



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE
*NASIONALE
SENIORSERTIFIKAAT***

GRADE/GRAAD 10

NOVEMBER 2019

**TECHNICAL MATHS P2 / *TEGNIESE WISKUNDE V2*
MARKING GUIDELINE / *NASIENRIGLYN***

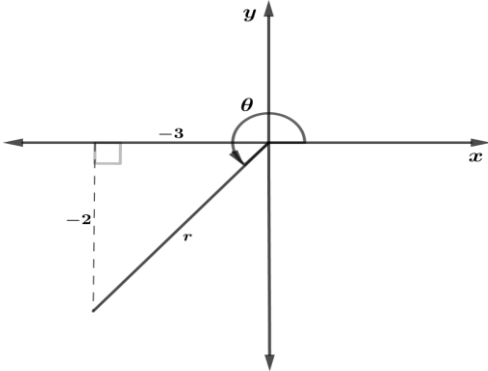
MARKS/PUNTE: 100

This marking guideline consists of 14 pages.
Hierdie nasienriglyn bestaan uit 14 bladsye.

QUESTION / VRAAG 1			
1.1	$m_{PQ} = \frac{y_2 - y_1}{x_2 - x_1}$ $\therefore m_{PQ} = \frac{-3 - (-1)}{4 - (-3)}$ $= \frac{4}{8}$ $\therefore m_{PQ} = \frac{1}{2}$	<p>✓ Substitution / <i>Vervanging</i></p> <p>✓ Answer / <i>antwoord</i></p>	(2)
1.2	$T\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$ $\therefore T\left(\frac{4+2}{2}; \frac{3-3}{2}\right)$ $\therefore T(3;0)$	<p>✓ Correct Formula / <i>Korrekte formule</i></p> <p>✓ Substitution / <i>Vervanging</i></p> <p>✓ Answer / <i>antwoord</i></p>	(3)
1.3	$QR = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(2+4)^2 + (-3+1)^2}$ $= \sqrt{40}$ $\therefore QR = 2\sqrt{10}$ <p>OR/OF</p> <p>$QR = 6.32$ units/<i>eenhede</i></p>	<p>✓ Correct Formula / <i>Korrekte formule</i></p> <p>✓ Substitution / <i>Vervanging</i></p> <p>✓ Answer / <i>antwoord</i></p>	(3)

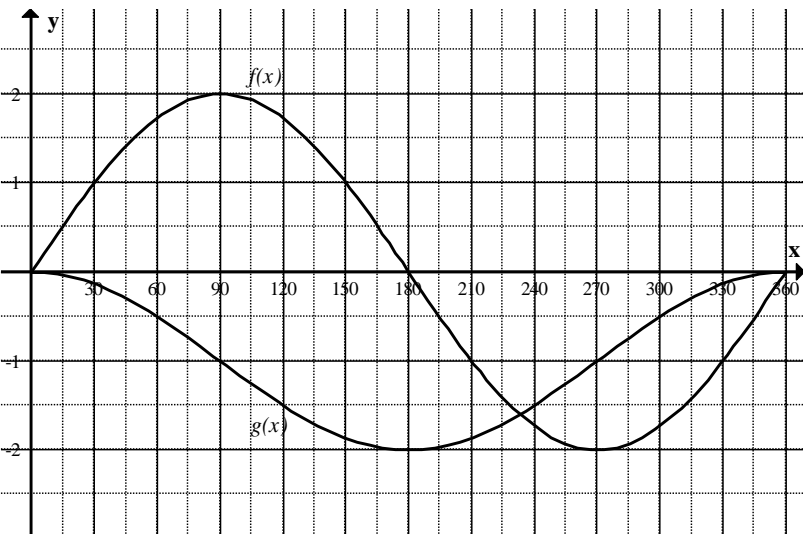
1.4	$m_l \times m_{PQ} = -1$ $m_l \times \frac{1}{2} = -1$ $m_l = -1 \times 2$ $m_l = -2$ $y - y_1 = m(x - x_1)$ $y - 0 = -2(x - 3)$ $y = -2x + 6$ <p>OR/OF</p>	$\checkmark m_l \times m_{PQ} = -1$ $\checkmark m_l = -2$ <p>\checkmark Substitution / <i>Vervanging</i></p> <p>\checkmark Answer / <i>antwoord</i></p> <p>OR/OF</p>	(4)
	$m_l \times m_{PQ} = -1$ $m_l \times \frac{1}{2} = -1$ $m_l = -1 \times 2$ $m_l = -2$ $y = mx + c$ $0 = -2(3) + c$ $\therefore c = 6$ $\therefore y = -2x + 6$	$\checkmark m_l \times m_{PQ} = -1$ $\checkmark m_l = -2$ <p>\checkmark Substitution / <i>Vervanging</i></p> <p>\checkmark Answer / <i>antwoord</i></p>	

1.5	<p>From the gradient of TD / <i>vanaf die gradiënt van TD</i></p> $\frac{y_D - y_T}{x_D - x_T} = -2$ $\frac{y_D - 0}{x_D - 3} = -2$ $y_D = -2x_D + 6 \quad \dots\dots\dots(1)$ <p>From the gradient of QD / <i>vanaf die gradiënt van QD</i></p> $\frac{y_D - y_Q}{x_D - x_Q} = \frac{1}{2}$ $\frac{y_D - 1}{x_D - 4} = \frac{1}{2}$ $y_D = \frac{1}{2}x_D + 1 \quad \dots\dots\dots(2)$ <p>(1) = (2) at/by D</p>	<p>✓ Equation/Vergelyking (1)</p> <p>✓ Equation/Vergelyking (2)</p>	
	$\therefore \frac{1}{2}x_D + 1 = -2x_D + 6$ $x_D + 2 = -4x_D + 12$ $5x_D = 10$ $x_D = 2$ <p>from/<i>vanaf</i> ... (1)</p> $y_D = -2(2) + 6$ $y_D = 2$ $\therefore D(2; 2)$	<p>✓ Answer / <i>antwoord</i></p>	(3)
			[15]

QUESTION/VRAAG 2			
2.1.1	$\cos(x + y) - \sin z$ $= \cos(27,5^\circ + 52^\circ) - \sin(43,2^\circ)$ $= \cos(79,5^\circ) - \sin(43,2^\circ)$ $= -0,50$	✓ Substitution / <i>Vervanging</i> ✓ Answer / <i>antwoord</i>	(2)
2.1.2	$\frac{\cos ec x}{\tan x + \tan z}$ $= \frac{1}{\sin 27,5^\circ \tan 52^\circ + \tan 43,2^\circ}$ $= 0,98$	✓ $\frac{1}{\sin 27,5^\circ}$ ✓ Answer / <i>antwoord</i>	(2)
2.2.1	$2 \cot \theta + 4 = 7$ $2 \cot \theta = 7 - 4$ $\cot \theta = \frac{3}{2}$ <div style="text-align: center;">  </div> $r^2 = x^2 + y^2$ $r^2 = 3^2 + 2^2$ $r = \sqrt{13}$ $\sin \theta = \frac{-3}{\sqrt{13}}$	✓ $\frac{3}{2}$ ✓ Correct Diagram / <i>korrekte diagram</i> ✓ Simplification / <i>vereenvoudiging</i> ✓ Answer / <i>antwoord</i>	(4)

2.2.2	$\cos \theta + 2 \tan \theta$ $= \frac{x}{r} + 2 \frac{x}{y}$ $= \frac{-3}{\sqrt{13}} + 2 \left(\frac{-2}{-3} \right)$ $= \frac{52 - 9\sqrt{13}}{39}$ $= 0,50$	$\checkmark \frac{-3}{\sqrt{13}}$ $\checkmark 2 \left(\frac{-2}{-3} \right)$ $\checkmark \text{ Answer / antwoord}$	(3)
2.3	$6 \cos \beta = 3 + \cos ec 27^\circ$ $6 \cos \beta = 3 + \frac{1}{\sin 27^\circ}$ $\cos \beta = \frac{5,20269}{6}$ $\beta = \cos^{-1}(0,867115)$ $\therefore \beta = 29,87^\circ$	$\checkmark \frac{1}{\sin 27^\circ}$ $\checkmark \text{ Simplification / vereenvoudiging}$ $\checkmark \text{ Answer / antwoord}$	(3)
			[14]

QUESTION / VRAAG 3			
3.1	$\cos 37^\circ = \frac{CD}{BD}$ $BD = \frac{1,8}{\cos 37^\circ}$ $BC = 2,4 \text{ m}$	$\checkmark \frac{CD}{BD}$ $\checkmark \text{ Answer / antwoord}$	(2)
3.2	$CF = DE$ $BC + DE = HG$ $DE = HG - BC$ $\sin 37^\circ = \frac{BC}{BD}$ $BC = 2,3 \times \sin 37^\circ$ $BC = 1,4 \text{ m}$ <p style="text-align: center;">OR/OF</p> $\tan 37^\circ = \frac{BC}{CD}$ $BC = 1,8 \times \tan 37^\circ$ $BC = 1,4 \text{ m}$ <p style="text-align: center;">OR/OF</p> $BC^2 = BD^2 - CD^2$ $BC = \sqrt{(2,3)^2 - (1,8)^2}$ $BC = 1,4 \text{ m}$ $DE = HG - BC$ $DE = 4,2 - 1,4$ $\therefore DE = 2,8 \text{ m}$	$\checkmark HG$ $\checkmark BC = 1,4 \text{ m}$ $\checkmark \text{ Simplification / vereenvoudiging}$ $\checkmark \text{ Answer / antwoord}$	(4)
3.3	$\sin \theta = \frac{AB}{AH}$ $AB = 2,5 \times \sin 37^\circ$ $AB = 1,5 \text{ m}$	$\checkmark \text{ Simplification / vereenvoudiging}$ $\checkmark \text{ Answer / antwoord}$	(2)
3.4	$\text{Area AFGH} = \text{Area BFGH} + \text{Area ABH}$ $\text{Area BFGH} = 4,2(2,5 \times \cos 37^\circ)$ $= 8,4 \text{ m}^2$ $\text{Area } \Delta ABH = \frac{1}{2} \times 2,0 \times 1,5$ $= 1,5 \text{ m}^2$ $\therefore \text{Area AFGH} = 8,4 + 1,5 = 9,9 \text{ m}^2$ <p><i>Number of litres/Aantal liters</i></p> $= \frac{1}{2} \times 9,9 = 4,95 \approx 5 \text{ l}$	$\checkmark \text{ Area BFGH}$ $\checkmark \text{ Area } \Delta ABH$ $\checkmark \text{ Answer / antwoord}$	(3)
			[11]

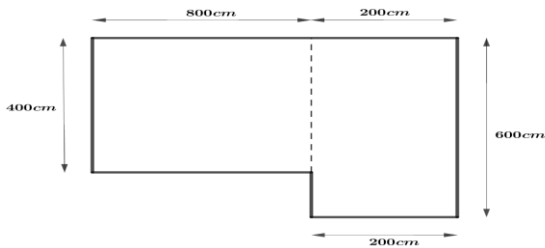
QUESTION/VRAAG 4			
4.1		<p>$f(x)$</p> <ul style="list-style-type: none"> ✓ x-intercepts / x-afsnit ✓ y-intercepts / y-afsnit ✓ shape / vorm <p>$g(x)$</p> <ul style="list-style-type: none"> ✓ x-intercepts / x-afsnit ✓ shape / vorm 	(5)
4.2	Amplitude is 2	✓ Answer / antwoord	(1)
4.3	Period/Periode is 360°	✓ Answer / antwoord	(1)
4.4	$y \in \mathbb{R}, y \in [-2; 0]$	<ul style="list-style-type: none"> ✓ $y \in \mathbb{R}$ ✓ Correct notation / korrekte notasie 	(2)
4.5	<p>$x = 0^\circ$</p> <p>$x = 233^\circ$ Accept values between 232° & 236° Aanvaar waardes tussen 232° & 236°</p> <p>$x = 360^\circ$</p>	<ul style="list-style-type: none"> ✓ $x = 0^\circ$ ✓ $x = 233^\circ$ ✓ $x = 360^\circ$ 	(3)
			[12]

5.3	$\widehat{NML} = \widehat{NMP} + \widehat{PML}$ $\widehat{NMP} = 180^\circ - (90^\circ + 33^\circ) \quad \left[\begin{array}{l} \text{sum of } \angle\text{s in } \Delta \\ \text{som van } \angle\text{e in } \Delta \end{array} \right]$ $\therefore \widehat{NMP} = 57^\circ$ $\widehat{PML} = 180^\circ - (90^\circ + 52^\circ) \quad \left[\begin{array}{l} \text{sum of } \angle\text{s in } \Delta \\ \text{som van } \angle\text{e in } \Delta \end{array} \right]$ $\widehat{PML} = 38^\circ$ $\therefore \widehat{NML} = 57^\circ + 33^\circ$ $\therefore \widehat{NML} = 95^\circ$	<p>✓ Statement & Reason /Bewering & rede</p> <p>✓ $\widehat{NMP} = 57^\circ$</p> <p>✓ $\widehat{PML} = 38^\circ$</p> <p>✓ Answer / antwoord</p>	(4)
			[09]

QUESTION/VRAAG 6				
6.1	$35^\circ + w + 90^\circ = 180^\circ$ $w = 180^\circ - 125^\circ$ $w = 55^\circ$ $\hat{LKI} = x = 21^\circ$ $\hat{HLT} = \hat{LTJ} = 35^\circ$ $\therefore x + y = \hat{LTY}$ $y = 35^\circ - 21^\circ$ $y = 14^\circ$	$\left[\begin{array}{l} \angle s \text{ on a str line} \\ \angle e \text{ op reguitlyn} \end{array} \right]$ $\left[\begin{array}{l} \text{Alt } \angle s; HK \parallel IJ \\ \text{verw } \angle e; HK \parallel IJ \end{array} \right]$ $\left[\begin{array}{l} \text{Alt } \angle s; HK \parallel IJ \\ \text{verw } \angle e; HK \parallel IJ \end{array} \right]$	✓ Statement & reason /Bewering & rede ✓ $w = 55^\circ$ ✓ Statement & reason /Bewering & rede ✓ Statement & reason /Bewering & rede ✓ $y = 14^\circ$	(5)
6.2	Trapezium/ <i>Trapezium</i> One pair of opposite sides parallel <i>Een paar teenoorst sye is ewewydig</i>		✓ Statement /bewering ✓ Reason / rede	(2)
6.3	$\triangle IMH \equiv \triangle JMK$ $IM = KM$ given / gegee $HM = JM$ given / gegee $\hat{IMH} = \hat{JMK}$ $\left[\begin{array}{l} \text{vert opp } \angle s = \\ \text{regoorst } \angle e \end{array} \right]$ $\therefore \triangle IMH \equiv \triangle JMK$ SAS / S \angle S		✓ Statement /bewering ✓ Statement & reason Bewering & rede ✓ Conclusion / Gevolgtrekking	(3)
				[10]

QUESTION/ VRAAG 7			
7.1.1	<p>E midpoint of AC; DE \parallel BC [line through midpt \parallel to 2nd side] <i>E middelpnt van AC; DE \parallel BC [lyn deur midpt \parallel aan 2^{de} sy]</i></p> <p>OR/OF E midpoint of AC; DE \parallel BC [converse midpoint th] <i>E middelpnt van AC; DE \parallel BC [omgekeerde midpt – stelling]</i></p>	<p>✓ Statement & reason / <i>Bewering & rede</i></p>	(1)
7.1.2 (i)	$DE = \frac{1}{2} BC$ (midpt theorem) <i>(midpt stelling)</i> $BC = 2DE$ $\therefore BC = 2(8)$ $\therefore BC = 16\text{cm}$	<p>✓ Statement & reason / <i>Bewering & rede</i></p> <p>✓ Substitution / <i>Vervanging</i></p> <p>✓ Answer / <i>antwoord</i></p>	(3)
7.1.2 (ii)	$AE = EC$ $AC = AE + EC$ $\therefore AC = 14 + 14$ $AC = 28$ $AC^2 = AB^2 + BC^2$ (Theorem of Pythagoras) <i>(Stelling van Pythagoras)</i> $AB = \sqrt{AC^2 - BC^2}$ $= \sqrt{28^2 - 16^2}$ $\therefore AB = 23\text{cm}$	<p>✓ $AC = 28$</p> <p>✓ Statement & reason / <i>Bewering & rede</i></p> <p>✓ Simplification / <i>Vereenvoudiging</i></p> <p>✓ Answer / <i>antwoord</i></p>	(4)
7.2.1	<p>In $\triangle ABC$ $\hat{B} = x$ (given / <i>gegee</i>) $\hat{A} = \hat{C}$ (\angles opp equal sides) <i>(\anglee teenoor gelyke sye)</i> $\hat{A} = \hat{C} = \frac{180^\circ - x}{2}$ In $\triangle XYZ$ $\hat{Y} = x$ (given / <i>gegee</i>) $\hat{X} = \hat{Z}$ (\angles opp equal sides) <i>(\anglee teenoor gelyke sye)</i> $\hat{X} = \hat{Z} = \frac{180^\circ - x}{2}$ $\therefore \hat{A} = \hat{X} = \hat{C} = \hat{Z} = \frac{180^\circ - x}{2}$ $\therefore \triangle ABC \equiv \triangle XYZ$ (AAA)</p>	<p>✓ Statement & reason / <i>Bewering & rede</i></p> <p>✓ Simplification / <i>Vereenvoudiging</i></p> <p>✓ Statement & reason / <i>Bewering & rede</i></p> <p>✓ Conclusion/ <i>Gevolgtrekking</i></p>	(4)

7.2.2	$\hat{A} = \hat{X} = \hat{C} = \hat{Z} = \frac{180^\circ - x}{2}$ $= \frac{180^\circ - 40}{2}$ $= 70^\circ$	<p>✓ Substitution / <i>Vervanging</i></p> <p>✓ Statement & reason / <i>Bewering & rede</i></p>	(2)
			[14]

QUESTION / VRAAG 8			
8.1.1	$28^{\circ}34'62'' = 28^{\circ} + \frac{34}{60} + \frac{62}{60 \times 60}$ $= 28,58^{\circ}$	✓ $\frac{34}{60}$ ✓ $\frac{62}{3600}$ ✓ Answer / antwoord	(3)
8.1.2	$131.42^{\circ} = 131^{\circ} + 0.42 \times 60^{\circ}$ $= 131^{\circ} + 25' + 0.2 \times 60^{\circ}$ $= 131^{\circ} 27' 36''$	✓ Multiply by 60 <i>Vermenigvuldig met 60</i> ✓ Simplification / Vereenvoudiging ✓ Answer / antwoord	(3)
8.2	$63^{\circ} + \frac{4\pi}{3} - 100^{\circ} = \frac{4\pi}{3} - 37^{\circ}$ $= \frac{4\pi}{3} - 37^{\circ} \times \frac{\pi}{180^{\circ}}$ $= \frac{4\pi}{3} - \frac{37\pi}{180}$ $= \frac{203\pi}{180}$	✓ Simplification / Vereenvoudiging ✓ $\frac{\pi}{180^{\circ}}$ ✓ Answer / antwoord	(3)
8.3	$s = r\theta$ $s = 7 \left(\frac{2\pi}{3} \right)$ $s = \frac{14\pi}{3}$ $s = 14,66\text{cm}$	✓ Formula / Formule ✓ Substitution / Vervanging ✓ Answer / antwoord	(3)
8.4	 <p>Area = $(800 \times 400) + (200 \times 600)$</p> $= 440000$ $= \frac{440000}{10000}$ $= 44\text{m}^2$ <p>OR / OF</p> $\frac{400}{100} = 4, \frac{800}{100} = 8, \frac{600}{100} = 6, \frac{200}{100} = 2$ $\text{Area} = (4 \times 8) + (6 \times 2)$ $= 44\text{m}^2$	✓ Area calculation / berekening ✓ Conversion / herleiding OR / OF ✓ Conversion / herleiding ✓ Area calculation / berekening ✓ Answer / antwoord	(3)
			[15]
TOTAL/TOTAAL:			100