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PREPARATORY EXAMINATION *VOORBEREIDENDE EKSAMEN*

2019

MARKING GUIDELINES / *NASIENRIGLYNE*

**MATHEMATICS (PAPER 2) (10612)
*WISKUNDE (VRAESTEL 2) (10612)***

22 pages / bladsye

**GAUTENG DEPARTMENT OF EDUCATION /
GAUTENGSE DEPARTEMENT VAN ONDERWYS
PREPARATORY EXAMINATION /
VOORBEREIDENDE EKSAMEN**

**MATHEMATICS / WISKUNDE
(Paper 2 / Vraestel 2)**

MARKING GUIDELINES / NASIENRIGLYNE

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

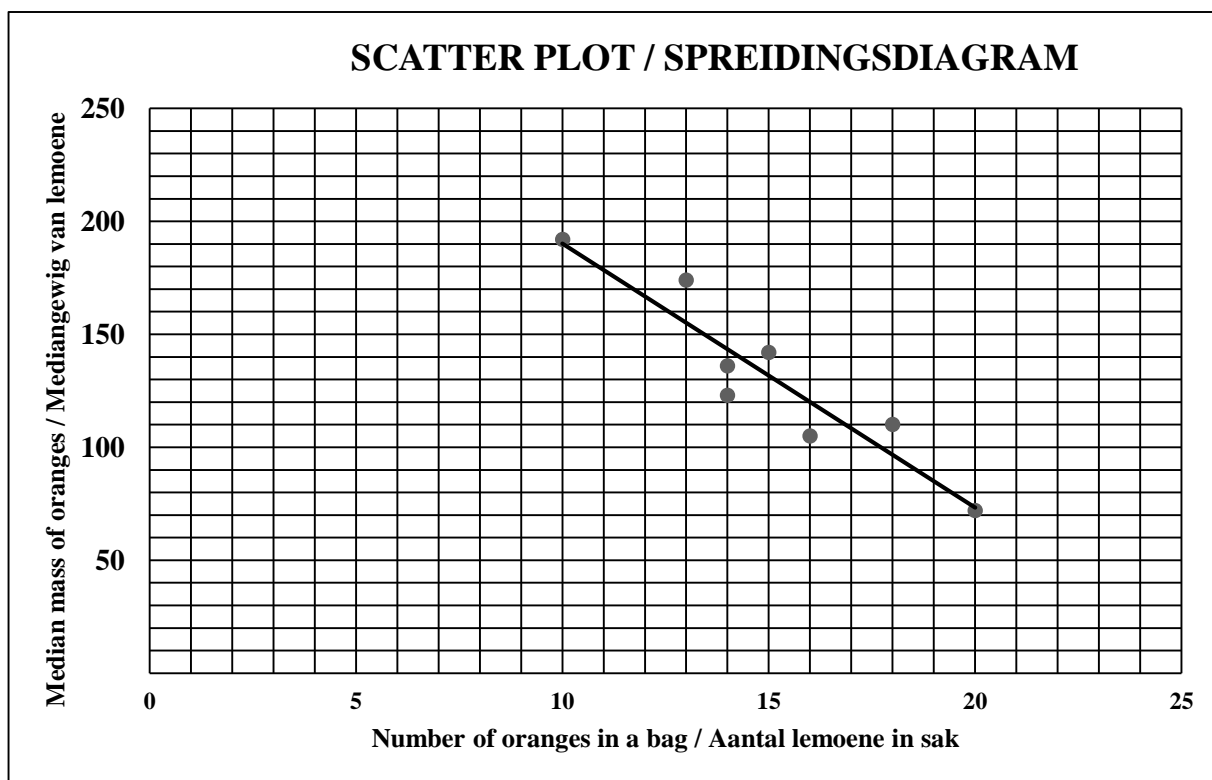
LET WEL:

- *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.*
- *Aannames van antwoorde / waardes 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.)
	<i>'n Punt vir 'n korrekte bewering ('n Punt vir 'n bewering is onafhanklik van die rede.)</i>
R	A mark for a correct reason (A reason mark may only be awarded if the statement is correct.)
	<i>'n Punt vir 'n korrekte rede ('n Punt word slegs vir die rede toegeken as die bewering korrek is.)</i>
S / R	Award a mark if the statement AND reason are both correct.
	<i>(Ken 'n punt toe as beide die bewering EN rede korrek is.)</i>

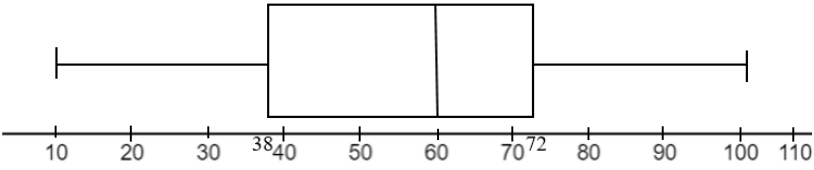
QUESTION / VRAAG 1

Number of oranges in the bag <i>Aantal lemoene in sak</i>	18	16	20	15	14	13	14	10
Median mass of oranges in the same bag (to the nearest gram) / <i>Mediaangewig van die lemoene in dieselfde sak (tot die naaste gram)</i>	110	105	72	142	123	174	136	192



1.1	$a = 307,20$ $b = -11,70$ $\hat{y} = 307,20 - 11,7x$	✓ $a = 307,20$ ✓ $b = -11,70$ ✓ $\hat{y} = 307,20 - 11,7x$ (3)
1.2	$r = -0,93$	✓ $r = -0,93$ (1)
1.3	See scatter plot above / <i>sien spreidingsdiagram hierbo</i> (10 ; 190,2) (20 ; 73,2)	✓ (10 ; 190,2) ✓ (20 ; 73,2) (2)
1.4	Negative strong association / <i>Negatiewe sterk assosiasie</i>	✓ answer / <i>antwoord</i> (1)
1.5	$\hat{y} = 307,20 - 11,7(12)$ $= 166,8$	✓ substitution / <i>vervang</i> ✓ answer / <i>antwoord</i> (2)
		[9]

QUESTION / VRAAG 2

2.1.1	100	✓ answer / antwoord (1)
2.1.2	Median / Mediaan = ± 62	✓✓ answer / antwoord (Accept / Aanvaar 61 / 62) (2)
2.1.3		✓ $Q_1 = 37/38$ ✓ $Q_3 = 72/73$ ✓ $Q_2 = 61/62$ & min & max / min & maks (10 & 100) (3)
2.1.4	Skewed to the left / Skeef na links	✓ left / links (1)
2.2	$b = 20$ $\frac{d-a}{2} = 8$ $2a = d$ $\text{sub } \frac{2a-a}{2} = 8$ $a = 16$ $d = 32$ $5 + 16 + 19 + 20 + c + 32 + 35 = 7 \times 22$ $\therefore c = 27$	✓ $b = 20$ ✓ $a = 16$ ✓ $d = 32$ ✓ $c = 27$ (4)
		[11]

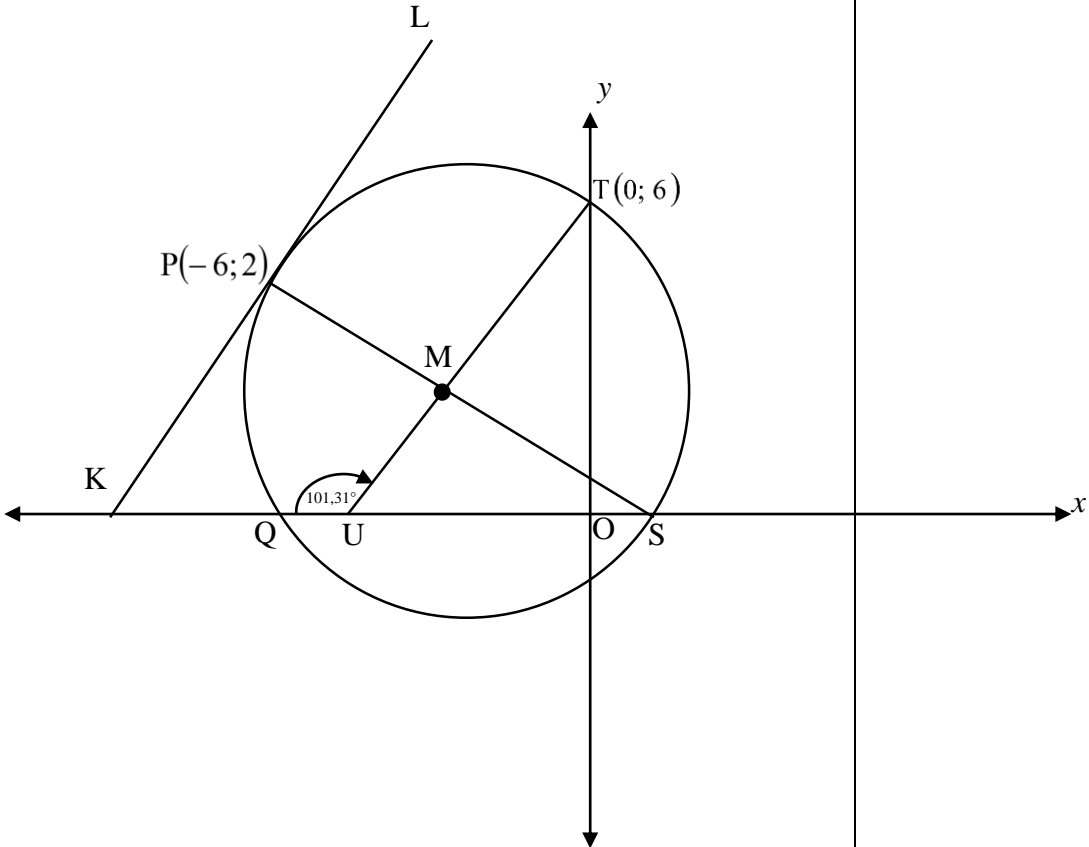
QUESTION / VRAAG 3

3.1		
3.1.1	$1 = \frac{3+x}{2} \qquad -2 = \frac{4+y}{2}$ $2 = 3+x \qquad -4 = 4+y$ $x = -1 \qquad y = -8$ $B(-1; -8)$	$\checkmark 1 = \frac{3+x}{2}$ $\checkmark -2 = \frac{4+y}{2}$ $\checkmark B(-1; -8) \qquad (3)$
3.1.2	$m_{CD} = \frac{0-4}{6-3}$ $= -\frac{4}{3}$	$\checkmark \text{substitution into gradient formula / vervang in gradient formule}$ $\checkmark m_{CD} = -\frac{4}{3} \qquad (2)$
3.1.3	$y - 2 = \frac{-4}{3}(x - 11)$ $y = \frac{-4}{3}x + \frac{50}{3}$ <p style="text-align: center;">OR / OF</p>	$y = \frac{-4}{3}x + c$ $2 = \frac{-4}{3}(11) + c$ $c = \frac{50}{3}$ $y = \frac{-4}{3}x + \frac{50}{3} \qquad (2)$

3.1.4	<p> $CD = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$ OR / OF $= \sqrt{(0 - 4)^2 + (6 - 3)^2}$ $R(5;10)$ midpoint / <i>middelpunt</i> $= \sqrt{25}$ $RQ = \sqrt{(2 - 10)^2 + (11 - 5)^2}$ $CD = 5$ $RQ = 10$ </p> <p> D is the midpoint of PR / <i>D is die middelpunt van PR</i> C is the midpoint of PQ (line from midpoint of 1 side to 2nd side) / <i>C is die middelpunt van PQ (lyn van middelpunt van 1 sy aan 2de sy)</i> </p> <p> $RQ = 2CD = 10$ (midpoint theorem/ <i>middelpuntstelling</i>) </p> <p> $PK = RQ$ $\sqrt{(y+2)^2 + (4-1)^2} = 10$ $\sqrt{(y+2)^2 + (4-1)^2} = 10$ $(y+2)^2 + (4-1)^2 = 10^2$ $y^2 + 4y + 4 + 9 = 100$ $(y+2)^2 = 91$ or / of $y^2 + 4y - 87 = 0$ $y + 2 = \pm \sqrt{91}$ $y = \frac{-4 \pm \sqrt{4^2 - 4(1)(-87)}}{2(1)}$ $y = \pm \sqrt{91} - 2$ $y = \frac{-4 \pm \sqrt{364}}{2}$ $y = -11,54$ or / of $y \neq 7,54$ $y = -11,54$ or / of $y \neq 7,54$ </p>	<p> ✓ $CD = 5$ OR / OF $R(5 ; 10)$ </p> <p> ✓ statement / <i>bewering</i> </p> <p> ✓ $RQ = 10$ </p> <p> ✓ correct substitution into distance formula / <i>korrekte vervanging in die afstandsformule</i> </p> <p> ✓ simplification / <i>vereenvoudiging</i> </p> <p> ✓ $y = -11,54$ </p> <p style="text-align: right;">(6)</p>
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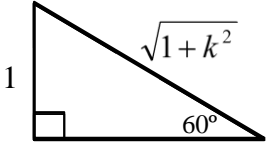
3.2.2	$\frac{U_2 + (-8)}{2} = 1$ <p><i>x at/by U:</i></p> $\therefore U_x = 10 \text{ units / eenhede}$ <p><i>QU = 18 units / eenhede</i></p> <p><i>x at/by W = x at / by U = 10</i></p> <p><i>y at/by W:</i></p> $y = 10 + \frac{2}{3}$ $= \frac{32}{3}$ $WU = \frac{32}{3} + 5 = \frac{47}{3}$ $\therefore \text{Area } \Delta QWU = \frac{1}{2}(18)\left(\frac{47}{3}\right)$ $= 141 \text{ square units / eenhede kwadraat}$	<p>✓ $U_x = 10 \text{ units / eenhede}$</p> <p>✓ $QU = 18 \text{ units / eenhede}$</p> <p>✓ $U = 10$</p> <p>✓ $WU = \frac{47}{3}$</p> <p>✓ correct substitution in area formula / <i>korrekte vervanging in oppv. formule</i></p> <p>✓ 141 square units / <i>eenhede kwadraat</i></p> <p style="text-align: right;">(6)</p>
		[24]

QUESTION / VRAAG 4

		
4.1	$\hat{TUS} = 180^\circ - 101,31^\circ = 78,69^\circ$ <p style="text-align: center;"><i>adj supp $\angle s$ / aangrensende suppl $\angle e$</i></p> $m_{TU} = \tan 78,69^\circ = 5$ $c = 6$ $y = 5x + 6$	$\checkmark \hat{TUS} = 78,69^\circ$ $\checkmark m_{TU} = 5$ $\checkmark y = 5x + 6$ <p style="text-align: right;">(3)</p>
4.2	$x - \text{int} / \text{afsnity} = 0$ $\frac{-1}{5}x + \frac{4}{5} = 0$ $-x + 4 = 0$ $x = 4$ $\therefore S(4; 0)$ $M = \left(\frac{-6 + 4}{2}; \frac{2 + 0}{2} \right)$ $\therefore M(-1; 1)$ <p>OR / OF</p>	$\checkmark S(4; 0)$ $\checkmark \text{substitute correctly /}$ $\checkmark \text{korrekte vervanging}$ $\checkmark M(-1; 1)$

	$5x + 6 = -\frac{1}{3}x + \frac{4}{5}$ $\frac{26}{5}x = -\frac{26}{5}$ <p>At M: $x = -1$ $y = -1$ $\therefore M(-1;1)$</p> <p>CANDIDATE MUST SHOW CALCULATIONS TO GET MARKS IN THIS QUESTION / KANDIDAAT MOET BEREKENINGS TOON OM PUNTE IN HIERDIE VRAAG TE VERDIEN</p>	$\checkmark 5x + 6 = -\frac{1}{3}x + \frac{4}{5}$ $\checkmark x = -1$ $\checkmark y = 1$ <p style="text-align: right;">(3)</p>
4.3	$(x+1)^2 + (y-1)^2 = r^2$ $(-6+1)^2 + (2-1)^2 = r^2$ $r^2 = 26$ $(x+1)^2 + (y-1)^2 = 26$ <p>OR / OF</p> $(x+1)^2 + (y-1)^2 = r^2$ $(4+1)^2 + (0-1)^2 = r^2$ $r^2 = 26$ $(x+1)^2 + (y-1)^2 = 26$	$\checkmark \text{substitute / vervang } (-6;2)$ $\checkmark r^2 = 26$ $\checkmark (x+1)^2 + (y-1)^2 = 26$ <p>OR / OF</p> $\checkmark \text{substitute / vervang } (4;0)$ $\checkmark r^2 = 26$ $\checkmark (x+1)^2 + (y-1)^2 = 26$ <p style="text-align: right;">(3)</p>
4.4	$m_{MP} = -\frac{1}{5} \quad m_{MP} \times m_{KL} = -1$ $m_{KL} = 5 \quad \text{radius} \perp \text{tan} / \text{radius} \perp \text{raaklyn}$ $m_{TU} = 5 \quad \text{proven} / \text{reeds bewys}$ $\therefore m_{TU} = m_{KL} = 5$ <p>KL \parallel TU</p>	$\checkmark m_{MP} = -\frac{1}{5}$ $\checkmark m_{KL} = 5$ $\checkmark m_{TU} = 5$ <p style="text-align: right;">(3)</p>
4.5	$VM = \sqrt{\left(-1 + \frac{1}{2}\right)^2 + (1-7)^2}$ $= 6,02$ $\text{radius} = \sqrt{26} = 5,1$ $6,02 > 5,1$ $\therefore V\left(-\frac{1}{2}; 7\right)$ <p>does not lie within the circle./ <i>lê nie binne die sirkel nie.</i></p>	$\checkmark VM = 6,02$ $\checkmark 6,02 > 5,1$ $\checkmark \text{conclusion} / \text{gevolgtrekking}$ <p style="text-align: right;">(3)</p>
		[15]

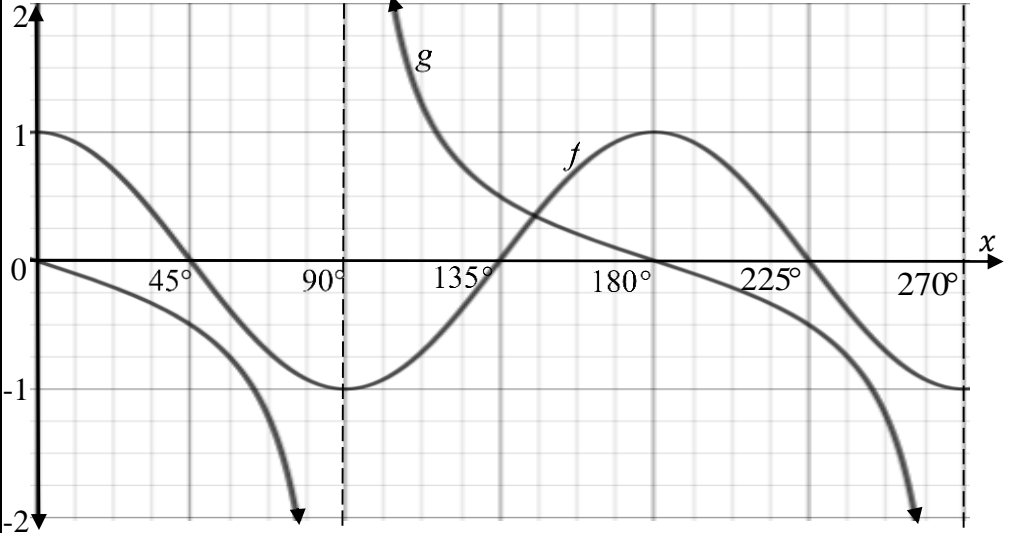
QUESTION / VRAAG 5

5.1.1	$x^2 = (\sqrt{1+k^2})^2 - (1)^2 \quad (\text{Pythagoras})$ $x^2 = k^2$ $x = k$ $\tan 16^\circ = \frac{1}{k}$ 	$\checkmark x = k$ $\checkmark \tan 16^\circ = \frac{1}{k}$ <p style="text-align: right;">(2)</p>
5.1.2	$\cos 32^\circ$ $= \cos 2(16^\circ)$ $= 2 \cos^2 16^\circ - 1$ $= 2 \left(\frac{k}{\sqrt{1+k^2}} \right)^2 - 1$ <p>OR / OF</p> $\cos 32^\circ$ $= \cos 2(16^\circ)$ $= \cos^2 16^\circ - \sin^2 16^\circ$ $= \left(\frac{k}{\sqrt{1+k^2}} \right)^2 - \left(\frac{1}{\sqrt{1+k^2}} \right)^2$ <p>OR / OF</p> $\cos 32^\circ$ $= \cos 2(16^\circ)$ $= 1 - 2 \sin^2 16^\circ$ $= 1 - 2 \left(\frac{1}{\sqrt{1+k^2}} \right)^2$	$\checkmark \cos 2(16^\circ)$ $\checkmark 2 \cos^2 16^\circ - 1$ <p>\checkmark correct substitution / korrekte vervanging</p> <p>OR / OF</p> $\checkmark \cos 2(16^\circ)$ $\checkmark \cos^2 16^\circ - \sin^2 16^\circ$ <p>\checkmark correct substitution / korrekte vervanging</p> <p>OR / OF</p> $\checkmark \cos 2(16^\circ)$ $\checkmark 1 - 2 \sin^2 16^\circ$ <p>\checkmark correct substitution / korrekte vervanging (3)</p>
5.2	$\frac{\cos(90^\circ + x) \sin(x - 180^\circ) - \cos^2(180^\circ - x)}{\cos(-2x)}$ $= \frac{(-\sin x)(-\sin x) - \cos^2 x}{\cos 2x}$ $= \frac{\sin^2 x - \cos^2 x}{\cos^2 x - \sin^2 x} \quad \text{OR / OF} \quad \frac{-\cos 2x}{\cos 2x}$ $= \frac{-(\cos^2 x - \sin^2 x)}{\cos^2 x - \sin^2 x} = -1$	$\checkmark -\sin x$ $\checkmark -\sin x$ $\checkmark -\cos^2 x$ $\checkmark \cos 2x$ <p>$\checkmark -(\cos^2 x - \sin^2 x)$ OR / OF $-\cos 2x$ $\checkmark -1$</p> <p style="text-align: right;">(6)</p>

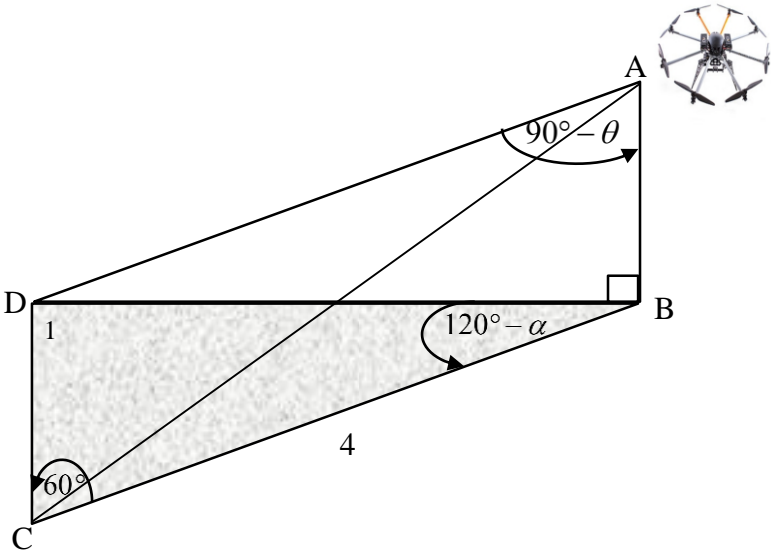
5.3	$\begin{aligned} & \cos 75^\circ \cdot \cos 45^\circ - \cos 15^\circ \cdot \cos 45^\circ \\ &= \cos 75^\circ \cdot \cos 45^\circ - \sin 75^\circ \cdot \sin 45^\circ \\ &= \cos(75^\circ + 45^\circ) \\ &= \cos 120^\circ \\ &= -\cos 60^\circ \\ &= -\frac{1}{2} \end{aligned}$ <p>OR / OF</p> $\begin{aligned} & \cos 75^\circ \cdot \cos 45^\circ - \cos 15^\circ \cdot \cos 45^\circ \\ &= \sin 15^\circ \cdot \cos 45^\circ - \cos 15^\circ \cdot \sin 45^\circ \\ &= \sin(15^\circ - 45^\circ) \\ &= \sin(-30^\circ) \\ &= -\sin 30^\circ \\ &= -\frac{1}{2} \end{aligned}$	$\begin{aligned} & \checkmark \cos 75^\circ \cdot \cos 45^\circ - \sin 75^\circ \cdot \sin 45^\circ \\ & \checkmark \cos(75^\circ + 45^\circ) \\ & \checkmark -\cos 60^\circ \\ & \checkmark -\frac{1}{2} \end{aligned}$ <p>OR / OF</p> $\begin{aligned} & \checkmark \sin 15^\circ \cdot \cos 45^\circ - \cos 15^\circ \cdot \sin 45^\circ \\ & \checkmark \sin(15^\circ - 45^\circ) \\ & \checkmark -\sin 30^\circ \\ & \checkmark -\frac{1}{2} \end{aligned}$ <p style="text-align: right;">(4)</p>
5.4.1	$\begin{aligned} & \tan \theta \left(\sin 2\theta + \frac{3\cos^2 \theta}{\sin \theta} \right) \\ &= \frac{\sin \theta}{\cos \theta} \left(2\sin \theta \cos \theta + \frac{3\cos^2 \theta}{\sin \theta} \right) \\ &= 2\sin^2 \theta + 3\cos \theta \\ &= 2(1 - \cos^2 \theta) + 3\cos \theta \\ &= -2\cos^2 \theta + 3\cos \theta + 2 \end{aligned}$	$\begin{aligned} & \checkmark 2\sin \theta \cos \theta \text{ and / en } \frac{\sin \theta}{\cos \theta} \\ & \checkmark \text{simplification /} \\ & \quad \text{vereenvoudiging} \\ & \checkmark 1 - \cos^2 \theta \end{aligned}$ <p style="text-align: right;">(3)</p>
5.4.2	$\begin{aligned} & -2\cos^2 \theta + 3\cos \theta + 2 = 0 \\ & 2\cos^2 \theta - 3\cos \theta - 2 = 0 \\ & (2\cos \theta + 1)(\cos \theta - 2) = 0 \\ & \cos \theta = -\frac{1}{2} \quad \text{or / of} \quad \cos \theta = 2 \end{aligned}$ <p style="text-align: center;">no solution / geen oplossing</p> <p style="text-align: center;">ref / verwy $\angle = 60^\circ$</p> $\theta = \pm 120^\circ + k360^\circ; k \in \mathbb{Z} \quad \text{OR / OF} \quad \theta = 120^\circ + k360^\circ; k \in \mathbb{Z}$ $\theta = 240^\circ + k360^\circ; k \in \mathbb{Z}$	$\begin{aligned} & \checkmark \text{factors / faktore} \\ & \quad (2\cos \theta + 1)(\cos \theta - 2) \\ & \checkmark \text{both equations / beide} \\ & \quad \text{vergelykings} \\ & \cos \theta = -\frac{1}{2} \quad \text{or / of} \quad \cos \theta = 2 \\ & \checkmark \text{no solution / geen oplossing} \\ & \checkmark \theta = \pm 120^\circ + k360^\circ \quad k \in \mathbb{Z} \\ & \quad \text{OR / OF} \\ & \quad \theta = 120^\circ + k360^\circ; k \in \mathbb{Z} \\ & \quad \theta = 240^\circ + k360^\circ; k \in \mathbb{Z} \end{aligned}$ <p style="text-align: right;">(4)</p>

5.5	$\cos(a+b) = -\frac{\sqrt{2}}{2} \quad \text{ref } \angle / \text{verw } \angle = 45^\circ$ $a+b = 180^\circ - 45^\circ$ $a+b = 135^\circ \dots\dots\dots (1)$ $\cos(a-2b) = \frac{1}{2} \quad \text{ref } \angle / \text{verw } \angle = 60^\circ$ $a-2b = 60^\circ \dots\dots\dots (2)$ $3b = 75^\circ \quad (1)-(2)$ $b = 25^\circ$ $a = 110^\circ$	$\checkmark a+b = 135^\circ$ $\checkmark a-2b = 60^\circ$ $\checkmark b = 25^\circ$ $\checkmark a = 110^\circ$ <p style="text-align: right;">(4)</p>
		[26]

QUESTION / VRAAG 6

6.1		<ul style="list-style-type: none"> ✓ $\left(45^\circ; -\frac{1}{2}\right)$ ✓ <i>x</i>-intercepts / <i>x</i>-afsnitte ✓ shape / vorm ✓ asymptotes / <i>asimptote</i> <p style="text-align: right;">(4)</p>
6.2	$y \in [2;4]$ OR / OF $2 \leq y \leq 4$	<ul style="list-style-type: none"> ✓ $y \in [2;4]$ OR / OF $2 \leq y \leq 4$ (1)
6.3	$x \in [135^\circ; 180^\circ]$ OR / OF $135^\circ \leq x \leq 180^\circ$ $x \in [225^\circ; 270^\circ)$ OR / OF $225^\circ \leq x < 270^\circ$	<ul style="list-style-type: none"> ✓ $x \in [135^\circ; 180^\circ]$ OR / OF $135^\circ \leq x \leq 180^\circ$ ✓ $x \in [225^\circ; 270^\circ)$ OR / OF $225^\circ \leq x < 270^\circ$ <p style="text-align: right;">(2)</p>
		[7]

QUESTION / VRAAG 7

		
7.1	$\hat{D}_1 = 180^\circ - 60^\circ - (120^\circ - \alpha)$ (sum of \angle s of Δ / somvd \angle ev Δ) $\hat{D}_1 = \alpha$	$\checkmark \hat{D}_1 = 180^\circ - 60^\circ - (120^\circ - \alpha)$ $\checkmark \hat{D}_1 = \alpha$ (2)
7.2	$\frac{BD}{\sin 60^\circ} = \frac{4}{\sin \alpha}$ $BD \sin \alpha = 4 \sin 60^\circ$ $BD = \frac{4 \left(\frac{\sqrt{3}}{2} \right)}{\sin \alpha}$ $BD = \frac{2\sqrt{3}}{\sin \alpha}$	\checkmark substitution into correct sin rule / vervang in korrekte sin reël \checkmark simplification / vereenvoudiging \checkmark answer / antwoord (3)
7.3	<p>In $\triangle ADB$: $\hat{A}DB = \theta$ (\angles of a Δ)</p> $\frac{AB}{BD} = \tan \theta$ $AB = BD \cdot \tan \theta$ $= \frac{2\sqrt{3}}{\sin \alpha} \cdot \tan \theta$ $AB = \frac{2\sqrt{3} \tan \theta}{\sin \alpha}$	$\checkmark \hat{A}DB = \theta$ \checkmark trig ratio / trig verhouding \checkmark substitution of BD / vervanging van BD (3)
		[8]

QUESTION / VRAAG 8

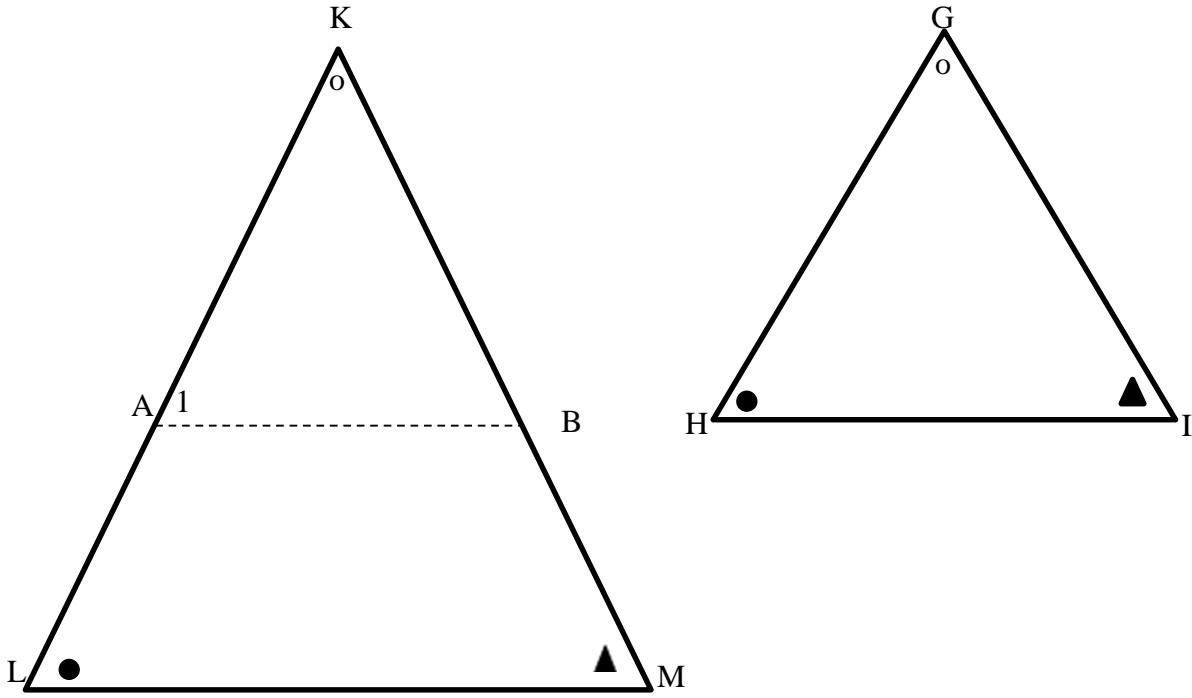
<p>8.1</p>	<p>$\hat{O}_2 = 50^\circ$ $\hat{D}_1 = 25^\circ$</p>	<p>\angles around a point / \anglee om 'n punt \angle centre = $2 \times \angle$ at circumference midpts $\angle = 2 \times$ omtreks \angle</p> <p>✓ S ✓ S ✓ R</p> <p>(3)</p>
<p>8.2</p>	<p>$\hat{B}_3 = 25^\circ$</p>	<p>tan chord theorem / raaklyn koordstelling</p> <p>✓ S ✓ R</p> <p>(2)</p>
<p>8.3</p>	<p>$\hat{BCD} = 120^\circ$ $\hat{B}_2 = 35^\circ$ $\hat{OBC} = \hat{OCB} = 65^\circ$ $\therefore \hat{B}_1 = 65^\circ - 35^\circ$ $\hat{B}_1 = 30^\circ$</p> <p>OR / OF $\hat{BCD} = 120^\circ$ $\hat{B}_2 = 35^\circ$ $\hat{B}_1 + \hat{B}_2 + \hat{B}_3 = 90^\circ$ $\hat{B}_1 = 30^\circ$</p>	<p>opp \angles of a cyclic quad / teenoorst \anglee v kvh sum of \angles of a triangle / som \anglee v Δ \angles opp. equal radii / \anglee teenoor gelyke radiuse</p> <p>✓ S / R ✓ S ✓ S</p> <p>✓ answer / antwoord</p> <p>OR / OF opp \angles of a cyclic quad / teenoorst \anglee v kvh sum of \angles of a triangle / som \anglee v Δ radius \perp tangent / radius \perp raaklyn</p> <p>✓ S / R ✓ S ✓ S ✓ answer / antwoord</p> <p>(4)</p>
		<p>[9]</p>

QUESTION / VRAAG 9

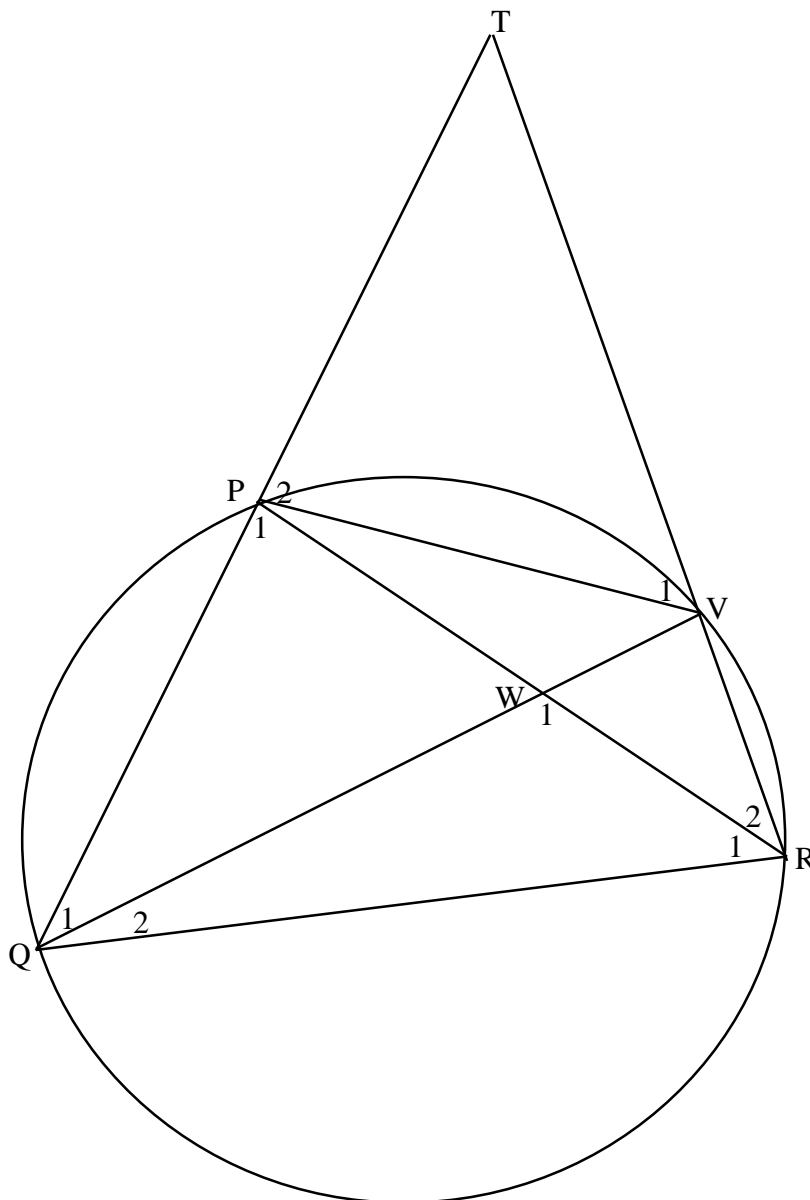
9.1	Equal / gelyk.	✓ answer / antwoord (1)	
9.2			
9.2.1	$\hat{D}_1 = \hat{F}_1 = x$ $\hat{F}_1 = \hat{F}_2 = x$	tan chord theorem / raaklyn koordstelling = chords subtend = $\angle s$ = koorde onderspan = $\angle e$	✓S / R ✓S ✓R (3)
9.2.2	$\hat{F}_2 = \hat{A} = x$ $\hat{D}_1 = \hat{A} = x$ ABDC is a cyclic quad / ABDC is 'n kvh	ext. \angle of cyclic quad / buite \angle v kvh ext $\angle =$ opp int \angle OR converse of ext. \angle of cyclic quad / buite $\angle =$ oorst binne \angle OF omgekeerde buite \angle v kvh	✓S ✓R ✓R (3)
9.2.3	$\hat{B}_1 + \hat{B}_2 = \hat{A}$ $\hat{A} = \hat{D}_1$ $\hat{B}_1 + \hat{B}_2 = \hat{D}_1$ BE \parallel CD	tan chord theorem / raaklyn koordstelling proved / reeds bewys correspond $\angle s = /$ ooreenkomst $\angle e =$	✓S ✓R (2)

9.2.4	$\hat{C}_1 + \hat{C}_2 + \hat{F}_1 + \hat{F}_2 = 180^\circ$ $\hat{C}_1 = \hat{C}_2$ $\hat{F}_1 = \hat{F}_2$ $2\hat{C}_1 + 2\hat{F}_2 = 180^\circ$ $\hat{C}_1 + \hat{F}_2 = 90^\circ$ $\hat{E}_1 = 90^\circ$ FC is a diameter of circle FDCE. <i>FC is 'n middellyn van sirkel FDCE.</i> OR / OF Let $\hat{F}_1 = \hat{F}_2 = x$ $\hat{C} = 180^\circ - 2x$ $\hat{C}_1 = \hat{C}_2 = 90^\circ - x$ In $\triangle FDC$ or / of $\triangle EFC$ $\hat{D} = 90^\circ$ or / of $\hat{E} = 90^\circ$ FC is a diameter of circle FDCE. <i>FC is 'n middellyn van sirkel FDCE.</i>	opp \angle s of a cyclic quad / <i>teenoorst \angle e v kvh</i> diag rhombus bisect \angle / <i>diag ruit halveer \angle</i> proved / <i>reeds bewys</i> converse \angle in a semi circle / <i>omgekeerde \angle in half sirkel</i> proved / <i>reeds bewys</i> opp \angle s of a cyclic quad / <i>teenoorst \angle e v kvh</i> diag rhombus bisect \angle / <i>diag ruit halveer \angle</i> sum of \angle s of Δ / <i>som van \angle e v Δ</i> converse \angle in a semi circle / <i>omgekeerde \angle in half sirkel</i>	✓S ✓R ✓S ✓S ✓R OR / OF ✓S ✓R ✓S ✓S ✓R (5) [14]
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QUESTION / VRAAG 10

10.1		
NB: NO construction 0 / 5 / GEEN konstruksie 0 / 5		
<p>On sides KL and KM of $\triangle KLM$ mark points A and B respectively such that $KA = GH$ and $KB = GI$. Draw AB</p> <p><i>Op sye KL en KM van $\triangle KLM$ plaas A en B onderskeidelik sodat $KA = GH$ en $KB = GI$. Trek lyn AB.</i></p> <p>Proof / Bewys In $\triangle GHI$ and/en $\triangle KAB$</p> <p>$KA = GH$ construction / konstruksie</p> <p>$\hat{K} = \hat{G}$ given / gegee</p> <p>$KB = GI$ construction / konstruksie</p> <p>$\therefore \triangle GHI \cong \triangle KAB$ S\angleS</p> <p>$\therefore \hat{A}_1 = \hat{H}$</p> <p>but $\hat{L} = \hat{H}$ given / gegee</p> <p>$\therefore \hat{A}_1 = \hat{L}$</p> <p>$\therefore AB \parallel LM$ corr.\angles = / ooreenkomst.\anglee =</p> <p>$\frac{KL}{KA} = \frac{KM}{KB}$ line one side Δ/lyn een sy v Δ</p> <p>$\therefore \frac{KL}{GH} = \frac{KM}{GI}$</p>		<p>✓ construction / konstruksie</p> <p>✓ S / R $\triangle GHI \cong \triangle KAB$ S\angleS</p> <p>✓ S</p> <p>✓ R</p> <p>✓ S / R</p> <p>(5)</p>

10.2



10.2.1

$\hat{R}_1 = 60^\circ$
 $\hat{W}_1 = \hat{P}_1 + \hat{Q}_1$
 $= 60^\circ + \hat{Q}_1$
 $= \hat{R}_1 + \hat{Q}_1$
 $\hat{Q}_1 = \hat{R}_2$
 $\therefore \hat{W}_1 = \hat{T}RQ$

equilateral Δ / *gelyksydig* Δ
 ext. \angle of a Δ / *buite* \angle v Δ
 \angle s in the same segment /
 \angle e in dieselfdesegment

\checkmark S
 \checkmark S
 \checkmark S / R

(3)

10.2.2

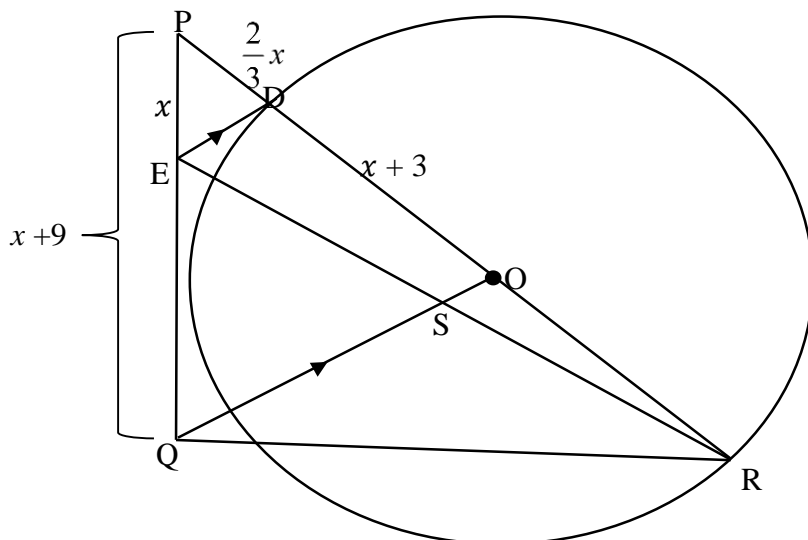
In ΔTQR and / *en* ΔQRV
 1. $\hat{W}_1 = \hat{T}RQ$
 2. $\hat{R}_1 = \hat{T}QR$
 3. $\hat{Q}_2 = \hat{T}$
 $\therefore \Delta WRQ \parallel \Delta RQT$

proved / *reedsbewys*
 equilateral Δ / *gelyksydig* Δ
 sum \angle s of Δ / *som van* \angle e v Δ
 $\angle\angle\angle$

\checkmark S
 \checkmark S
 \checkmark R

(3)

QUESTION / VRAAG 11



<p>11.1</p>	$\frac{PE}{EQ} = \frac{PD}{DO}$ $\frac{x}{x+9} = \frac{\frac{2}{3}x}{x+3}$ $x^2 + 3x = 6x$ $x^2 - 3x = 0$ $x(x-3) = 0$ $x = 0 \text{ or/of } x = 3$ <p>N.A / n.v.t</p> <p>DO = 6</p> <p>DO = OR</p> <p>OR = 6 units / eenhede</p>	<p>line one side ΔPOQ OR prop theorem ED OQ / lyn een sy ΔPOQ OF eweredigheid stelling ED OQ</p> <p>radii / radiusse</p>	<p>✓S ✓R</p> <p>✓ x = 3</p> <p>✓OR = 6 (4)</p>
<p>11.2</p>	<p>S is the midpoint of RE / S is die middelpunt van RE</p> <p>DE = 2OS</p> <p>DE = 2,8 units / eenhede</p>	<p>midpoint theorem / middelpunt stelling</p>	<p>✓R ✓answer (2)</p>
<p>11.3</p>	$\frac{\text{Area } \Delta PED}{\text{Area } \Delta PER} = \frac{PD}{PR}$ $= \frac{2}{14}$ $= \frac{1}{7}$ <p>Area $\Delta PER = 7 \times$ Area ΔPED</p> <p>= 18,9 units² / eenhede²</p>	<p>same height (DE) / dieselfde hoogte (DE)</p>	<p>✓S ✓R</p> <p>✓$\frac{1}{7}$</p> <p>✓18,9 (4)</p>
			<p>[10]</p>

TOTAL / TOTAAL [150]