



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 10

**MATHEMATICS P2/WISKUNDE V2
NOVEMBER 2019
MARKING GUIDELINES/NASIENRIGLYNE**

MARKS/PUNTE: 100

**These marking guidelines consist of 11 pages.
*Hierdie nasienriglyne bestaan uit 11 bladsye.***

NOTE:

- If a candidate answer 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 memorandum.
- 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 memorandum van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.

QUESTION/VRAAG 1

1.1.1	15 is the mode/is die modus	✓ answer/antwoord (1)
1.1.2	$\text{Position of the median} = \frac{n+1}{2}$ $= 10\text{th position}$ $\text{median} = 24$ $\text{Posisie van die mediaan} = \frac{n+1}{2}$ $= 10\text{de posisie}$ $\text{mediaan} = 24$	✓ answer/antwoord (1)
1.1.3	$\text{Interquartile range} = Q_3 - Q_1$ $= 38 - 13$ $= 25$ $\text{Variasiëwylde} = Q_3 - Q_1$ $= 38 - 13$ $= 25$	✓ Q_3 ✓ Q_1 ✓ answer/antwoord (3)
1.1.4		✓ box/mond ✓ whiskers/snor (2)

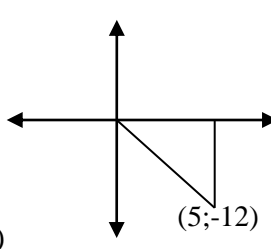
1.2.1	5 learners/ <i>leerders</i>	✓ answer/ <i>antwoord</i> (1)
1.2.2	40 learners/ <i>leerders</i>	✓ answer/ <i>antwoord</i> (1)
1.2.3	<p>Range = max value – min value $= 10 - 0$ $= 10$</p> <p><i>Varisasiewydte = maks waarde – min waarde</i> $= 10 - 0$ $= 10$</p>	<p>✓ min and max/<i>min en maks</i> ✓ answer/<i>antwoord</i> (2)</p>
1.2.4	<p>Number of learners/<i>Getal leerders</i> = $1 + 9 + 2 + 5 + 2$ $= 19$</p> <p>Percentage/<i>Persentasie</i> = $\frac{19}{40} \times 100$ $= 47,5\%$</p>	<p>✓ no. of learners/<i>getal leerders</i> ✓ answer/<i>antwoord</i> (2)</p>
1.2.5	$\bar{x} = \frac{(0 \times 2) + (1 \times 5) + (2 \times 2) + (3 \times 9) + \dots + (10 \times 1)}{40}$ $= \frac{195}{40}$ $= \frac{39}{8}$ $= 4,88$	<p>✓ 195 ✓ 40 ✓ answer/<i>antwoord</i> (3)</p>
		[16]

QUESTION/VRAAG 2

2.1.1	$AE = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(1 + 2)^2 + (3 + 1)^2}$ $= 5 \text{ cm}$	✓ substitution/ <i>vervanging</i> ✓ answer/ <i>antwoord</i> (2)
2.1.2	$m_{AC} = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{3 - 1}{1 - 2}$ $= -2$	✓ substitution/ <i>vervanging</i> ✓ answer/ <i>antwoord</i> (2)
2.1.3	$x_c = \frac{x_1 + x_2}{2}$ $2 = \frac{1 + x}{2}$ $x = 3$ $\mathbf{B(3; -1)}$ $y_c = \frac{y_1 + y_2}{2}$ $1 = \frac{y + 3}{2}$ $y = -1$	✓ substitution/ <i>vervanging</i> ✓ <i>x</i> -value/ <i>-waarde</i> ✓ <i>y</i> -value/ <i>-waarde</i> (3)

2.2	$BE = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(3 + 2)^2 + (-1 + 1)^2}$ $= 5 \text{ cm}$ <p>OR/OF</p> $BE = 3 + 2 \text{ (horizontal line/horizontale lyn)}$ $= 5$ $BE = AE \text{ and/en } AF = BF$ <p>\therefore AFBE is a kite/is 'n vlieër (2 adj. sides = but opp. sides not equal) / kite/vlieër (2 aangr.sye = maar teenoorg.sye is nie gelyknie)</p>	<p>✓BE</p> <p>✓kite/vlieër ✓justification/ regverdiging</p> <p>(3)</p>
2.3	$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(3 - 1)^2 + (-1 - 3)^2}$ $= 2\sqrt{5} \text{ cm}$ <p>$\therefore AC = \sqrt{5} \text{ cm}$</p> <p>In $\triangle ACF$</p> $\hat{A} = 45^\circ$ $\tan 45^\circ = \frac{CF}{\sqrt{5}}$ $CF = \sqrt{5} \text{ cm}$ $\text{Area} = \frac{1}{2} \times AB \times CF$ $= \frac{1}{2} \times 2\sqrt{5} \times \sqrt{5}$ $= 5 \text{ cm}^2$	<p>✓AB</p> <p>✓ratio/verhouding</p> <p>✓CF</p> <p>✓substitution/ vervanging</p> <p>✓answer/antwoord (5)</p>
		[15]

QUESTION/VRAAG 3

3.1	$\sin^2 x + 2 \cos y$ $= \sin^2 37^\circ + 2 \cos 44^\circ$ $= 1,80$	✓ answer/antwoord (1)
3.2	$\frac{\sin 30^\circ \cdot \cot 45^\circ}{\cos 30^\circ \cdot \tan 60^\circ}$ $= \frac{\frac{1}{2} \cdot 1}{\frac{\sqrt{3}}{2} \cdot \sqrt{3}}$ $= \frac{1}{3}$	✓ $\frac{1}{2}$ and/en 1 ✓ $\frac{\sqrt{3}}{2}$ and/en $\sqrt{3}$ ✓ answer/antwoord (3)
3.3.1	In ΔACD , $\cos D = \frac{CD}{AD}$	✓ answer/antwoord (1)
3.3.2	In ΔCDE , $\cos D = \frac{DE}{CD}$	✓ answer/antwoord (1)
3.3.3	$\frac{CD}{AD} = \frac{DE}{CD} \quad \text{both/beide} = \cos D$ $ED = \frac{CD^2}{AD}$ $ED = \frac{25}{13}$ $ED = 1,92 \text{ units/eenhede}$	✓ equating/ gelykstelling ✓ answer/antwoord (2)
3.4.1	$\cos \theta = \frac{5}{13}$ $y^2 = r^2 - x^2$ $= (13)^2 - (5)^2$ $= 144$ $y = -12 \text{ (in the 4th quad/in 4de kwad)}$ $\therefore \sin \theta = -\frac{12}{13}$	 ✓ diagram ✓ y-value/-waarde ✓ answer/antwoord (3)
3.4.2	$\sec \theta + \tan^2 \theta + 1$ $= \frac{13}{5} + \left(\frac{-12}{5}\right)^2 + 1$ $= \frac{13}{5} + \frac{144}{25} + 1$ $= \frac{234}{25}$	✓ $\frac{13}{5}$ ✓ $\frac{-12}{5}$ ✓ simplification/ vereenvoudiging ✓ answer/antwoord (4)
		[15]

QUESTION/VRAAG 4

4.1.1	$2 \sin \theta + 1 = 1,28$ $2 \sin \theta = 0,28$ $\sin \theta = 0,14$ $\theta = 8,05^\circ$	✓ simplification/ <i>vereenvoudiging</i> ✓ answer/ <i>antwoord</i> (2)
4.1.2	$\tan 2\theta = 4 \cot 60^\circ$ $\tan 2\theta = \frac{4}{\sqrt{3}}$ $2\theta = 66,5867\dots^\circ$ $\theta = 33,29^\circ$	✓ $\frac{4}{\sqrt{3}}$ ✓ $66,5867\dots^\circ$ ✓ answer/ <i>antwoord</i> (3)
4.2.1	<p>In $\triangle ABC$</p> $\sin A = \frac{BC}{AC} = \frac{5}{9}$ $\hat{C}AB = 33,75^\circ$ <p>OR/OF</p> $AB = 2\sqrt{14} \text{ (Pythagoras theorem)/} \textit{stelling van Pythagoras}$ $\cos A = \frac{2\sqrt{14}}{9}$ $A = 33,75^\circ$ <p>OR/OF</p> $\tan A = \frac{5}{2\sqrt{14}}$ $A = 33,75^\circ$	✓ ratio/ <i>verhouding</i> ✓ answer/ <i>antwoord</i> (2) ✓ ratio/ <i>verhouding</i> ✓ answer/ <i>antwoord</i> (2) ✓ ratio/ <i>verhouding</i> ✓ answer/ <i>antwoord</i> (2)

<p>4.2.2</p>	<p> $AB = \sqrt{9^2 - 5^2}$ $= 7,48 \text{ units/eenhede}$ OR/OF In $\triangle ABC$ $\cos \hat{A} = \frac{AB}{9}$ $AB = \cos 33,75^\circ \times 9$ $AB = 7,48 \text{ units/eenhede}$ OR/OF $BC = 5 \text{ units}$ $AB = \frac{5}{\tan 33,75^\circ}$ $= 7,48 \text{ units/eenhede}$ \therefore In $\triangle AEB$, $\hat{A} = 22,5^\circ$ $\cos \hat{A} = \frac{AB}{AE}$ $\cos 22,5^\circ = \frac{7,48}{AE}$ $AE = 8,096\dots$ $AE = 8,10$ </p>	<p> \checkmark ratio/verhouding \checkmark AB \checkmark $\hat{BAE} = 22,5^\circ$ \checkmark substitution/ vervanging \checkmark AE (5) </p>
<p>4.2.3</p>	<p> In $\triangle ABE$ $BE = \sqrt{AE^2 - AB^2}$ $= \sqrt{(8,1)^2 - (7,48)^2}$ $= 3,11$ OR/OF $BE = \sin 22,5^\circ \times 8,10 = 3,10$ OR/OF $BE = \tan 22,5^\circ \times 7,48 = 3,10$ In $\triangle ABD$ $\tan 11,25^\circ = \frac{DB}{AB}$ $\therefore DB = \tan 11,25^\circ \times 7,48$ $DB = 1,49$ $DE = BE - DB$ $= 3,10 - 1,49 \quad \text{or} \quad 3,11 - 1,49$ $= 1,61 \text{ units/eenhede} \quad \text{or} \quad 1,62 \text{ units/eenhede}$ </p>	<p> \checkmark BE \checkmark DB \checkmark BE – DB \checkmark answer/antwoord (4) </p>
<p>[16]</p>		

QUESTION/VRAAG 5

5.1.1	Period of/ <i>Periode van</i> f : 360°	✓ answer/ <i>antwoord</i> (1)
5.1.2	Range of/ <i>Waardeversameling van</i> g : $-2 \leq y \leq 0$ or/of $y \in [-2; 0]$	✓ critical values/ <i>kritieke waardes</i> ✓ answer/ <i>antwoord</i> (2)
5.1.3	2 solutions/ <i>oplossings</i>	✓ answer/ <i>antwoord</i> (1)
5.2	$90^\circ \leq x \leq 270^\circ$ or/of $x \in [90^\circ ; 270^\circ]$	✓ critical values ✓ notation (2)
5.3	$h(x) = -\sin x + 1$ Minimum T.P/ <i>Draaipunt</i> = $(90^\circ; 0)$	✓✓ $(90^\circ; 0)$ (2)
		[8]

QUESTION/VRAAG 6

6.1	Volume of the box/ <i>van houer</i> = $L \times B \times H$ $3000 = 25 \times 15 \times x$ $x = \frac{3000}{375}$ $x = 8 \text{ cm}$ The height of the box/ <i>hoogte van houer</i> = 8 cm	✓ formula/ <i>formule</i> ✓ substitution/ <i>vervanging</i> ✓ answer/ <i>antwoord</i> (3)
6.2	The diameter of each can is 5 cm./ <i>Die diameter van elke blikkie is 5 cm.</i> The radius of each can is 2,5 cm./ <i>Die radius van elke blikkie is 2,5 cm.</i>	✓ diameter ✓ answer/ <i>antwoord</i> (2)
6.3	Volume of drink in a can/ <i>van koeldrank in blikkie</i> = $\pi r^2 h$ $= \pi(2,5)^2(8)$ $= \pi(2,5)^2(8)$ $= 157,08 \text{ cm}^3$	✓ substitution/ <i>vervanging</i> ✓ answer/ <i>antwoord</i> (2)
6.4	Volume of the remaining space = V of the box – V of the 15 cans/ <i>Volume van oorblywende spasie = V van die houer – V van die 15 blikkies</i> $= 3000 - (15 \times 157,08)$ $= 3000 - 2356,20$ $= 643,80 \text{ cm}^3$	✓ 3000 – (15 × 157,08) ✓ answer/ <i>antwoord</i> (2)
		[9]

QUESTION/VRAAG 7		
7.1.1	$\hat{E}MF = 120^\circ$ (\angle 's on straight line/ <i>op reguitlyn</i>) $\hat{F}_1 = \hat{E}_1 = 30^\circ$ (\angle 's opp. = sides OR diag. of a rectangle = and bisect each other).	✓S/R ✓S/R (2)
7.1.2	$\hat{E}_1 = \hat{G}_1 = 30^\circ$ (Alt. \angle 's: $EF \parallel HG$) $\hat{L}_2 = \hat{G}_1 + \hat{G}ML$ (ext. \angle = sum of two opp. int. \angle 's) = $4\pi r^2$ $40^\circ = 30^\circ + \hat{G}ML$ $\hat{G}ML = 10^\circ$	✓S/R ✓S/R ✓ answer/ <i>antwoord</i> (3)
7.2	Perimeterof/ <i>Omtrek van</i> PQRS = 12 cm $\text{One side/Een sy} = \frac{12}{4} = 3 \text{ cm}$ $\therefore SR = 3 \text{ cm}$ PM = MR (diag. of <i>rhombus/ronbus(ruit)</i> PQRS) PL = LS (given/ <i>gegeë</i>) In ΔPSR $LM = \frac{1}{2}SR$ (Midpoint thm/ <i>Middelpunstelling</i>) $= \frac{1}{2}(3)$ $= \frac{3}{2} = 1,5 \text{ cm}$	✓3cm ✓S/R ✓S/R ✓ answer/ <i>antwoord</i> (4)
		[9]

QUESTION/VRAAG 8

8.1	Bisect each other/ <i>Halveer mekaar</i>	✓ answer/ <i>antwoord</i> (1)
8.2.1	A line drawn from the midpoint of one side of a triangle parallel to another side bisects the third side./'n Lyn wat van die middelpunt van een sy van 'n driehoek parallel aan 'n ander sy getrek word, halveer die derde sy.	✓R (1)
8.2.2 (a)	In $\triangle VWP \equiv \triangle VRS$ 1. $WV = VR$ (proved/ <i>bewys</i>) 2. $VP = SV$ (given/ <i>gegee</i>) 3. $\hat{V}_1 = \hat{V}_3$ (vert. opp \angle s) $\therefore \triangle VWP \equiv \triangle VRS$ (SAS)	✓S ✓S/R ✓R (3)
8.2.2(b)	$WV = VR$ (proved/ <i>bewys</i>) $VP = SV$ (given/ <i>gegee</i>) \therefore SWPR is a // ^m (diagonals bisect each other/ <i>hoeklynehalveermekaar</i>)	✓S ✓R (2)
8.2.2(c)	$PQ \parallel SR$ (WP // SR) $SP \parallel RQ$ (given/ <i>gegee</i>) \therefore PQRS is a parallelogram (both pairs of opp. sides are // <i>beide pare teenoorgsye is //</i>) OR/OF $PQ \parallel SR$ (WP // SR) $PQ = SR$ (PQ = WP = SR, proved/ <i>bewys</i>) \therefore PQRS is a // ^m (one pair of opp. sides = and // <i>een paar teenoorgsye = en//</i>)	✓S ✓R ✓R (3) ✓S ✓R ✓R (3)
8.2.3	$SR = TW$ (RSTW is // gram) But $SR = WP$ (proved/ <i>bewys</i>) $WP = QP$ (given/ <i>gegee</i>) $\therefore TQ = TW + WP + PQ$ $= 3SR$	✓S/R ✓S (2)
		[12]

TOTAL/TOTAAL: 100