $-\sin(90^\circ - x) = \cos 30^\circ \sin x - \sin 30^\circ \cos x$ $\sin(x - 30^\circ) = -\sin(90^\circ - x)$ $x - 30^\circ = 180^\circ + (90^\circ - x) + 360^\circ, k \in \mathbb{Z}$ $2x = 300^\circ + 360^\circ \cdot k$ $x = 150^\circ + 180^\circ \cdot k$ $x = 150^\circ$ or $x = -30^\circ$	✓ common factor ✓ identity ✓ co-ratio ✓ both solutions	(4)



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9.2	Correcting mark allocation	Iphondo leMpuma Kapa: Isebe leMfundo Provinsie van die Oos Kaap: Departement van Onderwys Porafensie Ya Kapa Botjhabela: Letapha le Butha	(10)
	$\hat{E}_1 = 100^\circ$ [ext $\angle$ of a cyclic quad]	✓ S ✓ R	
	$\hat{C}_1 = \hat{C}_2$ [given]		
	$\hat{A}_1 = \hat{C}_2$ [proved]	✓ S	
	$\therefore \hat{E}_1 = 2\hat{A}_1 = 100^\circ$	✓ S	



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