

Soek jy 'n fantastiese tutor?

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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

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

**MATHEMATICS P2/
WISKUNDE V2**

MARKING GUIDELINES/NASIENRIGLYNE

2019

**MARKS: 150
PUNTE: 150**

**These marking guidelines consist of 20 pages.
Hierdie nasienriglyne bestaan uit 20 bladsye..**

NOTE:

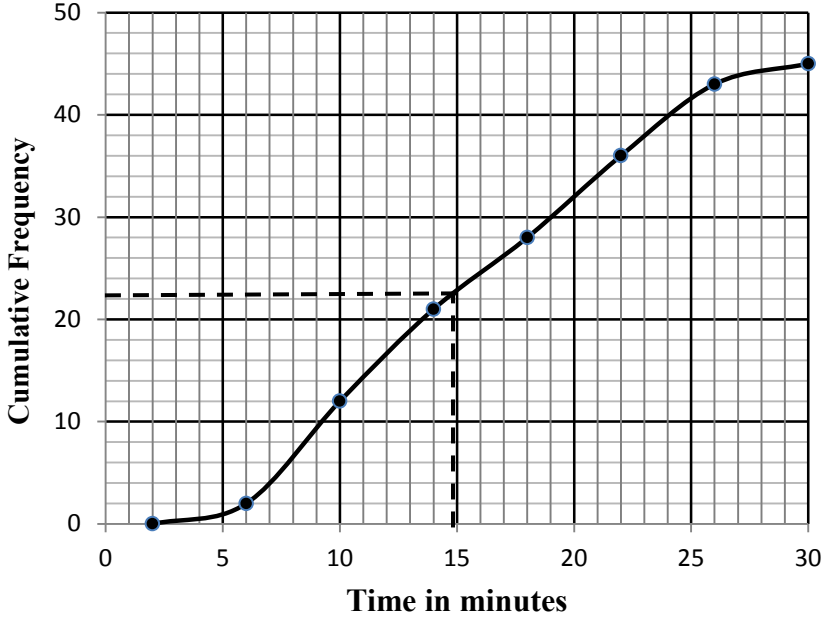
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of the marking memorandum. Stop marking at the second calculation error.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

NOTA:

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

GEOMETRY • MEETKUNDE	
S	A mark for a 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

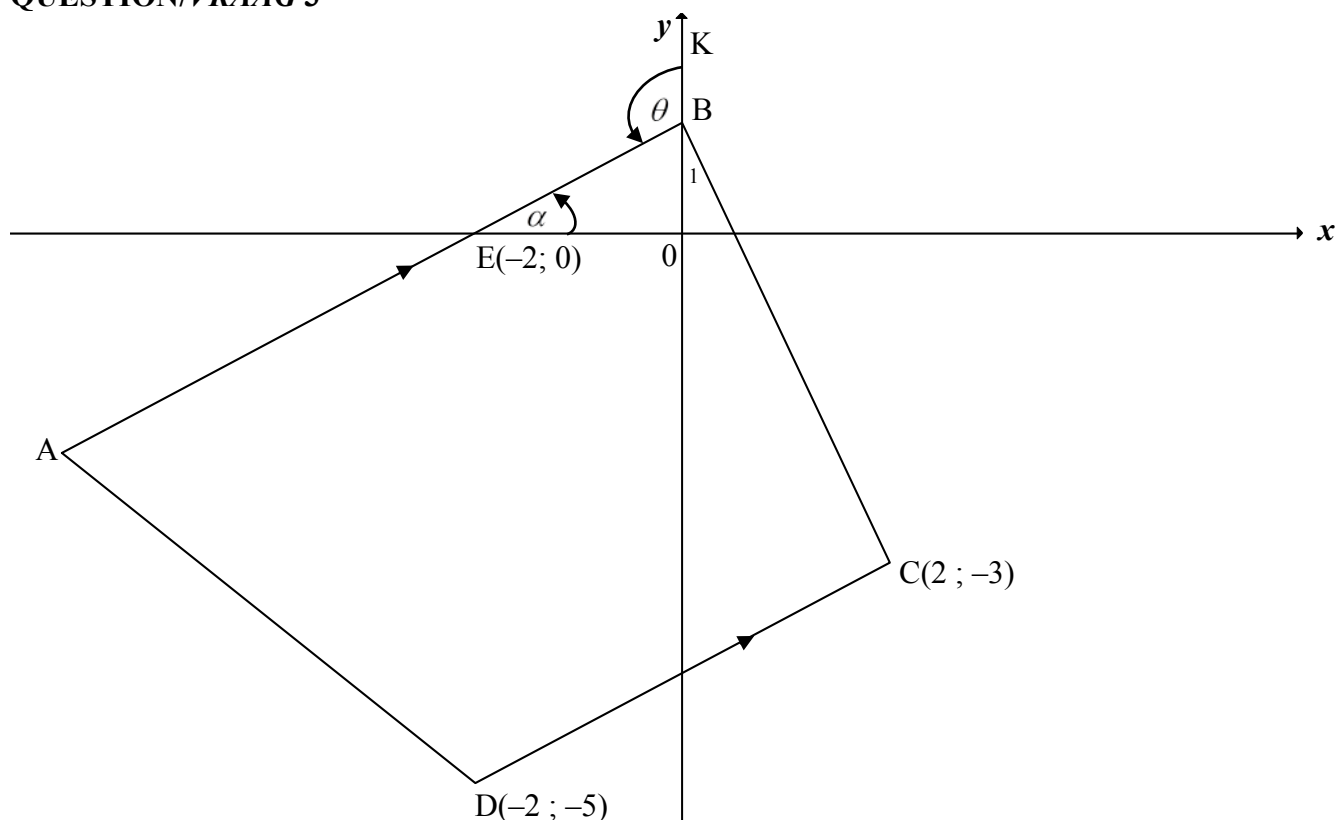
QUESTION/VRAAG 1

1.1	45 children	✓ answer (1)																								
1.2	$\bar{x} = \frac{\sum fx}{n} = \frac{(4 \times 2) + (8 \times 10) + (12 \times 9) + (16 \times 7) + (20 \times 8) + (24 \times 7) + (28 \times 2)}{45}$ $\bar{x} = \frac{692}{45} \text{ OR } \bar{x} = 15,38 \text{ minutes}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only: full marks</div>	✓ 692 ✓ answer (2)																								
1.3	<table border="1" style="margin: auto; text-align: center;"> <thead> <tr> <th>Time taken (<i>t</i>) (in minutes)</th><th>Number of children</th><th>Cumulative frequency</th></tr> </thead> <tbody> <tr><td>$2 < t \leq 6$</td><td>2</td><td>2</td></tr> <tr><td>$6 < t \leq 10$</td><td>10</td><td>12</td></tr> <tr><td>$10 < t \leq 14$</td><td>9</td><td>21</td></tr> <tr><td>$14 < t \leq 18$</td><td>7</td><td>28</td></tr> <tr><td>$18 < t \leq 22$</td><td>8</td><td>36</td></tr> <tr><td>$22 < t \leq 26$</td><td>7</td><td>43</td></tr> <tr><td>$26 < t \leq 30$</td><td>2</td><td>45</td></tr> </tbody> </table>	Time taken (<i>t</i>) (in minutes)	Number of children	Cumulative frequency	$2 < t \leq 6$	2	2	$6 < t \leq 10$	10	12	$10 < t \leq 14$	9	21	$14 < t \leq 18$	7	28	$18 < t \leq 22$	8	36	$22 < t \leq 26$	7	43	$26 < t \leq 30$	2	45	✓ first 4 cum freq correct ✓ last 3 cum freq correct (2)
Time taken (<i>t</i>) (in minutes)	Number of children	Cumulative frequency																								
$2 < t \leq 6$	2	2																								
$6 < t \leq 10$	10	12																								
$10 < t \leq 14$	9	21																								
$14 < t \leq 18$	7	28																								
$18 < t \leq 22$	8	36																								
$22 < t \leq 26$	7	43																								
$26 < t \leq 30$	2	45																								
1.4	<p style="text-align: center;">CUMULATIVE FREQUENCY GRAPH (OGIVE)</p> 	✓ plotting cum freq at upper limits correctly (all points) ✓ shape (smooth) ✓ grounding (2;0) (3)																								
1.5	On graph at the y-value of 22,5 or 23 Median = ± 15 minutes. <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only: full marks</div>	✓ graph ✓ answer (2)																								
		[10]																								

QUESTION/VRAAG 2

2.1	$a = 12,44$ $b = 0,98$ $y = 12,44 + 0,98x$ <div>Answer only: full marks</div>	✓ value of a ✓ value of b ✓ equation (3)
2.2.1	Percentage = $\frac{15}{50} \times 100$ = 30%	✓ answer (1)
2.2.2	$\hat{y} = 12,44 + 0,98x$ $\hat{y} = 12,44 + 0,98(30)$ $\hat{y} = 41,84$ = 42 OR $\hat{y} = 41,87$ (if using calculator) $\hat{y} = 42$ OR $\hat{y} = \frac{21}{50}$ <div>Answer only: full marks</div>	✓ substitution of 30 ✓ answer as integer (2) ✓ value of y ✓ answer as integer (2) ✓ ✓ answer (2)
2.3.1	standard deviation = 13,88	✓ ✓ answer (2)
2.3.2	$x = 50,67 - 45,67$ = 5% <div>Answer only: full marks</div>	✓ $50,67 - 45,67$ ✓ answer (2)
		[10]

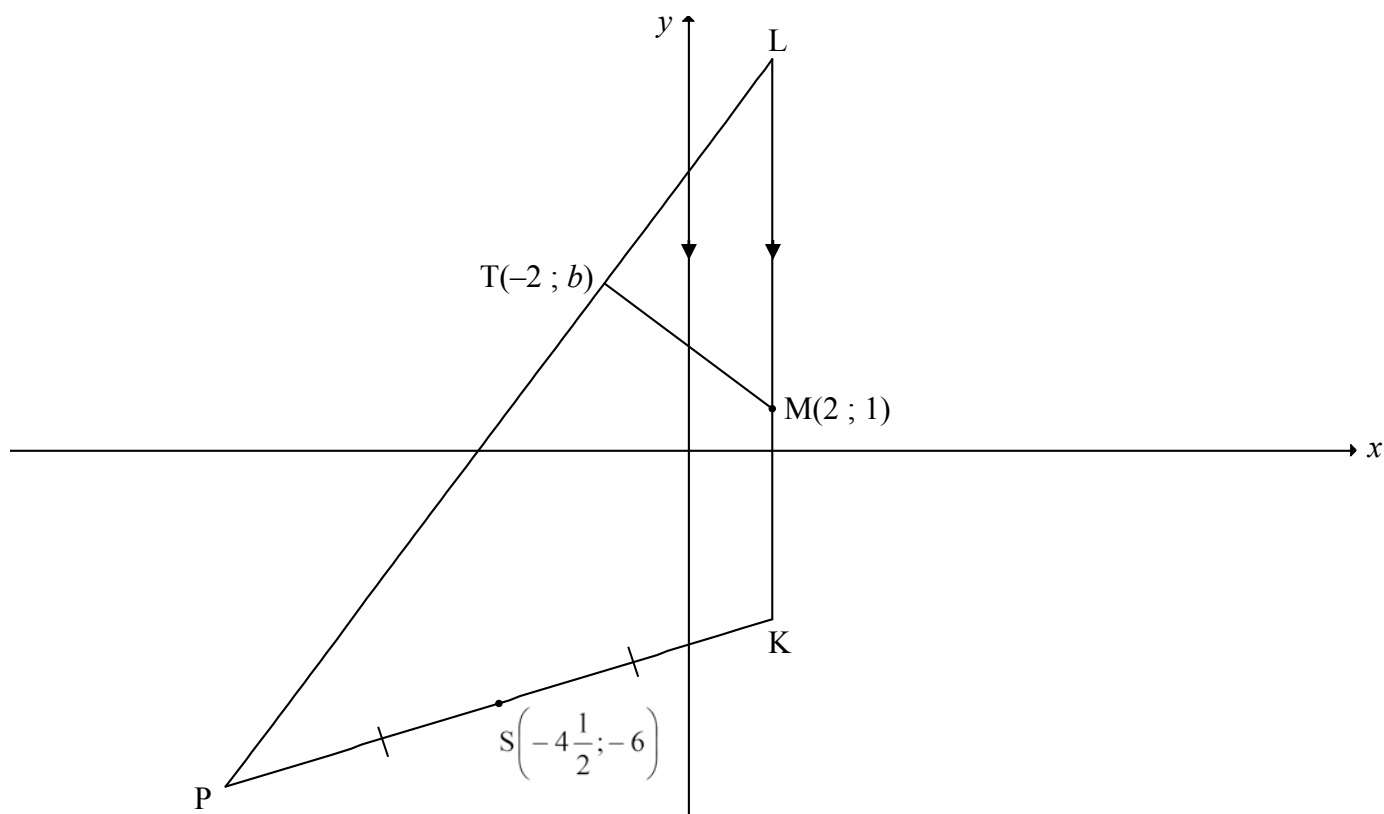
QUESTION/VRAAG 3



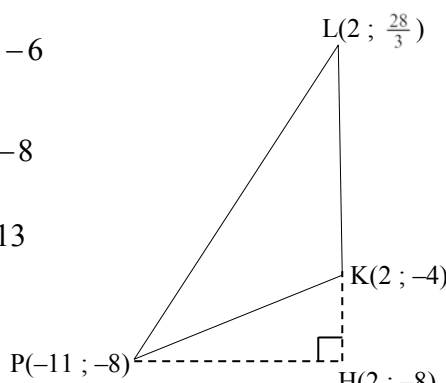
3.1.1	Midpoint of EC: $= \left(\frac{-2+2}{2} ; \frac{0+(-3)}{2} \right) = \left(0 ; \frac{-3}{2} \right)$	✓ x value ✓ y value (2)
3.1.2	$m_{DC} = \frac{-3-(-5)}{2-(-2)} \text{ OR } \frac{-5-(-3)}{-2-2}$ $= \frac{2}{4} = \frac{1}{2}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only: full marks</div>	✓ substitution ✓ answer (2)
3.1.3	$m_{AB} = \frac{1}{2} \quad [AB \parallel DC]$ $y = \frac{1}{2}x + c$ $0 = \frac{1}{2}(-2) + c \quad \text{OR} \quad y - y_1 = \frac{1}{2}(x - x_1)$ $c = 1$ $\therefore y = \frac{1}{2}x + 1$	✓ $m_{AB} = \frac{1}{2}$ ✓ substitution of $(-2; 0)$ ✓ equation (3)
3.1.4	$\tan \alpha = m_{AB} = \frac{1}{2}$ $\alpha = 26,57^\circ$ $\theta = 90^\circ + 26,57^\circ \quad [\text{ext } \angle \text{ of } \Delta]$ $= 116,57^\circ$	✓ $\tan \alpha = \frac{1}{2}$ ✓ value of α ✓ value of θ (3)

3.2	$B(0 ; 1)$ $m_{BC} = \frac{1 - (-3)}{0 - 2} \quad \text{OR} \quad m_{BC} = \frac{(-3) - 1}{2 - 0}$ $= -2 \qquad \qquad \qquad = -2$ $m_{AB} \times m_{BC} = \frac{1}{2} \times -2$ $= -1$ $\therefore AB \perp BC$	<p>✓ coordinates of B</p> <p>✓ $m_{BC} = -2$</p> <p>✓ product of gradients = -1</p> <p>(3)</p>
3.3.1	$\hat{ABC} = 90^\circ$ <p>\therefore EC is diameter [converse: \angle in semi circle]</p> $\therefore \text{centre of circle} = \left(0 ; -\frac{3}{2}\right)$	<p>✓ answer</p> <p>(1)</p>
3.3.2	$(x-0)^2 + \left(y + \frac{3}{2}\right)^2 = r^2$ $(-2-0)^2 + \left(0 + \frac{3}{2}\right)^2 = r^2 \quad \text{OR} \quad (2-0)^2 + \left(-3 - \left(-\frac{3}{2}\right)\right)^2 = r^2$ $\text{OR} \quad (0-0)^2 + \left(1 - \left(-\frac{3}{2}\right)\right)^2 = r^2$ $\text{OR} \quad r = \frac{EC}{2} = \frac{\sqrt{(-2-2)^2 + (0-(-3))^2}}{2}$ $\text{OR} \quad r = 1 - \left(-\frac{3}{2}\right)$ $\therefore r^2 = \frac{25}{4} \quad \text{or} \quad r = \frac{5}{2}$ $x^2 + \left(y + \frac{3}{2}\right)^2 = \frac{25}{4}$	<p>✓ substitution of centre</p> <p>✓ correct substitution of E(-1 ; 0), B(0 ; 1) or C(2 ; -3) to calculate r^2 or r</p> <p>✓ value of r^2 or r</p> <p>✓ equation</p> <p>(4)</p>
		[18]

QUESTION/VRAAG 4



4.1	$(x-2)^2 + (y-1)^2 = 25$ $(-2-2)^2 + (b-1)^2 = 25$ $(b-1)^2 = 9$ OF $16 + b^2 - 2b + 1 = 25$ $b-1 = \pm 3$ $\therefore b=4$ or $b \neq -2$	$(x-2)^2 + (y-1)^2 = 25$ $(-2-2)^2 + (b-1)^2 = 25$ $b^2 - 2b - 8 = 0$ $\therefore b=4$ or $b \neq -2$	✓ equation of the circle ✓ substitution of point T ✓ simplification ✓ answer (4)
4.2.1	K(2 ; 1 – 5) \therefore K(2 ; –4)	Answer only: full marks	✓ x value ✓ y value (2)
4.2.2	$m_{MT} = \frac{4-1}{-2-2} = -\frac{3}{4}$ $m_{PL} = \frac{4}{3}$ [radius \perp tangent] $y = \frac{4}{3}x + c$ $4 = \frac{4}{3}(-2) + c$ $c = \frac{20}{3}$ $y = \frac{4}{3}x + \frac{20}{3}$	 	

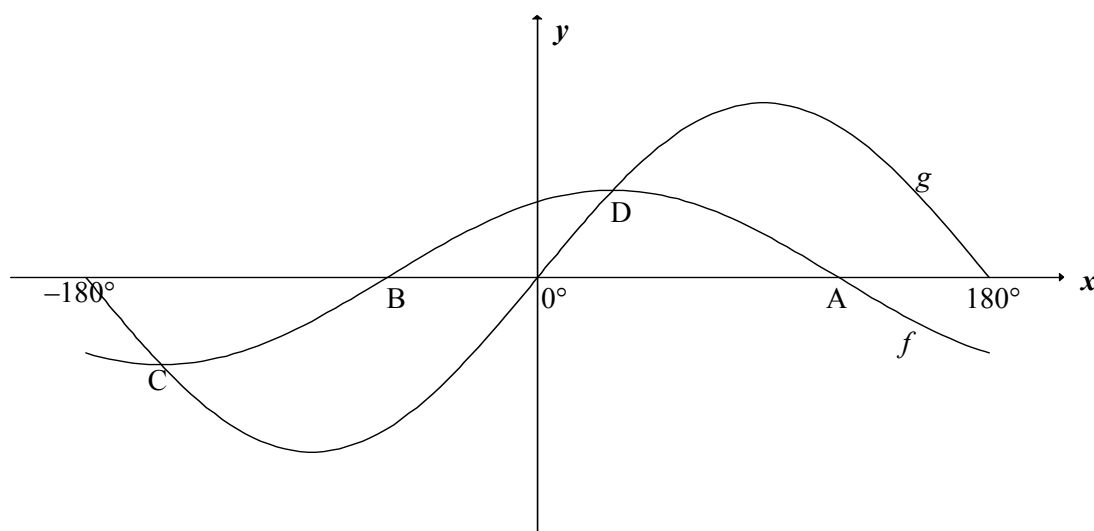
	<p>OR</p> $m_{MT} = \frac{4-1}{-2-2} = -\frac{3}{4}$ $m_{PL} = \frac{4}{3} \quad [\text{radius} \perp \text{tangent}]$ $y - y_1 = \frac{4}{3}(x - x_1)$ $y - 4 = \frac{4}{3}(x + 2)$ $y = \frac{4}{3}x + \frac{20}{3}$ <p>OR</p> <p>P(-11 ; -8)</p> $m_{PL} = \frac{4 - (-8)}{-2 - (-11)}$ $= \frac{4}{3}$ $y = \frac{4}{3}x + c$ $-8 = \frac{4}{3}(-11) + c$ $c = \frac{20}{3}$ $y = \frac{4}{3}x + \frac{20}{3}$	<p>✓ m_{MT}</p> <p>✓ $m_{PL} = \frac{4}{3}$</p> <p>✓ substitution of m_{PL} and the point T</p> <p>✓ equation (4)</p> <p>✓ coordinates of P</p> <p>✓ $m_{PL} = \frac{4}{3}$</p> <p>✓ substitution of m_{PL} and the point P or T</p> <p>✓ equation (4)</p>
4.2.3	$y_L = \frac{4}{3}(2) + \frac{20}{3} = \frac{28}{3}$ $L\left(2; \frac{28}{3}\right) \text{ and } K(2; -4): \quad LK = \frac{28}{3} - (-4) = \frac{40}{3}$ <p><u>Coordinates of P:</u></p> $\frac{x+2}{2} = -4\frac{1}{2} \quad \text{and} \quad \frac{y-4}{2} = -6$ $\therefore x = -11 \quad y = -8$ $\therefore P(-11; -8)$ $\perp \text{ height (PH)} = 2 - (-11) = 13$ $\text{Area } \triangle PKL = \frac{1}{2}(LK)(PH)$ $= \frac{1}{2}\left(\frac{40}{3}\right)(13)$ $= \frac{260}{3} \quad \text{OR} \quad 86,67 \text{ square units}$ 	<p>✓ $y_L = \frac{28}{3}$</p> <p>✓ length of LK</p> <p>✓ x_p ✓ y_p</p> <p>✓ length of \perp height</p> <p>✓ substitution into the area formula</p> <p>✓ answer (7)</p>

QUESTION/VRAAG 5

5.1.1	$\sin 191^\circ$ $= -\sin 11^\circ$	$\checkmark -\sin 11^\circ$ (1)
5.1.2	$\cos 22^\circ$ $= \cos(2 \times 11^\circ)$ $= 1 - 2\sin^2 11^\circ$	\checkmark answer (1)
5.2	$\cos(x - 180^\circ) + \sqrt{2} \sin(x + 45^\circ)$ $= -\cos x + \sqrt{2}(\sin x \cos 45^\circ + \cos x \sin 45^\circ)$ $= -\cos x + \sqrt{2}\left(\sin x \left(\frac{1}{\sqrt{2}}\right) + \cos x \left(\frac{1}{\sqrt{2}}\right)\right)$ $= -\cos x + \sin x + \cos x$ $= \sin x$ OR $\cos(x - 180^\circ) + \sqrt{2} \sin(x + 45^\circ)$ $= -\cos x + \sqrt{2}(\sin x \cos 45^\circ + \cos x \sin 45^\circ)$ $= -\cos x + \sqrt{2}\left(\sin x \left(\frac{\sqrt{2}}{2}\right) + \cos x \left(\frac{\sqrt{2}}{2}\right)\right)$ $= -\cos x + \sin x + \cos x$ $= \sin x$	$\checkmark -\cos x$ \checkmark expansion \checkmark special angle ratios \checkmark simplification of last 2 terms \checkmark answer (5) $\checkmark -\cos x$ \checkmark expansion \checkmark special angle ratios \checkmark simplification of last 2 terms \checkmark answer (5)
5.3	$\sin P + \sin Q = \sin P + \cos P$ $(\sin P + \cos P)^2 = \left(\frac{7}{5}\right)^2$ $\sin^2 P + 2 \sin P \cos P + \cos^2 P = \frac{49}{25}$ $2 \sin P \cos P = \frac{49}{25} - 1$ $\sin 2P = \left(\frac{49}{25} - \frac{25}{25}\right)$ $= \frac{24}{25}$	$\checkmark \sin Q = \cos P$ \checkmark squaring \checkmark expansion $\checkmark \sin^2 P + \cos^2 P = 1$ \checkmark answer (5)
		[12]

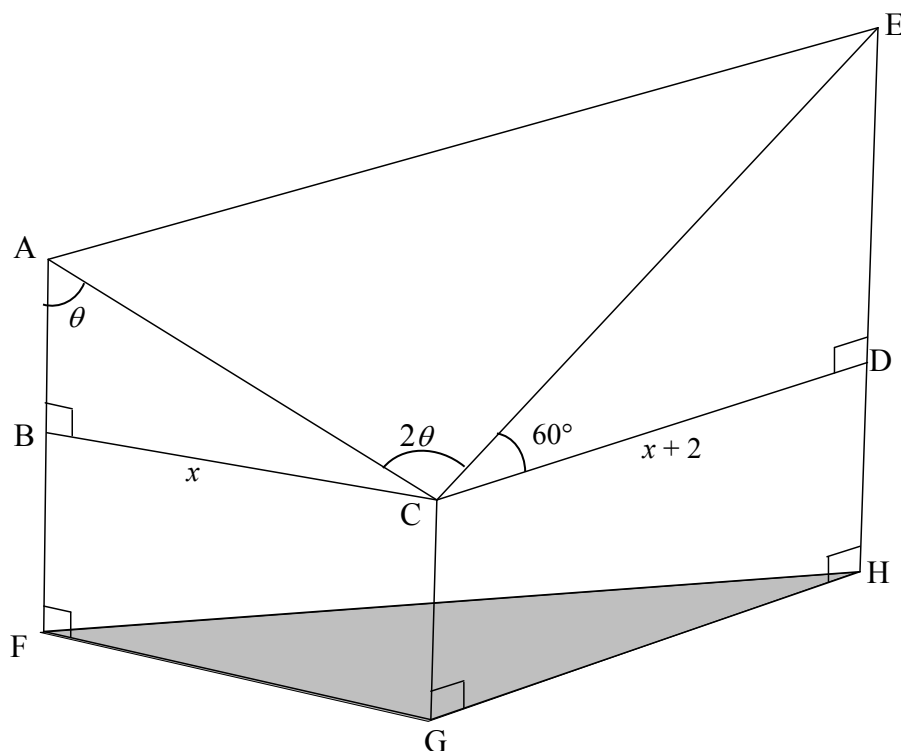
QUESTION/VRAAG 6

6.1	$\cos(x - 30^\circ) = 2 \sin x$ $\cos x \cos 30^\circ + \sin x \sin 30^\circ = 2 \sin x$ $\frac{\sqrt{3}}{2} \cos x + \frac{1}{2} \sin x = 2 \sin x$ $\frac{\sqrt{3}}{2} \cos x = \frac{3}{2} \sin x$ $\tan x = \frac{\sqrt{3}}{3}$ $x = 30^\circ + k \cdot 180^\circ; \quad k \in \mathbb{Z}$ OR $x = 30^\circ + k \cdot 360^\circ$ or $x = 210^\circ + k \cdot 360^\circ; \quad k \in \mathbb{Z}$	✓ expansion ✓ special \angle s ✓ simplification ✓ equation in tan ✓ 30° ✓ $k \cdot 180^\circ; k \in \mathbb{Z}$ OR ✓ 30° and 210° ✓ $k \cdot 360^\circ; \quad k \in \mathbb{Z}$ (6)
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6.2.1(a)	A(120° ; 0)	✓ answer (1)
6.2.1(b)	C(-150° ; -1)	✓ x value ✓ y value (2)
6.2.2(a)	$x \in (-90^\circ ; 30^\circ)$ OR $-90^\circ < x < 30^\circ$	✓ endpoints ✓ correct interval (2)
6.2.2(b)	$x \in (-160^\circ ; 20^\circ)$ OR $-160^\circ < x < 20^\circ$	✓ endpoints ✓ correct interval (2)
6.2.3	$y = 2^{2 \sin x + 3}$ Range of $y = 2 \sin x$: $y \in [-2 ; 2]$ OR $-2 \leq y \leq 2$ Range of $y = 2 \sin x + 3$: $y \in [1 ; 5]$ OR $1 \leq y \leq 5$ Range: $y = 2^{2 \sin x + 3}$: $y \in [2 ; 32]$ OR $2 \leq y \leq 32$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only: full marks</div>	✓ 1 ✓ 5 ✓ 2 ✓ 32 ✓ correct interval (5)
		[18]

QUESTION/VRAAG 7

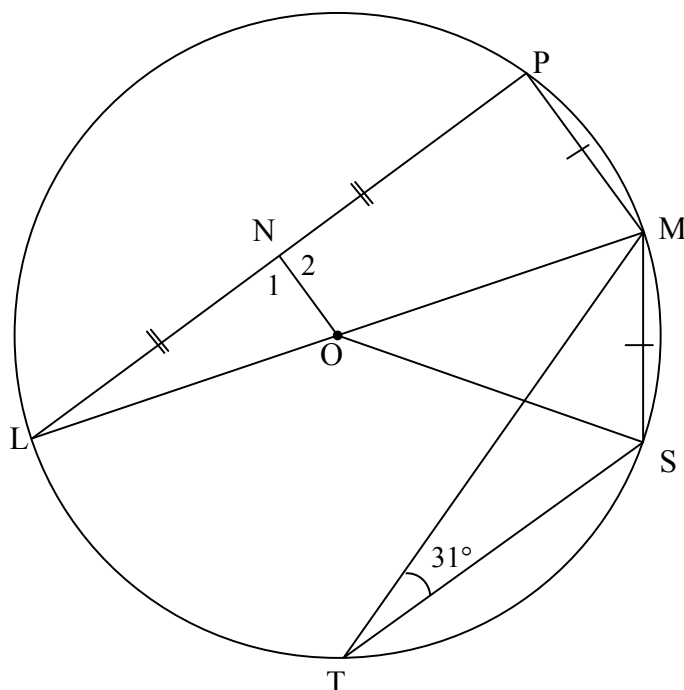


7.1.1	$\sin \theta = \frac{x}{AC}$ <p style="text-align: center;">OR</p> $\frac{\sin \theta}{x} = \frac{\sin 90^\circ}{AC}$ $AC = \frac{x}{\sin \theta}$ $AC = \frac{x}{\sin \theta}$	✓ trig ratio ✓ simplification (2)
7.1.2	$\cos 60^\circ = \frac{x+2}{CE}$ <p style="text-align: center;">OR</p> $\frac{\sin 30^\circ}{x+2} = \frac{\sin 90^\circ}{CE}$ $CE = \frac{x+2}{\cos 60^\circ}$ $CE = \frac{x+2}{\sin 30^\circ}$ $= \frac{x+2}{\frac{1}{2}} = 2(x+2)$ $= 2(x+2)$	✓ trig ratio ✓ making CE the subject (2)
7.2	$\text{Area } \triangle ACE = \frac{1}{2} AC \cdot EC \cdot \sin \hat{ACE}$ $= \frac{1}{2} \left(\frac{x}{\sin \theta} \right) (2(x+2)) \sin 2\theta$ $= \frac{x(x+2) \times 2 \sin \theta \cos \theta}{\sin \theta}$ $= 2x(x+2) \cos \theta$	✓ use area rule correctly ✓ substitution of $\frac{x}{\sin \theta} (2(x+2))$ ✓ substitution of $\sin 2\theta$ (3)

7.3	$EC = 2(12 + 2) = 28$ $AE^2 = AC^2 + EC^2 - 2(AC)(EC)\cos\hat{A}CE$ $= \left(\frac{12}{\sin 55^\circ}\right)^2 + 28^2 - 2\left(\frac{12}{\sin 55^\circ}\right)(28)\cos 110^\circ$ $AE = 35,77m$	✓ EC ✓ use cosine rule correctly ✓ substitution ✓ answer (4)
		[11]

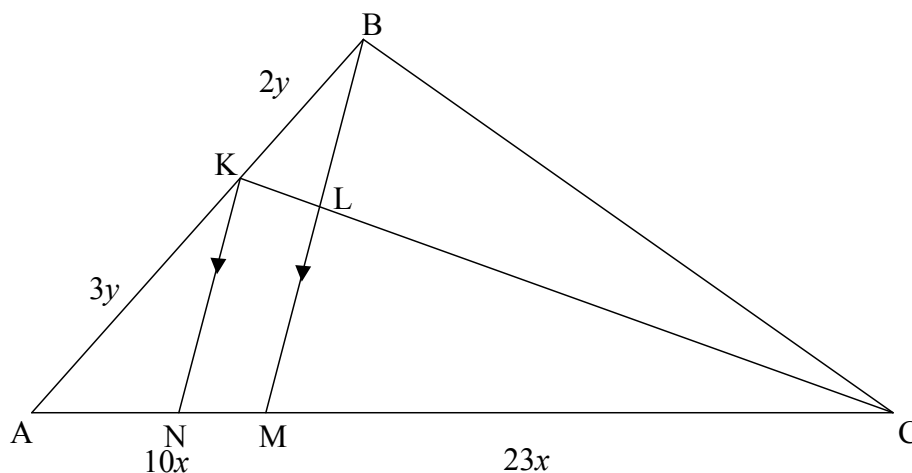
QUESTION/VRAAG 8

8.1



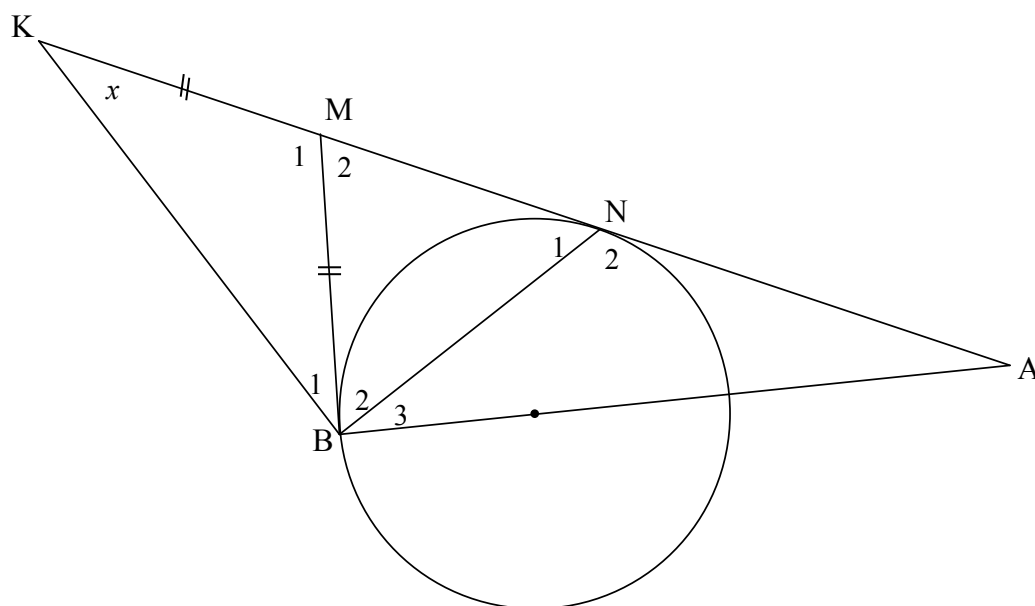
8.1.1(a)	$\hat{MÔS} = 62^\circ$ [\angle at centre = $2 \times \angle$ at circumf/middelpnts $\angle = 2 \text{omtreks} \angle$]	✓ S ✓ R (2)
8.1.1(b)	$\hat{L} = 31^\circ$ [equal chords; equal \angle s / = koorde; = \angle e]	✓ S ✓ R (2)
8.1.2	<p>LN = NP and LO = OM</p> <p>$\therefore ON = \frac{1}{2} PM$ [midpoint theorem/middelpuntstelling]</p> <p>$\therefore ON = \frac{1}{2} MS$ [PM = MS]</p> <p>OR</p> <p>$\hat{N}_1 = 90^\circ$ [line from centre to midpt chord/lyn v midpt na midpt kd]</p> <p>$\hat{P} = 90^\circ$ [\angle in semi-circle/\angle in halfsirkel]</p> <p>\hat{L} is common/gemeen</p> <p>$\therefore \triangle NLO \parallel \triangle PLM$ ($\angle \angle \angle$)</p> <p>$\frac{NL}{PL} = \frac{NO}{PM} = \frac{1}{2}$</p> <p>$\therefore ON = \frac{1}{2} PM$</p> <p>$\therefore ON = \frac{1}{2} MS$ [PM = MS]</p>	<p>✓ LO = OM</p> <p>✓ S ✓ R</p> <p>✓ S</p> <p>(4)</p> <p>✓ S R</p> <p>✓ S/R</p> <p>✓ S</p> <p>✓ S</p> <p>(4)</p>

8.2



8.2.1	$\frac{AN}{AM} = \frac{AK}{AB}$ <p>[line one side of Δ OR prop theorem; $KN \parallel BM$/ lyn sy van Δ OR eweredigheidst; $KN \parallel BM$]</p> $\frac{AN}{AM} = \frac{3y}{5y} = \frac{3}{5}$	<p>✓ R</p> <p>✓ S</p> <p>(2)</p>
8.2.2	$\frac{AM}{MC} = \frac{10x}{23x}$ <p>[given]</p> $AM = 5y = 10x \quad \therefore y = 2x$ $\frac{LC}{KL} = \frac{MC}{NM}$ <p>[line one side of Δ OR prop theorem; $KN \parallel LM$/ lyn sy van Δ OR eweredigheidst; $KN \parallel BM$]</p> $= \frac{23x}{2y} = \frac{23x}{4x} = \frac{23}{4}$ <p>OR</p> $\frac{AM}{MC} = \frac{10x}{23x}$ <p>[given]</p> $\frac{AN}{MN} = \frac{3y}{2y} = \frac{6x}{4x}$ $\frac{LC}{KL} = \frac{MC}{NM}$ <p>[line one side of Δ OR prop theorem; $KN \parallel LM$/ lyn sy van Δ OR eweredigheidst; $KN \parallel BM$]</p> $= \frac{23x}{2y} = \frac{23x}{4x} = \frac{23}{4}$	<p>✓ S</p> <p>✓ R</p> <p>✓ S</p> <p>(3)</p> <p>✓ S</p> <p>✓ R</p> <p>✓ S</p> <p>(3)</p>
		[13]

QUESTION/VRAAG 9

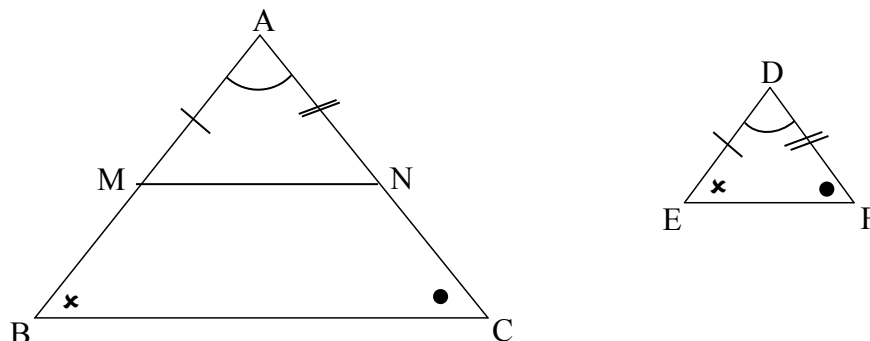


9.1	$\hat{B}_1 = x$ [\angle 's opp = sides/ \angle e teenoor = sye] $\hat{M}_2 = 2x$ [ext \angle of Δ] OR $\hat{M}_1 = 180^\circ - 2x$ [\angle s of Δ] $BM = MN$ [2 tans from a common point/raaklyne vanuit dieselfde punt] $\hat{N}_1 = \frac{180^\circ - 2x}{2} = 90^\circ - x$ [\angle 's opp = sides/ \angle e teenoor = sye] OR $NM = BM$ [2 tans from a common point/raaklyne vanuit dieselfde punt] $\hat{B}_2 = \hat{N}_1$ [\angle 's opp = sides/ \angle e teenoor = sye] $\hat{B}_1 = x$ [\angle 's opp = sides/ \angle e teenoor = sye] In ΔKBN : $x + x + \hat{B}_2 + \hat{N}_1 = 180^\circ$ [sum of \angle 's of Δ] $2x + 2\hat{N}_1 = 180^\circ$ $x + \hat{N}_1 = 90^\circ$ $\hat{N}_1 = 90^\circ - x$	$\checkmark S$ $\checkmark S \checkmark R$ $\checkmark S \checkmark R$ \checkmark answer $\checkmark S \checkmark R$ $\checkmark S \checkmark R$ $\checkmark S$ \checkmark answer (6)
9.2	$\hat{MBA} = \hat{B}_2 + \hat{B}_3 = 90^\circ$ [tangent \perp diameter/raaklyn \perp middellyn] $\hat{B}_3 = 90^\circ - \hat{B}_2$ $= 90^\circ - (90^\circ - x) = x$ $\hat{B}_3 = \hat{K} = x$ $\therefore AB$ is a tangent/raaklyn converse tan-chord theorem/ omgekeerde raakl koordst]]	$\checkmark S \checkmark R$ $\checkmark S$ $\checkmark S$ $\checkmark R$ (5)

	<p>OR</p> <p>$\hat{B}_2 = \hat{N}_1$</p> <p>$\hat{B}_1 + \hat{B}_2 = x + (90^\circ - x) = 90^\circ$</p> <p>$\therefore$ KN is diameter/<i>middel lyn</i> [converse \angle in semi-circle/ <i>omgekeerde \angle in halfsirkel</i>]</p> <p>$\hat{MBA} = \hat{B}_2 + \hat{B}_3 = 90^\circ$ [tangent \perp diameter]</p> <p>\therefore AB is a tangent/<i>raaklyn</i> converse tan-chord theorem/ <i>omgekeerde raakl koordst</i>]]</p>	<p>✓ S</p> <p>✓ R</p> <p>✓ S ✓ R</p> <p>✓ R</p> <p>(5)</p>
		[11]

QUESTION/VRAAG 10

10.1



10.1	<p>Constr: Let M and N lie on AB and AC respectively such that $AM = DE$ and $AN = DF$. Draw MN.</p> <p>Konst: Merk M en N op AB en AC onderskeidelik af sodanig dat $AM = DE$ en $AN = DF$. Verbind MN.</p> <p>Proof:</p> <p>In $\triangle AMN$ and $\triangle DEF$</p> <p>$AM = DE$ [Constr]</p> <p>$AN = DF$ [Constr]</p> <p>$\hat{A} = \hat{D}$ [Given]</p> <p>$\therefore \triangle AMN \equiv \triangle DEF$ (SAS)</p> <p>$\therefore \hat{AMN} = \hat{E} = \hat{B}$</p> <p>$MN \parallel BC$ [corresp \angle's are equal/ooreenkomstige $\angle e =$]</p> <p>$\frac{AB}{AM} = \frac{AC}{AN}$ [line \parallel one side of \triangle OR prop theorem; $MN \parallel BC$]</p> <p>$\therefore \frac{AB}{DE} = \frac{AC}{DF}$ [AM=DE and AN=DF]</p>	<p>✓ Constr / Konst</p> <p>✓ $\triangle AMN \equiv \triangle DEF$</p> <p>✓ SAS</p> <p>✓ $MN \parallel BC$ and R</p> <p>✓ $\frac{AB}{AM} = \frac{AC}{AN}$ ✓ R</p> <p>(6)</p>
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10.2.2(a)	$AB = DE = 14$ [diameters/ <i>middel</i> lyne] $\therefore OB = 7$ units $\therefore BC = OC - OB = 11 - 7$ $= 4$ units	\checkmark S \checkmark S \checkmark S Answer only: full marks (3)
10.2.2(b)	In $\triangle CGB$ and $\triangle CAG$ $\hat{G}_1 = \hat{A} = x$ [tan-chord theorem/ <i>raakl koordst</i>] $\hat{C} = \hat{C}$ [common] $\triangle CGB \parallel \triangle CAG$ [\angle, \angle, \angle] $\frac{CG}{CA} = \frac{CB}{CG}$ $\frac{CG}{18} = \frac{4}{CG}$ $CG^2 = 72$ $CG = \sqrt{72}$ or $6\sqrt{2}$ or 8,49 units	\checkmark S/R \checkmark S \checkmark S \checkmark CA = 18 \checkmark answer (5)
10.2.2(c)	$OF = OC - FC$ $= 11 - \sqrt{72}$ $\tan E = \frac{OF}{OE}$ $= \frac{11 - \sqrt{72}}{7} = 0,36$ $\hat{E} = 19,76^\circ$ OR $OF = OC - FC$ $= 11 - \sqrt{72}$ $FE^2 = OE^2 + OF^2$ $= 7^2 + (11 - \sqrt{72})^2$ $FE = 7,437.. = 7,44$ $\cos E = \frac{OE}{FE}$ $= \frac{7}{7,44} = 0,94$ $\hat{E} = 19,76^\circ$	\checkmark OF \checkmark trig ratio \checkmark substitution \checkmark answer (4) \checkmark OF \checkmark trig ratio \checkmark substitution \checkmark answer (4)
		[26]

	TOTAL/TOTAAL:	150
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