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*

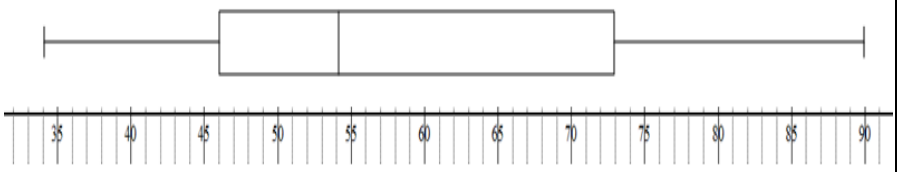
MARKS/*PUNTE*: 100

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	IQR(IKV) = $Q_3 - Q_1$ = 73 – 46 = 27	✓ 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

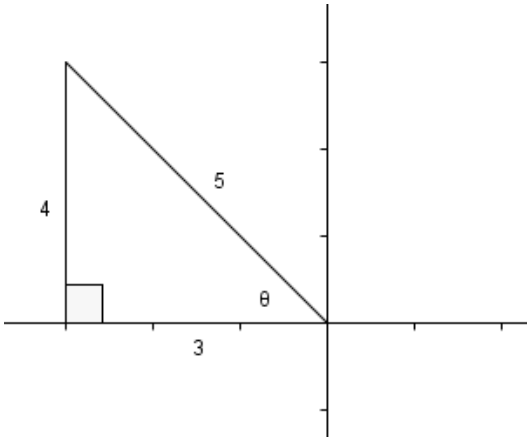
2.1	30 days/*dae*	✓answ./*antw.* (1)
2.2	$28 \le T < 32$	✓answ./*antw.* (1)
2.3	The mean/*Gemiddeld* $(\overline{X}) = \frac{44+104+270+170+266+126}{30}$ $= \frac{980}{30}$ $= 32{,}666$ $= 32{,}67^{\circ}C.$	✓ addition/*optel* ✓30 ✓answ./*antw.* (3)
2.4	$9+5+7+3 = 24$ days/*dae* % of number of days/*getal 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	$M_{QS} = T(x;y)$ $\left(\frac{6+x}{2};\frac{6+y}{2}\right) = \left(\frac{7}{2};\frac{7}{2}\right)$ $\frac{6+x}{2} = \frac{7}{2}$ $\frac{6+y}{2} = \frac{7}{2}$ $x = 1$ $y = 1$ $S(1;1)$	✓$\frac{6+x}{2} = \frac{7}{2}$ ✓$\frac{6+y}{2} = \frac{7}{2}$ ✓answ./*antw.* (3)

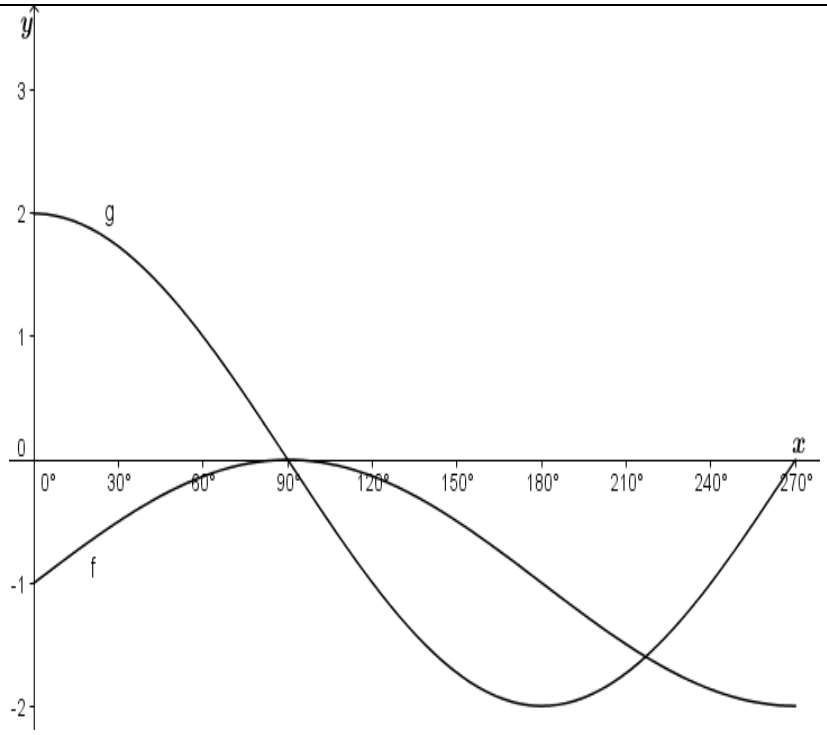
3.3	$PR = \sqrt{(x_p - x_R)^2 + (y_p - y_R)^2}$ $= \sqrt{(7-0)^2 + (4-3)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7{,}07$ **OR/*OF*** $QS = \sqrt{(x_S - x_Q)^2 + (y_S - y_Q)^2}$ $= \sqrt{(1-6)^2 + (1-6)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7{,}07$ $\therefore PR = QS$	✓answ./*antw.* ✓answ./*antw.* (2)
3.4	$m_{QR}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

QUESTION/*VRAAG* 4

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

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

QUESTION/*VRAAG* 5

5.1		*f* ✓shape/*vorm* ✓ *x*-intercept/*afsnit* ✓*y*-intercept/*afsnit* *g* ✓shape/*vorm* ✓*x*-intercepts/*afsnitte* ✓*y*-intercept/*afsnit* (6)
5.2.1	Amplitude of/*van* g $= 2$	✓answ./antw. (1)
5.2.2	Range of/*Waardeversameling van* $f : -2 \le y \le 0$ **OR/*OF*** $y \in [-2;0]$	✓critical values/*kritieke waardes* ✓notation/*notasie* (2)
5.3.1	2 solutions/*oplossings*	✓answ./*antw.* (1)
5.3.2	$x = 180^{\circ}$	✓✓✓ $x = 180^{\circ}$ (3)
		[13]

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	$\cos 47^\circ = \frac{PQ}{21}$ $PQ = 21 \times \cos 47^\circ$ $PQ = 14{,}32\text{m}$ $PS = 14{,}32 + 17$ $= 31{,}32\text{m}$	✓trig. ratio/*trig. verhoud* ✓PQ = 14,32 m ✓addition/*optel* ✓answ./antw. (4)
		[10]

QUESTION/*VRAAG* 7

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

QUESTION/*VRAAG* 8

8.1.1	$\hat{O}_1 = 90^o$ Diagonal bisect at/*Hoeklyne sny by* 90^o.	✓S/R (1)
8.1.2	$\hat{L}_{1.} = 180^o - (34^o + 90^o)$ Sum of angles of/*Som van hoeke* Δ. $= 56^o$	✓S/R ✓answ./*antw.* (2)
8.1.3	$\hat{L}_1 = \hat{L}_2 = 56^o$ diagonals bisect the/*hoeklyne sny die* $\angle$s. $\hat{L}_1 + \hat{L}_2 = \hat{N}_1 + \hat{N}_2$ opp. $\angle$s of rhombus/ *teenoorst* $\angle$*evan die ruit* = $\therefore K\hat{N}M = 112^o$	✓S/R ✓answ./*antw.* (2)
8.2	Given/*Gegee* : $//^m$ *PQRS* with diagonals/*met hoeklyne PR* and/*en* *R.P.T* : $PM = MR$ Proof/*Bewys* : In ΔPMS and/*en* ΔRMQ 1. $\hat{P}_1 = \hat{R}_1$ (alt./*verw.* $\angle_S$, $PS // QR$) 2. $\hat{S}_1 = \hat{Q}_1$ (alt./*verw.* $\angle_S$, $PS // QR$) 3. $PS = QR$ (opp. sides parm are /*teenoorst. sye van parm.* =) $\therefore \Delta PMS \equiv \Delta RMQ$ (AAS) $\Rightarrow PM = MR$ *and* $MS = MQ$	✓ 1. S/R ✓2. S/R ✓3. S/R ✓congruency/*kongruensie* (AAS) (4)
	OR/*OF* Given/*Gegee* : $//^m$ *PQRS* with diagonals/*met hoeklyne PR* and/*en* *R.P.T* : $QM = MS$ Proof/*Bewys* : In ΔPQM and/*en* ΔRSM 1. $\hat{P}_2 = \hat{R}_2$ (alt./*verw.* $\angle_S$, $QP // SR$) 2. $\hat{S}_2 = \hat{Q}_2$ (alt./*verw.* $\angle_S$, $SR // PQ$) 3. $PQ = SR$ (opp. sides parm are/*teenoorst. sye van parm* =) $\therefore \Delta PQM \equiv \Delta RSM$ (AAS) $\Rightarrow QM = MS$ *and* $PM = MR$	**OR/*OF*** ✓ 1. S/R ✓2. S/R ✓3. S/R ✓congruency/*kongruensie* (AAS) (4)

8.3	DB = 2DE (DE = EB)
	DE = FC (opp. side of/*teenoorst. sy van* //gram.)
	but/*maar* FC = 2KC (FK = KC)
	DE = 2KC (DE = FC)
	DB = 2(2KC) (DB = 2DE)
	DB = 4KC
		✓S/R
		✓S/R
		✓S/R
		✓S/R (4)

		[13]

QUESTION/*VRAAG* 9

9.1	In ΔACG F and/*en* H are midpoints/*is middelpunte* (given/*gegee*) $\therefore FH \,//\, CG$ (midpoint theorem/*middelpuntstelling*) $FE \,//\, BC$ (same straight lines/*dieselfde reguitlyne*) In ΔAGB, H is the midpoint/*is die middelpunt* $HE \,//\, BG$ (proved/*bewys*) $\therefore$ E is the midpoint/*is die middelpunt* (Line drawn from midpt of side/*Lyn getrek vanaf midpt van sy*, // to 2nd side/*na 2de sy*)	✓ $FH \,//\, CG$ ✓midpoint theorem/ *middelpuntstelling* ✓ reason/*rede* (3)
9.2	$A\hat{E}H = A\hat{B}C = 90^0$ (Corresponding angle/*Ooreenst hoek*) Area/*Oppervl.* $= \frac{1}{2} EH \times AE$ $9{,}5 = \frac{1}{2} \times 3{,}5 \times AE$ $AE = \frac{38}{7} = 5{,}43\text{cm}$ $AB = 2AE$ $AB = 2\left(\frac{38}{7}\right)$ $= \frac{76}{7}$ $= 10{,}86\text{cm}$	✓subst./*verv.* ✓ AE ✓ AB (3)
9.3	BG = 7 cm (midpoint theorem/*middelpuntstelling*) BC = 14 cm Area/*Oppervl.* $= \frac{1}{2} BC \times AB$ $= \frac{1}{2} \times 14 \times \frac{76}{7}$ $= 76\text{cm}^2$	✓BG =7 (midpt thm)/ *(middelpuntstelling)* ✓BC=2BG=14 ✓answ./*antw.* (3)
		[9]

TOTAL/*TOTAAL*: 100