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.

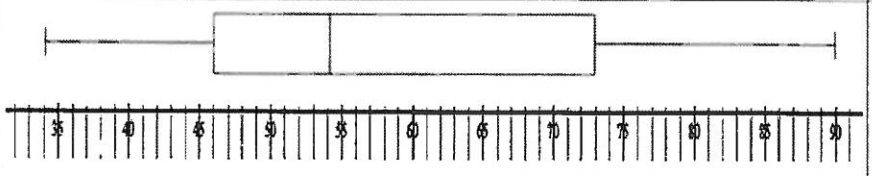
2017-01-02

Please turn over/*Blaai om asseblief*

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	34 37 43 46 48 48 52 54 58 62 68 73 78 84 90 Median/*Mediaan* = 54	✓ arranging in ascending order/ rangskik in stygende orde ✓answ./*antw.* (2)
1.2	Range/*Variasiewydte* = 90 – 34 = 56	✓ difference between max and min/ verskil tussen maks en min ✓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]

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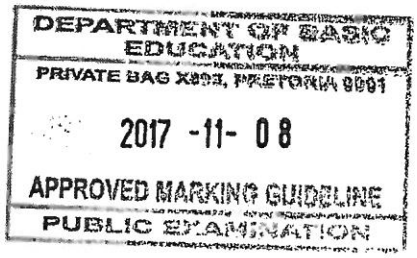
QUESTION/*VRAAG* 2

2.1	30 days/*dae*	✓answ./*antw.* (1)
2.2	$28 \leq T < 32$	✓answ./*antw.* (1)
2.3	The mean/*Gemiddeld* $(\overline{X}) = \frac{2(22)+4(26)+9(30)+\ldots+3(42)}{30}$ $= \frac{44+104+270+170+266+126}{30}$ $= \frac{980}{30}$ $= 32{,}67°\text{C}.$	✓ 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]



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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. into dist formula/*verv. In afstandsformule* ✓answ./*antw.* (2)
3.2	$\left(\frac{6+t}{2};\frac{6+k}{2}\right) = \left(\frac{7}{2};\frac{7}{2}\right)$ $\frac{6+t}{2} = \frac{7}{2}$ $\quad$ $\frac{6+k}{2} = \frac{7}{2}$ $t = 1$ $\quad$ $k = 1$ $S(1;1)$	✓$\frac{6+t}{2} = \frac{7}{2}$ ✓$\frac{6+k}{2} = \frac{7}{2}$ ✓answ./*antw.* (3)
3.3	$PR = \sqrt{(x_P - x_R)^2 + (y_P - y_R)^2}$ $= \sqrt{(7-0)^2 + (4-3)^2}$ $= \sqrt{50}$ (or $5\sqrt{2}$ or 7,07) $QS = \sqrt{(x_S - x_Q)^2 + (y_S - y_Q)^2}$ $= \sqrt{(1-6)^2 + (1-6)^2}$ $= \sqrt{50}$ (or $5\sqrt{2}$ or 7,07) $\therefore PR = QS$	✓ length of PR / lengte van PR ✓ length of QS / lengte van QS (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)

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3.6	$RS = \sqrt{5}$ Opposite sides of rectangle $\cos R\hat{S}Q = \frac{\sqrt{5}}{5\sqrt{2}}$ $R\hat{S}Q = 71{,}57°$ **OR/OF** $QR = \sqrt{(6-0)^2 + (6-3)^2} = \sqrt{45}$ $\sin R\hat{S}Q = \frac{\sqrt{45}}{5\sqrt{2}}$ $R\hat{S}Q = 71{,}57°$ **OR/OF** $QR = \sqrt{(6-0)^2 + (6-3)^2} = \sqrt{45}$ $RS = \sqrt{5}$ Opposite sides of rectangle $\tan R\hat{S}Q = \frac{\sqrt{45}}{\sqrt{5}}$ $R\hat{S}Q = 71{,}57°$	✓ $RS = \sqrt{5}$ ✓ $\cos R\hat{S}Q = \frac{\sqrt{5}}{5\sqrt{2}}$ ✓ answ./*antw.* (3) **OR/OF** ✓ $QR = \sqrt{45}$ ✓ $\sin R\hat{S}Q = \frac{\sqrt{45}}{5\sqrt{2}}$ ✓ answ./*antw.* (3) **OR/OF** ✓ $QR = \sqrt{45}$ ✓ $\tan R\hat{S}Q = \frac{\sqrt{45}}{\sqrt{5}}$ ✓ answ./*antw.* (3)	
			[16]

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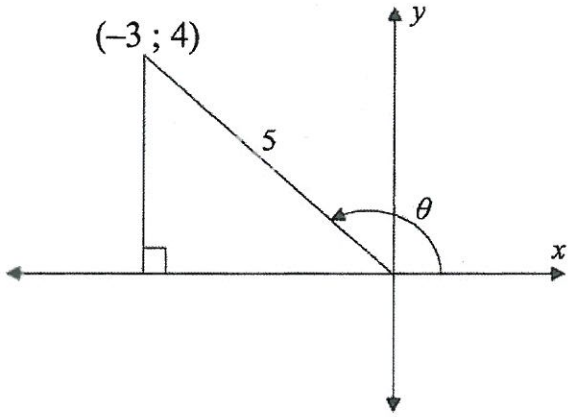
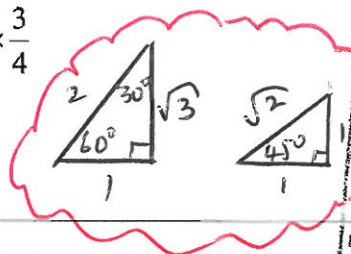
QUESTION/*VRAAG* 4

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)	$\frac{3\sin\theta\sec\theta}{\tan\theta}$ $=3\left(\frac{\left(\frac{4}{5}\right)\left(-\frac{5}{3}\right)}{-\frac{4}{3}}\right)$ $=3$	✓ $\frac{4}{5}$ ✓ $-\frac{5}{3}$ ✓ $-\frac{4}{3}$ ✓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	$\cos30°\tan60°+\text{cosec}^2 45°\sin^2 60°$ $=\frac{\sqrt{3}}{2}\times\sqrt{3}+\left(\frac{2}{\sqrt{2}}\right)^2\times\left(\frac{\sqrt{3}}{2}\right)^2$ $=\frac{3}{2}+\frac{4}{2}\times\frac{3}{4}$ $=\frac{3}{2}+\frac{3}{2}$ $=3$  	NO TRIANGLES 0/3 ✓ any 2 ratios correct / enige twee verhoudings korrek ✓ other 2 ratios correct / ander twee verhoudins korrek ✓answ./*antw.* (3)

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4.3	$\frac{4}{3}\sin\theta = \cos 37°$ $\sin\theta = \frac{3(0,79863551)}{4}$ $\theta = 36,8°$	✓multiplying by/ *vermenigvuldig met* $\frac{3}{4}$ ✓answ./*antw.* (2)
		[16]

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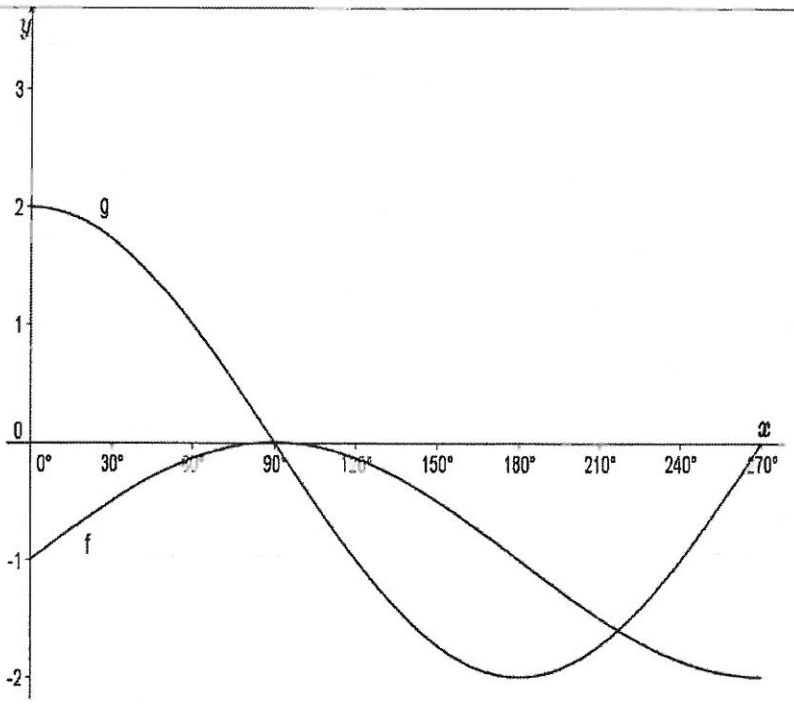
QUESTION/*VRAAG* 5

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	$\sin x = 2 + 2\cos x$ $\sin x - 1 - 2\cos x = 1$ $f(x) - g(x) = 1$ $x = 126{,}87°$ or $x = 180°$	✓ manipulation / manipulasie ✓ $x = 126{,}87°$ ✓ $x = 180°$ (3)
		[13]

QUESTION/*VRAAG* 6

6.1	$\theta = 47°$	✓answ./*antw.* (1)
6.2	$\sin P = \frac{RQ}{RP}$ $\sin 47° = \frac{RQ}{21}$ $RQ = 21\sin 47°$ $RQ = 15{,}36$ m **OR/OF** $P\hat{R}Q = 43°$ $\cos P\hat{R}Q = \frac{RQ}{RP}$ $\cos 43° = \frac{RQ}{21}$ $RQ = 21\cos 43°$ $RQ = 15{,}36$ m	✓ trig. ratio/*trig. verhoud* ✓correct subst./ *korrekte instelling.* ✓answ./*antw.* (3) **OR/OF** ✓ trig. ratio/*trig. verhoud* ✓correct subst./ *korrekte instelling.* ✓answ./*antw.* (3)
6.3	$\tan S = \frac{RQ}{QS}$ $\tan S = \frac{15{,}36}{17}$ $\hat{S} = \tan^{-1}\left(\frac{15{,}36}{17}\right)$ $\hat{S} = 42{,}10°$	✓subst into trig ratio./*verv in trig verh* ✓answ./*antw.* (2)
6.4	$\cos 47° = \frac{PQ}{21}$ $PQ = 21 \times \cos 47°$ $PQ = 14{,}32$ $PS = 14{,}32 + 17$ $= 31{,}32$ m **OR/OF** **OR/*OF*** $\sin 43° = \frac{PQ}{21}$ $PQ = 21 \times \sin 43°$ $PQ = 14{,}32$ $PS = 14{,}32 + 17$ $= 31{,}32$ m	✓subst into trig. ratio/ *verv in trig. verhoud* ✓PQ = 14,32 m ✓addition/*optel* ✓answ./antw. (4) **OR/OF**

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	$PQ^2 = PR^2 - RQ^2$ $= 21^2 - 15{,}36^2$ $= 205{,}07$ $PQ = 14{,}32$ $PS = 14{,}32 + 17$ $= 31{,}32$ m	✓Th of Pyth/ *Stel van Pyth* ✓PQ = 14,32 m ✓addition/*optel* ✓answ./antw. (4)
		[10]

QUESTION/*VRAAG* 7

7.1	$V = \frac{1}{3}\pi r^2 h$ $83{,}38 = \frac{1}{3} \times 6{,}5\pi r^2$ $r^2 = \frac{3 \times 83{,}38}{6{,}5\pi}$ $r = 3{,}50$ cm	✓subst./*verv.* ✓answ./*antw.* (2)
7.2	$s^2 = h^2 + r^2$ $s^2 = 6{,}5^2 + 3{,}5^2$ $s = 7{,}38$ cm	✓subst./*verv.* ✓answ./*antw.* (2)
7.3	Surface area of the solid/*Buite-oppervlakte (Oppervlakarea) van die vaste liggaam* $= 2\pi r^2 + \pi rs$ $= 2\pi(3{,}5)^2 + \pi(3{,}5)(7{,}38)$ $= 158{,}12$ cm^2	✓subst./*verv.* ✓answ./*antw.* (2)
		[6]

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QUESTION/*VRAAG* 8

8.1.1	$\hat{O}_1 = 90°$ Diagonal bisect at/*Hoeklyne sny by* 90°.	✓S/R (1)
8.1.2	$\hat{L}_1 = 180° - (34° + 90°)$ Sum of angles in/*Som van hoeke Δ.* $= 56°$	✓S ✓answ./*antw.* (2)
8.1.3	$\hat{L}_1 = \hat{L}_2 = 56°$ diagonals bisect the/*hoeklyne sny die ∠s.* $\hat{L}_1 + \hat{L}_2 = \hat{N}_1 + \hat{N}_2$ opp. ∠s of rhombus/*teenoorst ∠evan die ruit* = $\therefore K\hat{N}M = 112°$ **OR/OF** $\hat{K}_1 = 34°$ diagonals bisect the/*hoeklyne sny die ∠s.* $K\hat{N}M + 68° = 180°$ co - int angles KL ∥ NM $\therefore K\hat{N}M = 112°$ **OR/OF** $\hat{N}_2 = 56°$ alt angles KL ∥ NM $\hat{N}_1 = \hat{N}_2 = 56°$ diagonals bisect the/*hoeklyne sny die ∠s.* $\therefore K\hat{N}M = 112°$	✓S/R ✓answ./*antw.* (2) **OR/OF** ✓S/R ✓answ./*antw.* (2) **OR/OF** ✓S/R ✓answ./*antw.* (2)
8.2	Given/*Gegee* : $\|\|^m$ *PQRS* with diagonals/*met hoeklyne PR* and/*en QS*. *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* $MS = MQ$ **OR/*OF***	✓ 1. S/R ✓2. S ✓3. S/R ✓congruency/*kongruensie* (AAS) (4) **OR/*OF***

	Given/*Gegee* $\|\|^{m}$ $PQRS$ with diagonals/*met hoeklyne* PR and/*en* QS. *R.P.T* : $QM = MS$ Proof/*Bewys* : In ΔPQM and/*en* ΔRSM 1. $\hat{P}_2 = \hat{R}_2$ (alt./*verw.* $\angle_S, QP \parallel SR$) 2. $\hat{S}_2 = \hat{Q}_2$ (alt./*verw.* $\angle_S, SR \parallel PQ$) 3. $PQ = SR$ (opp. sides parm are/*teenoorst. sye van parm* =) $\therefore \Delta PQM \equiv \Delta RSM$ (AAS) $\Rightarrow QM = MS$ *and* $PM = MR$	✓ 1. S/R ✓2. S ✓3. S/R ✓congruency/*kongruensie* (AAS) (4)
8.3	DB = 2DE (diagonals bisect each other) DE = FC (opp. side of/*teenoorst. sy van* //gram.) but/*maar* FC = 2KC (diagonals bisect each other) DE = 2KC (DE = FC) DB = 2(2KC) (DB = 2DE) DB = 4KC	✓S/R ✓S/R ✓S ✓S (4)
		[13]

QUESTION/*VRAAG* 9

9.1	In ΔACG F and/*en* H are midpoints/*is middelpunte* (given/*gegee*) $\therefore FH \parallel CG$ (line joining the midpoints/ *lynstuk wat middelpunte verbind*) $FE \parallel BC$ (same straight lines/*dieselfde reguitlyne*) In ΔAGB, 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*, // to 2nd side/*na 2de sy*)	✓ $FH \parallel CG$ ✓ reason/*rede* ✓ reason/*rede* (3)
9.2	$A\hat{E}H = A\hat{B}C = 90^0$ (Corr angle/*Ooreenst hoek* $BC \parallel EF$) In ΔAEH, Area/*Oppervl.* $= \frac{1}{2} EH \times AE$ $9{,}5 = \frac{1}{2} \times 3{,}5 \times AE$ $AE = \frac{38}{7} = 5{,}43$ cm $AB = 2AE$ $AB = 2\left(\frac{38}{7}\right)$ $= \frac{76}{7}$ $= 10{,}86$ cm	 ✓subst./*verv.* ✓ AE ✓ AB (3)
9.3	BG = 7 cm (line joining the midpoints/ *lynstuk wat middelpunte verbind*) BC = 14 cm In ΔABC, Area/*Oppervl.* $= \frac{1}{2} BC \times AB$ $= \frac{1}{2} \times 14 \times \frac{76}{7}$ $= 76$ cm^2	✓ S/R ✓BC=2BG=14 ✓answ./*antw.* (3)
		[9]

TOTAL/*TOTAAL*: 100

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