



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE /
NASIONALE SENIOR
SERTIFIKAAT**

GRADE/GRAAD 10

NOVEMBER 2020

**TECHNICAL MATHEMATICS P2 /
TEGNIESE WISKUNDE V2**

MARKING GUIDELINE / NASIENRIGLYN

MARKS/ PUNTE: 100

MARKING CODES / NASIENKODES	
A	Accuracy/Akkuraatheid
CA	Consistent accuracy/Deurlopende akkuraatheid
SF	Substitution correctly in correct formula/ Korrekte vervanging in die korrekte formule
NRP	No rounding penalty / Geen afronding penalisering
NPU	No penalty for omitting units / Geen penalisering vir eenhede uitgelaat

This marking guideline consists of 12 pages. /
Hierdie nasienriglyn bestaan uit 12 bladsye.

QUESTION/VRAAG 1			
1.1	$B(0;2),$ $C(6;4)$	✓ Answer/ <i>Antwoord</i> ✓ Answer/ <i>Antwoord</i>	(2)
1.2	$E(1;0)$ and/ <i>en</i> $C(6;4)$ $m_{AC} = m_{EC} = \frac{4-0}{6-1} = \frac{4}{5}$	✓ Answer/ <i>Antwoord</i>	(1)
1.3	$BD: y = -2x + 2$ $m_{BD} = -2$ $m_{AC} = \frac{4}{5}$ $m_{AC} \times m_{BD} \neq -1$ \therefore BD is not perpendicular to AC \therefore <i>BD is nie loodreg op AC nie</i>	✓ $m_{BD} = -2$ ✓ $m_{AC} \times m_{BD} \neq -1$ ✓ Conclusion / <i>Gevolgtrekking</i>	(3)
1.4	$BD = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(2-0)^2 + (-2-2)^2}$ $= \sqrt{2^2 + (-4)^2}$ $= \sqrt{20}$ $= 2\sqrt{5}$ $= 4,5$ units/ <i>eenhede</i>	✓ Formula/ <i>Formule</i> ✓ SF ✓ Answer/ <i>Antwoord</i> CA	(3)
1.5	$2x = 6y - 12$ $F(x;6)$ $2x = 6(6) - 12$ $2x = 36 - 12$ $x = \frac{24}{2}$ $x = 12$	✓ Substitution / <i>Vervanging</i> ✓ Answer/ <i>Antwoord</i> CA	(2)

<p>1.6</p>	<p>Midpt/Middelpt BC</p> $S\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$ $= S\left(\frac{6+0}{2}; \frac{4+2}{2}\right)$ $= S(3;3)$ <p>$E(1;0)$</p> <p>$y = mx + c$</p> $m_{ES} = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{3-0}{3-1}$ $= \frac{3}{2}$ <p>$y - y_1 = m(x - x_1)$</p> $y - 3 = \frac{3}{2}(x - 3)$ $y = \frac{3}{2}x - \frac{9}{2} + 3$ $y = \frac{3}{2}x - \frac{3}{2}$	<p>✓ Substitution / <i>Vervanging</i></p> <p>✓ $S(3;3)$</p> <p>✓ $m_{ES} = \frac{3}{2}$ CA</p> <p>✓ Substitution/ <i>Vervanging</i> CA</p> <p>✓ Answer/ <i>Antwoord</i> CA</p>	<p>(5)</p> <p>[16]</p>
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QUESTION/VRAAG 2			
2.1.1	$= \tan^2(13,4^\circ) + \sin(23,5^\circ)$ $= 0,46$	✓ Substitution/ <i>Vervanging</i> ✓ Answer/ <i>Antwoord</i> NRP	(2)
2.1.2	$\frac{2}{\cos \alpha + \cot \beta}$ $= \frac{2}{\cos(23,5^\circ) + \frac{1}{\tan(13,4^\circ)}}$ $= 0.39$	✓ $\frac{1}{\tan(13,4^\circ)}$ ✓ Answer/ <i>Antwoord</i> NRP	(2)
2.2.1	$\sin \theta = \frac{b}{3}$ $3^2 = 2^2 + b^2$ $b = \pm \sqrt{3^2 - 2^2}$ $b = \pm \sqrt{5}$ $\therefore b = -\sqrt{5}$ $\therefore \sin \theta = \frac{-\sqrt{5}}{3}$	✓ $3^2 = 2^2 + b^2$ ✓ Simplification / <i>Vereenvoudiging</i> ✓ $b = \pm \sqrt{5}$ ✓ $-\sqrt{5}$ ✓ Answer/ <i>Antwoord</i>	(5)
2.2.2	$\cos \theta + \tan \theta$ $= \frac{x}{r} + \frac{y}{x}$ $= \frac{2}{3} + \left(\frac{-\sqrt{5}}{2} \right)$ $= \frac{4 - 3\sqrt{5}}{6}$ $= -0.451$	✓ $\frac{2}{3}$ ✓ $\frac{-\sqrt{5}}{2}$ ✓ Answer / <i>Antwoord</i>	(3)
2.2.3	$\frac{\sec \theta}{1 + \cos \theta}$ $\frac{\frac{3}{2}}{1 + \left(-\frac{2}{\sqrt{5}} \right)}$ $= \frac{15 + 6\sqrt{5}}{2}$ $= 14.208$	✓ $\frac{3}{2}$ ✓ $\left(-\frac{2}{\sqrt{5}} \right)$ ✓ Answer/ <i>Antwoord</i> A	(3)

2.3	$\frac{3 \tan(x + 20^\circ)}{5} = \cot 23,1^\circ$ $3 \tan(x + 20^\circ) = 5 \times \frac{1}{\tan 23.1^\circ}$ $\tan(x + 20^\circ) = \frac{5 \times \frac{1}{\tan 23.1^\circ}}{3}$ $x + 20^\circ = \tan^{-1}(3,9074)$ $x = 75.64^\circ - 20^\circ$ $x = 55.64^\circ$	$\checkmark \frac{1}{\tan 23.1^\circ}$ $\checkmark \text{ Simplification / Vereenvoudiging}$ $\checkmark \text{ Answer / Antwoord}$	(3)
			[18]

QUESTION/ VRAAG 3			
3.1	$x + 10$	✓ Answer/ <i>Antwoord</i>	(1)
3.2	$\tan 45^\circ = \frac{BH}{AH}$ $AH = x + 10$ $AE = 4AH$ $= 4(x + 10)$ $\therefore AE = 4x + 40$	✓ $AE = 4x + 40$	(1)
3.3			
3.3.1	$4x + 40 = 80$ $4x = 80 - 40$ $x = \frac{40}{4}$ $x = 10m$	✓ Substitution / <i>Vervanging</i> ✓ Answer/ <i>Antwoord</i> CA	(2)
3.3.2	$\sin 45^\circ = \frac{20}{DE}$ $DE = \frac{20}{\sin 45^\circ}$ $DE = 20\sqrt{2}m$ <p style="text-align: center;">OR / OF</p> $DE = \sqrt{20^2 + 20^2}$ $= \sqrt{400 + 400}$ $= \sqrt{800}$ $= 20\sqrt{2}m$	$\checkmark \sin 45^\circ = \frac{20}{DE}$ ✓ Answer/ <i>Antwoord</i> CA <p style="text-align: center;">OR / OF</p> $\checkmark \sqrt{20^2 + 20^2}$ ✓ Answer/ <i>Antwoord</i> CA	(2)

3.3.3	$x = 10$ $AH = x + 10$ $= 20$ <p>Area of/<i>Oppervlakte van</i> ABDE</p> $= 6 \times \text{Area } \triangle ABH$ $= 6 \times \left(\frac{1}{2} \times 20 \times 20 \right)$ $= 1\,200 \text{ m}^2$ <p style="text-align: center;">OR / OF</p> <p>Area of/<i>Oppervlakte van Trapezium</i> ABDE</p> $= \frac{1}{2}(a + b)h$ $= \frac{1}{2}(40 + 80) \times 20$ $= 1\,200 \text{ m}^2$	<p>✓ $AH = 20$</p> <p>✓ Simplification/ <i>Vereenvoudiging</i></p> <p>✓ Answer/ <i>Antwoord</i> CA</p> <p>OR / OF</p> <p>✓ Formula / <i>Formule</i></p> <p>✓ Substitution / <i>Vervanging</i></p> <p>✓ Answer/ <i>Antwoord</i> CA</p>	(3)
			[9]

QUESTION/VRAAG 4			
4.1			
4.1.1			Graph of y Grafiek van y ✓ x -intercepts/ <i>afsnitte</i> ✓ y -intercept/ <i>afsnit</i> ✓ shape / <i>vorm</i> ✓ End points / <i>Eindpunte</i>
			(4)
4.1.2	(i)	Amplitude = 3	✓ Answer / <i>Antwoord</i> (1)
	(ii)	Range/Waardeversameling: $y \in [-3; 3]$ or/of $y \in \mathbb{R}, -3 \leq x \leq 3$	✓✓ Answer / <i>Antwoord</i> (2)
4.1.3	$p(x) = 3 \cos x - 3$		✓ Answer / <i>Antwoord</i> (1)
4.2			
4.2.1	$b = 2$		✓ Answer / <i>Antwoord</i> (1)
4.2.2	180°		✓ Answer / <i>Antwoord</i> (1)
4.2.3	$70^\circ < x < 200^\circ, 270^\circ < x < 360^\circ$		✓ 70° ✓ 200° ✓ 270°
			(3)
			[13]

QUESTION/VRAAG 5			
5.1	$a = 55^\circ$ (Alt \angle s/Verw \angle e, RP \parallel SV) $90^\circ + 55^\circ + b = 180^\circ$ (Sum \angle s in triangle) \angle e in driehoek $b = 180^\circ - 145^\circ$ $b = 35^\circ$ $c + 135^\circ = 180^\circ$ (co-int \angle s /ko-binne \angle e RP \parallel SV) $c = 45^\circ$ $d = b = 35^\circ$ (corr \angle s / ooreenk \angle e RP \parallel SV) OR / OF $d + 55^\circ = 90^\circ$ PS \perp TR $d = 90^\circ - 55^\circ$ $d = 35^\circ$	✓ Statement ✓ Reason <i>Bewering / Rede</i> ✓ Reason / Rede ✓ Statement / <i>Bewering</i> ✓ Reason / Rede ✓ Statement / <i>Bewering</i> ✓ Statement / <i>Bewering</i> ✓ Reason / Rede OR / OF ✓ Reason / Rede ✓ Statement / <i>Bewering</i>	(8)
5.2	If/As UQ \parallel TR then/dan $135^\circ + b = 180^\circ$ co-int \angle s /ko-binne \angle e but/maar $b = 35^\circ$ False/Vals, UQ not/nie \parallel TR, $135^\circ + 35^\circ \neq 180^\circ$	✓ Statement / <i>Bewering</i> ✓ UQ not/nie \parallel TR	(2)
			[10]

QUESTION/VRAAG 6			
6.1	MNOP is a rectangle / 'n reghoek	✓ Statement / Bewering	(1)
6.2			
6.2.1	$MQ = \sqrt{MR^2 - RQ^2}$ <p style="text-align: right;">Thm of/St van Pythagoras</p> $MQ = \sqrt{35^2 - 10^2}$ $= 15\sqrt{5}cm$ $QP = 75 - 10$ $= 65cm$ $y = \sqrt{(15\sqrt{5})^2 + 65^2}$ $= 5\sqrt{214}$ $y = 73.14cm$	✓ Reason / Rede ✓ MQ ✓ QP ✓ Answer / Antwoord	(4)
6.2.2	$45 + z = 65$ $z = 65 - 45$ $z = 20cm$	✓ Statement / Bewering ✓ Answer / Antwoord	(2)
6.2.3	$w^2 = z^2 + (15\sqrt{2})^2$ <p style="text-align: right;">Pythagoras thm / st</p> $w = \sqrt{25^2 + (15\sqrt{2})^2}$ $w = 5\sqrt{43}$ $w = 32.79cm$	✓ Statement / Bewering ✓ Simplification / Vereenvoudiging ✓ Statement / Bewering	(3)
6.3	$MQ = OP$ <p style="text-align: right;">(oppsides of rectangle MOPQ/ teenoorst sye van reghoek MOPQ)</p> $\hat{M}\hat{Q}P = \hat{M}\hat{O}P = 90^\circ$ <p style="text-align: right;">given/gegee</p> $QP = MO$ $\therefore \Delta MPQ \equiv \Delta MOP$ <p style="text-align: right;">SAS/SHS</p>	✓ Statement / Bewering ✓ Statement / Bewering ✓ Reason / Rede	(3)
			[13]

QUESTION/VRAAG 7			
7.1			
7.1.1	$AC = 2ED$ midpnt thm / <i>Middelpt st</i> $AC = 2\left(\frac{x+3}{2}\right)$ $AC = x+3$	✓ Statement and Reason / <i>Bewering en Rede</i> ✓ Answer / <i>Antwoord</i>	(2)
7.1.2	$AC = 7+3$ $AC = 10$ units / <i>eenhede</i>	✓ Answer / <i>Antwoord</i>	(1)
7.2	$\hat{A} = \alpha$ (corr $s \angle$ s; $ED \parallel AC$) (ooreenk \angle e; $ED \parallel AC$) $25^\circ + \alpha + \hat{A}CD = 180^\circ$ (Sum \angle s in a triangle) (\angle e van driehoek) $\hat{A}CD = 180^\circ - 25^\circ - \alpha$ $= 155^\circ - \alpha$	✓ Statement and Reason / <i>Bewering en Rede</i> ✓ Statement and Reason / <i>Bewering en Rede</i> ✓ Answer / <i>Antwoord</i>	(3)
7.3	$\hat{D} = \hat{C}$ (corr $s \angle$ s; $AC \parallel ED$) (ooreenk \angle e; $AC \parallel ED$) $\hat{E} = \hat{A} = \alpha$ (corr $s \angle$ s; $AC \parallel ED$) (ooreenk \angle e; $AC \parallel ED$) B (common/ <i>gemeen</i>) $\therefore \triangle DBE \parallel \triangle ABC$ AAA / <i>HHH</i>	✓ Statement and Reason / <i>Bewering en Rede</i> ✓ Statement and Reason / <i>Bewering en Rede</i> ✓ Reason / <i>Rede</i>	(3)
			[9]

QUESTION/VRAAG 8			
8.1.1	$307,5^\circ = 307^\circ + 0,5 \times 60^\circ$ $= 307^\circ + 30' + 0 \times 60'$ $= 307^\circ 30' 00''$	✓ Multiply by / maal met 60 ✓ Simplification / Vereenvoudiging ✓ Answer / Antwoord	(3)
8.1.2	$79^\circ 39' 18'' = 79^\circ + \frac{39}{60} + \frac{18}{60 \times 60}$ $= 79,66^\circ$	✓ $\frac{39}{60}$ ✓ $\frac{18}{3600}$ ✓ Answer / Antwoord	(3)
8.2	$s = r\theta \quad r = \frac{0,75}{2}$ $\theta = \frac{s}{r} = \frac{250}{0,375}$ $\theta = 666,66 \times \frac{\pi}{180}$ $\theta = 11,64 \text{ rad}$	✓ Formula / Formule ✓ Substitution / Vervanging ✓ Answer / Antwoord	(3)
8.3	$\frac{3\pi}{7} + 1,3\pi - 23,5^\circ = \left(\frac{3\pi}{7} \times \frac{180^\circ}{\pi} \right) + \left(1,3\pi \times \frac{180^\circ}{\pi} \right) - 23,5^\circ$ $= 77,14^\circ + 234^\circ - 23,5^\circ$ $= 287,64^\circ$	✓ $\frac{3\pi}{7} \times \frac{180^\circ}{\pi}$ ✓ $1,3\pi \times \frac{180^\circ}{\pi}$ ✓ Answer / Antwoord	(3)
			[12]
		TOTAL/TOTAAL:	100