



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 10

MATHEMATICS P2/WISKUNDE V2

NOVEMBER 2017

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 100

**These marking guidelines consist of 10 pages.
*Hierdie nasienriglyne bestaan uit 10 bladsye.***

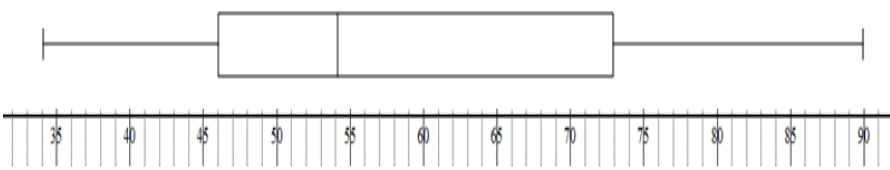
NOTE:

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

LET WEL:

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.
- Dit is onaanvaarbaar dat waardes/antwoorde veronderstel word om 'n probleem op te los.

QUESTION/VRAAG 1

1.1	Median/Mediaan = 54	✓✓ answ./antw. (2)
1.2	Range/Variasiewydte = $90 - 34 = 56$	✓✓ answ./antw. (2)
1.3	$\begin{aligned} \text{IQR(IKV)} &= Q_3 - Q_1 \\ &= 73 - 46 \\ &= 27 \end{aligned}$	✓ $Q_1 = 46$ ✓ $Q_3 = 73$ ✓ answ./antw. (3)
1.4		✓ min. & max./maks. ✓ median/mediaan (Q_2) ✓ Q_1 and/en Q_3 (3)
		[10]

QUESTION/VRAAG 2

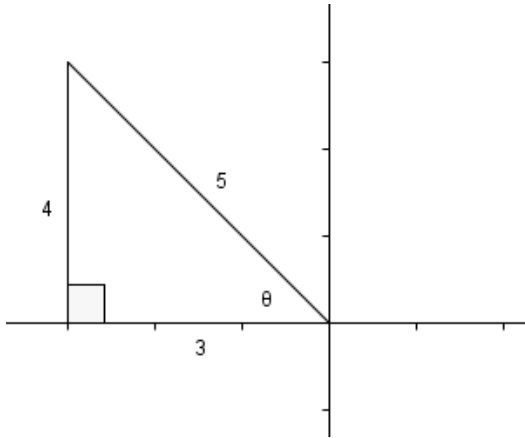
2.1	30 days/dae	✓ answ./antw. (1)
2.2	$28 \leq T < 32$	✓ answ./antw. (1)
2.3	The mean/Gemiddeld (\bar{X}) = $\frac{44 + 104 + 270 + 170 + 266 + 126}{30}$ $= \frac{980}{30}$ $= 32,666$ $= 32,67^\circ \text{C.}$	✓ addition/optel ✓ 30 ✓ answ./antw. (3)
2.4	$9 + 5 + 7 + 3 = 24$ days/dae % of number of days/getal dae = $\frac{24}{30} \times 100$ $= 80\%$	✓ addition/optel ✓ answ./antw. (2)
		[7]

QUESTION/VRAAG 3

3.1	$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(7 - 6)^2 + (4 - 6)^2}$ $= \sqrt{(1)^2 + (-2)^2}$ $= \sqrt{5}$	✓ subst./verv. ✓ answ./antw. (2)
3.2	$M_{QS} = T(x; y)$ $\left(\frac{6+x}{2}, \frac{6+y}{2}\right) = \left(\frac{7}{2}, \frac{7}{2}\right)$ $\frac{6+x}{2} = \frac{7}{2} \quad \frac{6+y}{2} = \frac{7}{2}$ $x = 1 \quad y = 1$ $S(1;1)$	✓ $\frac{6+x}{2} = \frac{7}{2}$ ✓ $\frac{6+y}{2} = \frac{7}{2}$ ✓ answ./antw. (3)

3.3	$PR = \sqrt{(x_p - x_R)^2 + (y_p - y_R)^2}$ $= \sqrt{(7 - 0)^2 + (4 - 3)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7,07$ <p>OR/OF</p> $QS = \sqrt{(x_S - x_Q)^2 + (y_S - y_Q)^2}$ $= \sqrt{(1 - 6)^2 + (1 - 6)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7,07$ $\therefore PR = QS$	<p>✓ answ./antw.</p> <p>✓ answ./antw.</p> <p>(2)</p>
3.4	$m_{QR} = \frac{6 - 3}{6 - 0} = \frac{1}{2}$ $m_{RS} = \frac{3 - 1}{0 - 1} = -2$ $m_{QR} \times m_{RS}$ $= \frac{1}{2} \times -2$ $= -1$ $m_{QR} \times m_{RS} = -1$ $\therefore QR \perp RS$	<p>✓ $m_{QR} = \frac{1}{2}$</p> <p>✓ $m_{RS} = -2$</p> <p>✓ $\frac{1}{2} \times -2$</p> <p>✓ $m_{QR} \times m_{RS} = -1$</p> <p>(4)</p>
3.5	<p>Rectangle./Reghoek.</p> <p>The diagonals are equal and one of the interior angles is equal to 90°.</p> <p><i>Die hoeklyne is gelyk en een van die binnehoeke is gelyk aan 90°.</i></p>	<p>✓ Rectangle/Reghoek</p> <p>✓ reason/rede</p> <p>(2)</p>
3.6	$\cos \hat{RSQ} = \frac{\sqrt{5}}{5\sqrt{2}}$ $\hat{RSQ} = 71,57^\circ$	<p>✓✓ $\cos \hat{RSQ} = \frac{\sqrt{5}}{5\sqrt{2}}$</p> <p>✓ answ./antw.</p> <p>(3)</p>
		[16]

QUESTION/VRAAG 4

<p>4.1.1 (a)</p>	<p>$4 \cot \theta + 3 = 0$ $\cot \theta = -\frac{3}{4}$</p>  <p>$\cos \theta = -\frac{3}{5}$</p>	<p>✓ $\cot \theta = -\frac{3}{4}$</p> <p>✓ diagram</p> <p>✓ $r = 5$</p> <p>✓ $\cos \theta = -\frac{3}{5}$</p> <p>(4)</p>
<p>4.1.1 (b)</p>	<p>$\frac{3 \sin \theta \sec \theta}{\tan \theta}$ $= 3 \left(\frac{\left(\frac{4}{5}\right)\left(-\frac{5}{3}\right)}{-\frac{4}{3}} \right)$ $= 3$</p>	<p>✓ $\frac{4}{5}$</p> <p>✓ $-\frac{5}{3}$</p> <p>✓ simpl./vereenv.</p> <p>✓ answ./antw.</p> <p>(4)</p>
<p>4.1.2</p>	<p>$LHS = \left(\frac{4}{5}\right)^2 - 1$ $= -\frac{9}{25}$ $RHS = -\left(\frac{3}{5}\right)^2$ $= -\frac{9}{25}$ $\therefore \sin^2 \theta - 1 = -\cos^2 \theta.$</p>	<p>✓ subst./verv.</p> <p>✓ answ./antw.</p> <p>✓ answ./antw.</p> <p>(3)</p>
<p>4.2</p>	<p>$\cos 30^\circ \tan 60^\circ + \operatorname{cosec}^2 45^\circ \sin^2 60^\circ$ $= \frac{\sqrt{3}}{2} \times \sqrt{3} + \left(\frac{2}{\sqrt{2}}\right)^2 \times \left(\frac{\sqrt{3}}{2}\right)^2$ $= \frac{3}{2} + \frac{4}{2} \times \frac{3}{4}$ $= \frac{3}{2} + \frac{3}{2}$ $= 3$</p>	<p>✓ $\frac{\sqrt{3}}{2}$ and/en $\sqrt{3}$</p> <p>✓ $\frac{2}{\sqrt{2}}$ and/en $\frac{\sqrt{3}}{2}$</p> <p>✓ answ./antw.</p> <p>(3)</p>

4.3	$\frac{4}{3} \sin \theta = \cos 37^\circ$ $\sin \theta = \frac{3(0,79863551)}{4}$ $\theta = 36,80^\circ$	✓ multiplying by/ vermenigvuldig met $\frac{3}{4}$ ✓ answ./antw. (2)
		[16]

QUESTION/VRAAG 5

<p>5.1</p>		<p><i>f</i> ✓ shape/vorm ✓ x-intercept/afsnit ✓ y-intercept/afsnit</p> <p><i>g</i> ✓ shape/vorm ✓ x-intercepts/afsnitte ✓ y-intercept/afsnit</p> <p style="text-align: right;">(6)</p>
<p>5.2.1</p>	<p>Amplitude of/van $g = 2$</p>	<p>✓ answ./antw. (1)</p>
<p>5.2.2</p>	<p>Range of/Waardeversameling van $f : -2 \leq y \leq 0$ OR/OF $y \in [-2; 0]$</p>	<p>✓ critical values/kritieke waardes ✓ notation/notasie (2)</p>
<p>5.3.1</p>	<p>2 solutions/oplossings</p>	<p>✓ answ./antw. (1)</p>
<p>5.3.2</p>	<p>$x = 180^\circ$</p>	<p>✓✓✓ $x = 180^\circ$ (3)</p>
		<p style="text-align: right;">[13]</p>

QUESTION/VRAAG 6

6.1	$\theta = 47^\circ$	✓ answ./antw. (1)
6.2	$\sin P = \frac{RQ}{RP}$ $\sin 47^\circ = \frac{RQ}{21}$ $RQ = 21 \sin 47^\circ$ $RQ = 15,36m$	✓ trig. ratio/trig. verhoud ✓ subst./verv. ✓ answ./antw. (3)
6.3	$\tan S = \frac{RQ}{QS}$ $\tan S = \frac{15,36}{17}$ $\hat{S} = \tan^{-1}\left(\frac{15,36}{17}\right)$ $\hat{S} = 42,10^\circ$	✓ subst./verv. ✓ answ./antw. (2)
6.4	$\cos 47^\circ = \frac{PQ}{21}$ $PQ = 21 \times \cos 47^\circ$ $PQ = 14,32m$ $PS = 14,32 + 17$ $= 31,32m$	✓ trig. ratio/trig. verhoud ✓ PQ = 14,32 m ✓ addition/optel ✓ answ./antw. (4)
		[10]

QUESTION/VRAAG 7

7.1	$V = \frac{1}{3} \pi r^2 h$ $83,38 = \frac{1}{3} \times 6,5 \pi r^2$ $r^2 = \frac{3 \times 83,38}{6,5 \pi}$ $r = 3,5cm$	✓ subst./verv. ✓ answ./antw. (2)
7.2	$s^2 = h^2 + r^2$ $s^2 = 6,5^2 + 3,5^2$ $s = 7,38cm$	✓ subst./verv. ✓ answ./antw. (2)
7.3	Surface area of the solid/ <i>Buite-oppervlakte (Oppervlakarea) van die vaste liggaam</i> $= 2\pi r^2 + \pi rs$ $= 2\pi(3,5)^2 + \pi(3,5)(7,38)$ $= 158,12cm^2$	✓ subst./verv. ✓ answ./antw. (2)
		[6]

QUESTION/VRAAG 8

8.1.1	$\hat{O}_1 = 90^\circ$ Diagonal bisect at/ <i>Hoeklyne sny by</i> 90° .	✓S/R (1)
8.1.2	$\hat{L}_1 = 180^\circ - (34^\circ + 90^\circ)$ Sum of angles of/ <i>Som van hoeke</i> Δ . $= 56^\circ$	✓S/R ✓answ./ <i>antw.</i> (2)
8.1.3	$\hat{L}_1 = \hat{L}_2 = 56^\circ$ diagonals bisect the/ <i>hoeklyne sny die</i> \angle s. $\hat{L}_1 + \hat{L}_2 = \hat{N}_1 + \hat{N}_2$ opp. \angle s of rhombus/ <i>teenoorst \anglevan die ruit =</i> $\therefore \hat{KNM} = 112^\circ$	✓S/R ✓answ./ <i>antw.</i> (2)
8.2	<p>Given/<i>Gegee</i> : $//^m PQRS$ with diagonals/<i>met hoeklyne PR and/en R.P.T</i> : $PM = MR$</p> <p>Proof/<i>Bewys</i> : In ΔPMS and/<i>en</i> ΔRMQ</p> <p>1. $\hat{P}_1 = \hat{R}_1$ (alt./<i>verw. \angles, PS // QR</i>)</p> <p>2. $\hat{S}_1 = \hat{Q}_1$ (alt./<i>verw. \angles, PS // QR</i>)</p> <p>3. $PS = QR$ (opp. sides parm are /<i>teenoorst. sye van parm. =</i>) $\therefore \Delta PMS \equiv \Delta RMQ$ (AAS) $\Rightarrow PM = MR$ and $MS = MQ$</p> <p>OR/OF</p> <p>Given/<i>Gegee</i> : $//^m PQRS$ with diagonals/<i>met hoeklyne PR and/en R.P.T</i> : $QM = MS$</p> <p>Proof/<i>Bewys</i> : In ΔPQM and/<i>en</i> ΔRSM</p> <p>1. $\hat{P}_2 = \hat{R}_2$ (alt./<i>verw. \angles, QP // SR</i>)</p> <p>2. $\hat{S}_2 = \hat{Q}_2$ (alt./<i>verw. \angles, SR // PQ</i>)</p> <p>3. $PQ = SR$ (opp. sides parm are /<i>teenoorst. sye van parm =</i>) $\therefore \Delta PQM \equiv \Delta RSM$ (AAS) $\Rightarrow QM = MS$ and $PM = MR$</p>	<p>✓ 1. S/R ✓ 2. S/R ✓ 3. S/R</p> <p>✓ congruency/<i>kongruensie</i> (AAS) (4)</p> <p>OR/OF</p> <p>✓ 1. S/R ✓ 2. S/R ✓ 3. S/R</p> <p>✓ congruency/<i>kongruensie</i> (AAS) (4)</p>
8.3	<p>DB = 2DE (DE = EB)</p> <p>DE = FC (opp. side of/<i>teenoorst. sy van //gram.</i>)</p> <p>but/<i>maar</i> FC = 2KC (FK = KC)</p> <p>DE = 2KC (DE = FC)</p> <p>DB = 2(2KC) (DB = 2DE)</p> <p>DB = 4KC</p>	<p>✓S/R ✓S/R ✓S/R ✓S/R</p> <p>(4)</p>
		[13]

QUESTION/VRAAG 9

9.1	<p>In $\triangle ACG$ F and/en H are midpoints/is middelpunte (given/gegee) $\therefore FH \parallel CG$ (midpoint theorem/middelpuntstelling) $FE \parallel BC$ (same straight lines/dieselfde reguitlyne) In $\triangle AGB$, H is the midpoint/is die middelpunt $HE \parallel BG$ (proved/bewys) $\therefore E$ is the midpoint/is die middelpunt (Line drawn from midpt of side/Lyn getrek vanaf midpt van sy, \parallel to 2nd side/na 2de sy)</p>	<p>$\checkmark FH \parallel CG$ \checkmark midpoint theorem/ middelpuntstelling \checkmark reason/rede (3)</p>
9.2	<p>$\hat{A}EH = \hat{A}BC = 90^\circ$ (Corresponding angle/Ooreenst hoek) $Area/Oppervl. = \frac{1}{2} EH \times AE$ $9,5 = \frac{1}{2} \times 3,5 \times AE$ $AE = \frac{38}{7} = 5,43\text{cm}$ $AB = 2AE$ $AB = 2\left(\frac{38}{7}\right)$ $= \frac{76}{7}$ $= 10,86\text{cm}$</p>	<p>\checkmark subst./verv. $\checkmark AE$ $\checkmark AB$ (3)</p>
9.3	<p>$BG = 7 \text{ cm}$ (midpoint theorem/middelpuntstelling) $BC = 14 \text{ cm}$ $Area/Oppervl. = \frac{1}{2} BC \times AB$ $= \frac{1}{2} \times 14 \times \frac{76}{7}$ $= 76\text{cm}^2$</p>	<p>$\checkmark BG = 7$ (midpt thm)/ (middelpuntstelling) $\checkmark BC = 2BG = 14$ \checkmark answ./antw. (3)</p>
		[9]

TOTAL/TOTAAL: 100