



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

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 in NOT acceptable.

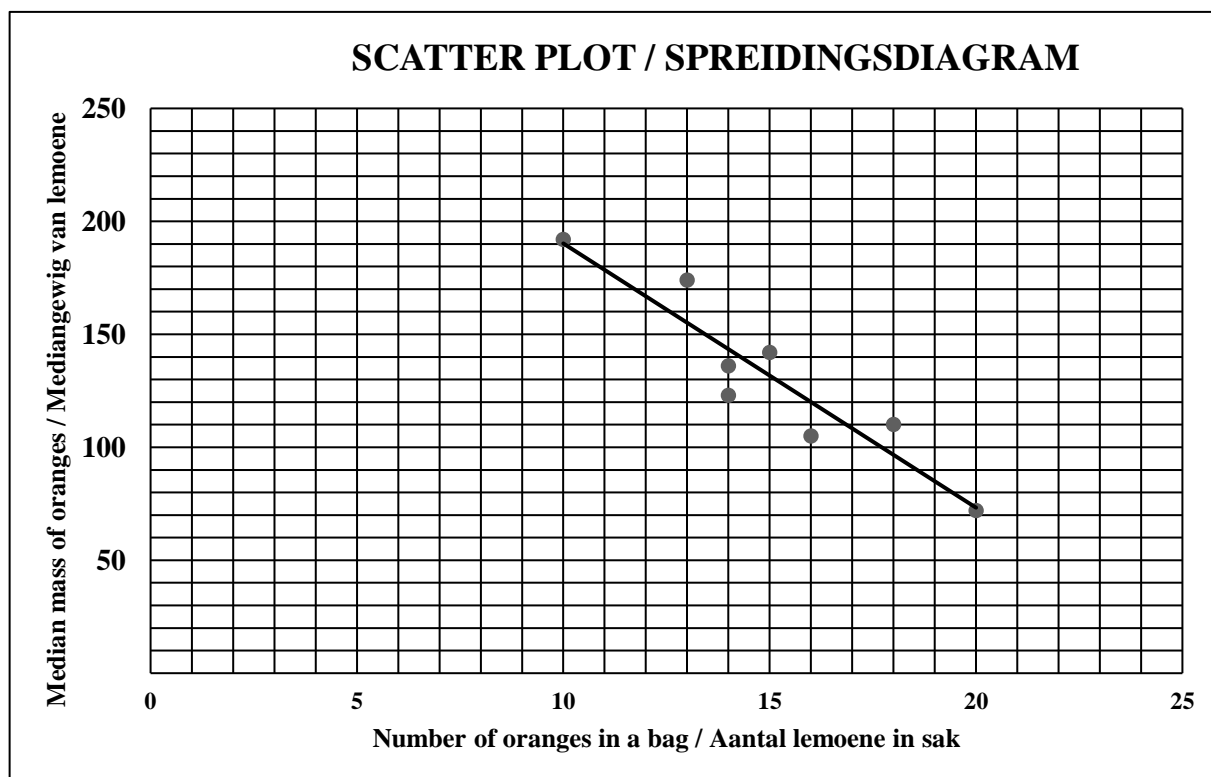
LET WEL:

- *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>

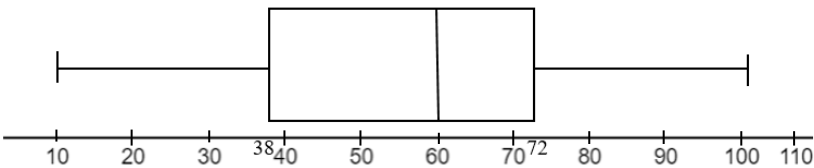
QUESTION / VRAAG 1

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

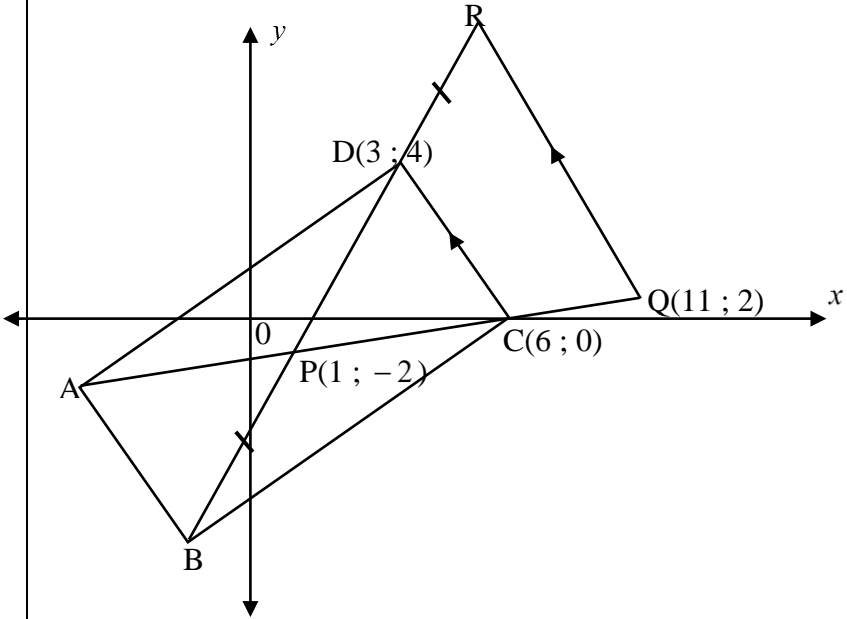


1.1	$a = 307,20$ $b = -11,70$ $\hat{y} = 307,20 - 11,7x$	$\checkmark a = 307,20$ $\checkmark b = -11,70$ $\checkmark \hat{y} = 307,20 - 11,7x$	(3)
1.2	$r = -0,93$	$\checkmark r = -0,93$	(1)
1.3	See scatter plot above/sien spreidingsdiagram hierbo (10 ; 190,2) (20 ; 73,2)	$\checkmark (10 ; 190,2)$ $\checkmark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

QUESTION / VRAAG 2

2.1.1	100	✓ answer / <i>antwoord</i> (1)
2.1.2	Median / <i>Mediaan</i> = ± 62	✓✓ answer / <i>antwoord</i> (Accept / <i>Aanvaar</i> 61 / 62) (2)
2.1.3		✓ $Q_1 = 37 / 38$ ✓ $Q_3 = 72 / 73$ ✓ $Q_2 = 61 / 62$ & min & max / <i>min & maks</i> (10 & 100) (3)
2.1.4	Skewed to the left / <i>Skeef na links</i>	✓ left / <i>links</i> (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	$1 = \frac{3+x}{2} \quad -2 = \frac{4+y}{2}$ $2 = 3+x \quad -4 = 4+y$ $x = -1 \quad y = -8$ $B(-1; -8)$	$\checkmark 1 = \frac{3+x}{2}$ $\checkmark -2 = \frac{4+y}{2}$ $\checkmark B(-1; -8) \quad (3)$
3.1.2	$m_{CD} = \frac{0-4}{6-3}$ $= -\frac{4}{3}$	$\checkmark \text{substitution into gradient formula / vervang in gradient formule}$ $\checkmark m_{CD} = -\frac{4}{3} \quad (2)$
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>	$y = \frac{-4}{3}x + c$ $2 = \frac{-4}{3}(11) + c$ $c = \frac{50}{3}$ $y = \frac{-4}{3}x + \frac{50}{3} \quad (2)$

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 / middelpunt $= \sqrt{25}$ 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		
3.2.1	<p> $m_{PQ} = \tan \theta$ $\tan \theta = 1$ $\theta = 45^\circ$ $\hat{P}_1 = 35^\circ$ vertical opp \angles / regoorst \anglee QR \parallel to the x-axis / aan die x-as $\hat{T}_1 = 35^\circ + 45^\circ$ ext \angle of Δ / buite \angle v Δ $\hat{T}_1 = 80^\circ$ $\alpha = \hat{T}_1 = 80^\circ$ corr \angles $ST \parallel QR$ / ooreenkomstige \anglee $ST \parallel QR$ OR / OF $m_{PQ} = \tan \theta$ $\tan \theta = 1$ $\theta = 45^\circ$ QR \parallel to the x-axis / aan die x-as $\hat{S}_1 = \hat{Q} = 45^\circ$ corr \angle's $ST \parallel QR$ / ooreenkomstige \angle'e $ST \parallel QR$ $\hat{P}_1 = 35^\circ$ vertical opp \angles / regoorst \anglee $\alpha = 35^\circ + 45^\circ$ ext \angle of Δ / buite \angle v Δ $\alpha = 80^\circ$ </p>	<p> $\checkmark m_{PQ} = \tan \theta$ $\checkmark \theta = 45^\circ$ $\checkmark \hat{P}_1 = 35^\circ$ $\checkmark \hat{T}_1 = 80^\circ$ $\checkmark \alpha = \hat{T}_1 = 80^\circ$ OR / OF $\checkmark m_{PQ} = \tan \theta$ $\checkmark \theta = 45^\circ$ $\checkmark \hat{S}_1 = \hat{Q} = 45^\circ$ $\checkmark \hat{P}_1 = 35^\circ$ $\checkmark \alpha = \hat{T}_1 = 80^\circ$ </p>

(5)

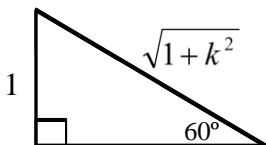
3.2.2	$\frac{U_2 + (-8)}{2} = 1$ <p>x at/by U: $\therefore U_x = 10$ units / <i>eenhede</i></p> <p>$QU = 18$ units / <i>eenhede</i></p> <p>x at/by $W = x$ at / by $U = 10$</p> <p>y at/by W: $y = 10 + \frac{2}{3}$ $= \frac{32}{3}$</p> <p>$WU = \frac{32}{3} + 5 = \frac{47}{3}$</p> <p>$\therefore \text{Area } \Delta QWU = \frac{1}{2}(18)\left(\frac{47}{3}\right)$ $= 141$ square units / <i>eenhede kwadraat</i></p>	<p>✓ $U_x = 10$ units / <i>eenhede</i> ✓ $QU = 18$ units / <i>eenhede</i></p> <p>✓ $U = 10$</p> <p>✓ $WU = \frac{47}{3}$ ✓ correct substitution in area formula / <i>korrekte vervanging in oppv. formule</i></p> <p>✓ 141 square units / <i>eenhede kwadraat</i></p> <p>(6)</p>
		[24]

QUESTION / VRAAG 4

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

	$5x + 6 = -\frac{1}{3}x + \frac{4}{5}$ $\frac{26}{5}x = -\frac{26}{5}$ <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>(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>(3)</p>
4.4	$m_{MP} = -\frac{1}{5} \qquad m_{MP} \times m_{KL} = -1$ $m_{KL} = 5 \qquad \text{radius} \perp \text{tan} / \text{radius} \perp \text{raaklyn}$ $m_{TU} = 5 \qquad \text{proven / reeds bewys}$ $\therefore m_{TU} = m_{KL} = 5$ $KL \parallel TU$	$\checkmark m_{MP} = -\frac{1}{5}$ $\checkmark m_{KL} = 5$ $\checkmark m_{TU} = 5$ <p>(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>	$\checkmark VM = 6,02$ $\checkmark 6,02 > 5,1$ $\checkmark \text{conclusion / gevolgtrekking}$ <p>(3)</p>
		[15]

QUESTION / VRAAG 5

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

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

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

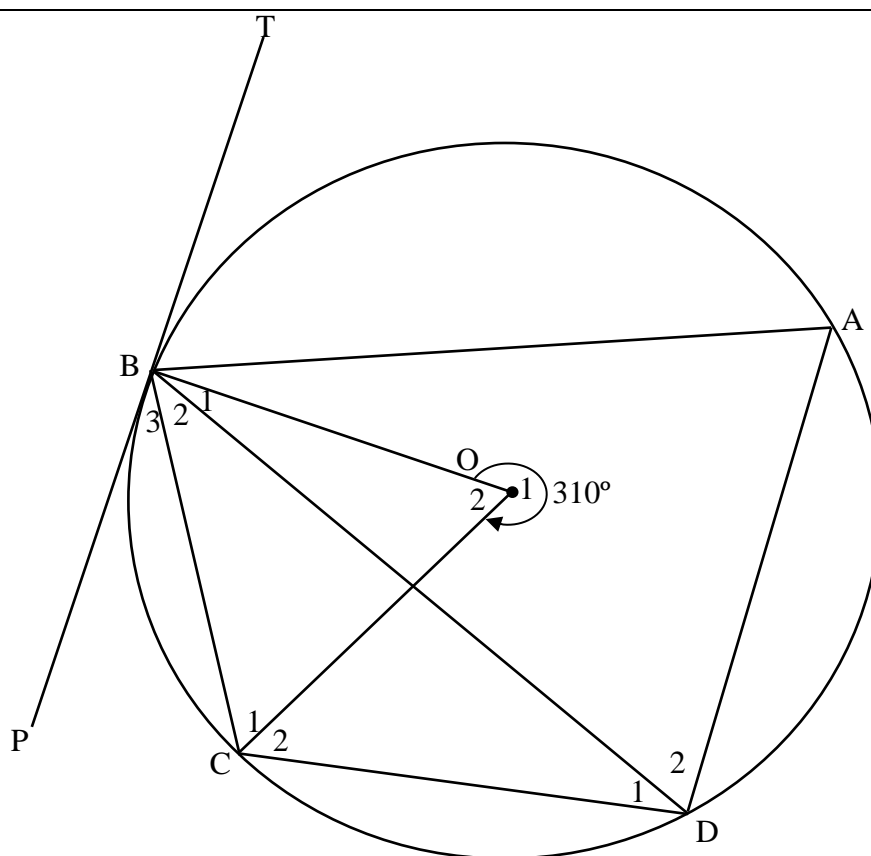
QUESTION / VRAAG 6

6.1		$\checkmark \left(45^\circ; -\frac{1}{2}\right)$ \checkmark <i>x</i> -intercepts / <i>x</i> -afsnitte \checkmark shape / vorm \checkmark asymptotes / <i>asimptote</i> <div style="text-align: right;">(4)</div>
6.2	$y \in [2;4]$ OR / OF $2 \leq y \leq 4$	\checkmark $y \in [2;4]$ 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 $225^\circ \leq x < 270^\circ$	\checkmark $x \in [135^\circ; 180^\circ]$ OR / OF $135^\circ \leq x \leq 180^\circ$ \checkmark $x \in [225^\circ; 270^\circ)$ OR / OF $225^\circ \leq x < 270^\circ$ <div style="text-align: right;">(2)</div>
		[7]

QUESTION / VRAAG 7

7.1	$\hat{D}_1 = 180^\circ - 60^\circ - (120^\circ - \alpha)$ (sum of \angle s of Δ / som van \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	In $\triangle ADB$: $\hat{ADB} = \theta$ (\angle s of a Δ) $\frac{AB}{BD} = \tan \theta$ $AB = BD \cdot \tan \theta$ $= \frac{2\sqrt{3}}{\sin \alpha} \cdot \tan \theta$ $AB = \frac{2\sqrt{3} \tan \theta}{\sin \alpha}$	$\checkmark \hat{ADB} = \theta$ \checkmark trig ratio / trig verhouding \checkmark substitution of BD / vervanging van BD (3)
		[8]

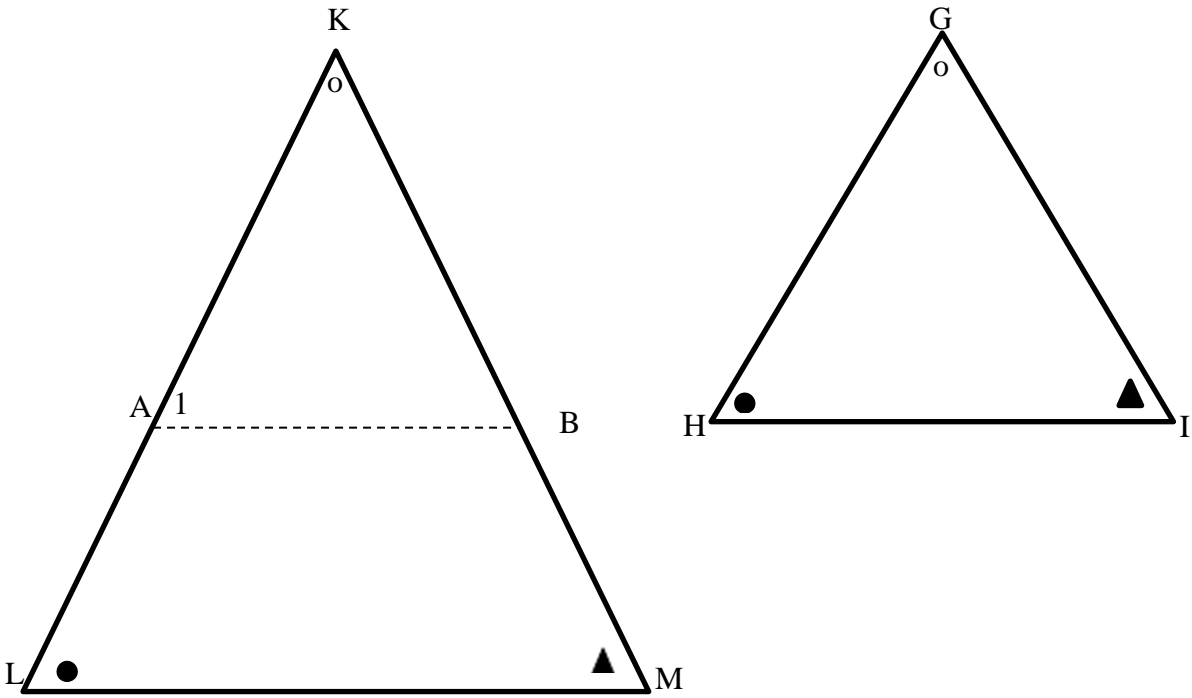
QUESTION / VRAAG 8



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

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

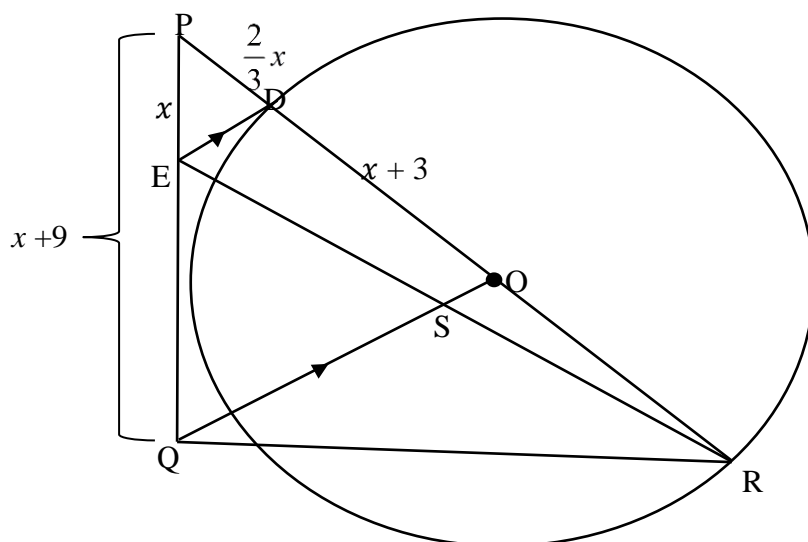
QUESTION / VRAAG 10

10.1	 <p>NB: NO construction 0 / 5 / GEEN konstruksie 0 / 5</p>																				
	<p>On sides KL and KM of ΔKLM mark points A and B respectively such that $KA = GH$ and $KB = GI$. Draw AB</p> <p><i>Op sye KL en KM van ΔKLM plaas A en B onderskeidelik sodat $KA = GH$ en $KB = GI$. Trek lyn AB.</i></p> <p>Proof / Bewys</p> <p>In ΔGHI and/en ΔKAB</p> <table border="0"> <tr> <td>$KA = GH$</td> <td>construction / konstruksie</td> </tr> <tr> <td>$\hat{K} = \hat{G}$</td> <td>given / gegee</td> </tr> <tr> <td>$KB = GI$</td> <td>construction / konstruksie</td> </tr> <tr> <td>$\therefore \Delta GHI \equiv \Delta KAB$</td> <td>S$\angle$S</td> </tr> <tr> <td>$\therefore \hat{A}_1 = \hat{H}$</td> <td></td> </tr> <tr> <td>but $\hat{L} = \hat{H}$</td> <td>given / gegee</td> </tr> <tr> <td>$\therefore \hat{A}_1 = \hat{L}$</td> <td></td> </tr> <tr> <td>$\therefore AB \parallel LM$</td> <td>corr. \angles = / ooreenkomst. \anglee =</td> </tr> <tr> <td>$\frac{KL}{KA} = \frac{KM}{KB}$</td> <td>line \parallel one side Δ/lyn \parallel een sy v Δ</td> </tr> <tr> <td>$\therefore \frac{KL}{GH} = \frac{KM}{GI}$</td> <td></td> </tr> </table> <div style="text-align: right;">(5)</div>	$KA = GH$	construction / konstruksie	$\hat{K} = \hat{G}$	given / gegee	$KB = GI$	construction / konstruksie	$\therefore \Delta GHI \equiv \Delta KAB$	S \angle S	$\therefore \hat{A}_1 = \hat{H}$		but $\hat{L} = \hat{H}$	given / gegee	$\therefore \hat{A}_1 = \hat{L}$		$\therefore AB \parallel LM$	corr. \angle s = / ooreenkomst. \angle e =	$\frac{KL}{KA} = \frac{KM}{KB}$	line \parallel one side Δ /lyn \parallel een sy v Δ	$\therefore \frac{KL}{GH} = \frac{KM}{GI}$	
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10.2			
10.2.1	$\hat{R}_1 = 60^\circ$ $\hat{W}_1 = \hat{P}_1 + \hat{Q}_1$ $= 60^\circ + \hat{Q}_1$ $= \hat{R}_1 + \hat{Q}_1$ $\hat{Q}_1 = \hat{R}_2$ $\therefore \hat{W}_1 = \hat{TRQ}$	equilateral Δ / gelyksydige Δ ext. \angle of a Δ / buite \angle v Δ \angle s in the same segment/ \angle e in dieselfde segment	\checkmark S \checkmark S \checkmark S / R (3)
10.2.2	In ΔTQR and / en ΔQRV 1. $\hat{W}_1 = \hat{TRQ}$ 2. $\hat{R}_1 = \hat{TQR}$ 3. $\hat{Q}_2 = \hat{T}$ $\therefore \Delta WRQ \parallel \Delta RQT$	proved / reeds bewys equilateral Δ / gelyksydige Δ sum \angle s of Δ / som van \angle e v Δ $\angle \angle \angle$	\checkmark S \checkmark S \checkmark R (3)

10.2.3	<p>In $\triangle TPV$ and / <i>en</i> $\triangle WQR$</p> <p>1. $\hat{PQR} = \hat{R}_1$ both 60° / <i>albei</i> 60° ✓S</p> <p>$\hat{PQR} = \hat{V}_1$ ext. \angle of a cyclic quad. / <i>buite</i> $\angle v kvh$ ✓S / R</p> <p>$\hat{V}_1 = \hat{R}_1$ ✓S</p> <p>2. $\hat{P}_2 = \hat{TRQ}$ ext. \angle of a cyclic quad. / <i>buite</i> $\angle v kvh$ ✓S</p> <p>but / <i>maar</i> $\hat{W}_1 = \hat{TRQ}$ proved / <i>reeds bewys</i></p> <p>$\hat{P}_2 = \hat{W}_1$</p> <p>3. $\hat{T} = \hat{Q}_2$ sum of \angles of \triangle / <i>som v</i> $\angle v \triangle$ ✓S</p> <p>$\triangle VPT \parallel \triangle RWQ$ $\angle \angle \angle$ ✓R</p> <p>$\frac{VP}{RW} = \frac{PT}{WQ} = \frac{VT}{RQ}$ corresponding sides in prop / <i>ooreenkomstige sye in verhouding</i></p> <p>$\therefore \frac{PT}{WQ} = \frac{PV}{WR}$</p> <p>(6)</p>	
		[17]

QUESTION / VRAAG 11



11.1	$\frac{PE}{EQ} = \frac{PD}{DO}$ $\frac{x}{9} = \frac{\frac{2}{3}x}{x+3}$ $x^2 + 3x = 6x$ $x^2 - 3x = 0$ $x(x-3) = 0$ $x = 0 \text{ or/of } x = 3$ <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 $\triangle POQ$ OR</p> <p>prop theorem $ED \parallel OQ$ /</p> <p>lyn een sy $\triangle POQ$ OF</p> <p>eweredigheid stelling $ED \parallel OQ$</p> <p>radii / radiusse</p>	<p>✓S</p> <p>✓R</p> <p>✓ $x = 3$</p> <p>✓OR = 6 (4)</p>
11.2	<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</p> <p>✓answer (2)</p>
11.3	$\frac{\text{Area } \triangle PED}{\text{Area } \triangle PER} = \frac{PD}{PR}$ $= \frac{2}{14}$ $= \frac{1}{7}$ <p>Area $\triangle PER = 7 \times \text{Area } \triangle PED$</p> <p>$= 18,9 \text{ units}^2 / \text{eenhede}^2$</p>	<p>same height (DE) / dieselfde hoogte (DE)</p>	<p>✓S</p> <p>✓R</p> <p>✓ $\frac{1}{7}$</p> <p>✓18,9 (4)</p>
			[10]

TOTAL / TOTAAL [150]