



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE  
*NASIONALE  
SENIOR SERTIFIKAAT***

**GRADE/GRAAD 12**

**SEPTEMBER 2020**

**MATHEMATICS P2/WISKUNDE V2  
MARKING GUIDELINE/NASIENRIGLYN**

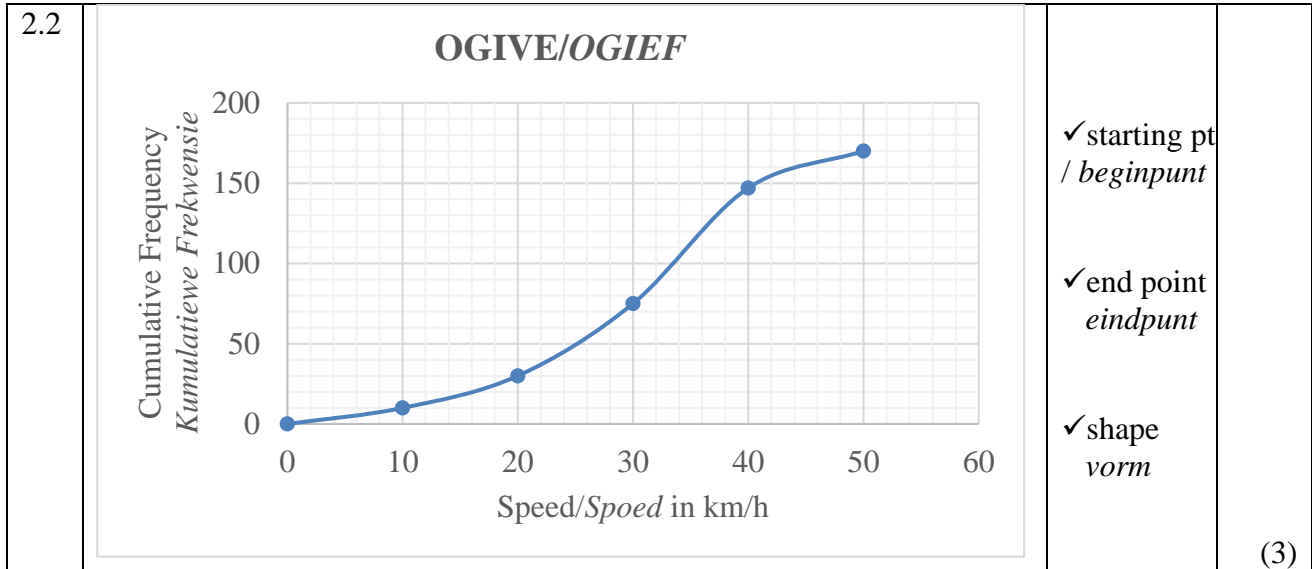
**MARKS/PUNTE: 150**

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This marking guideline consists of 13 pages.  
*Hierdie nasienriglyn bestaan uit 13 bladsye.*

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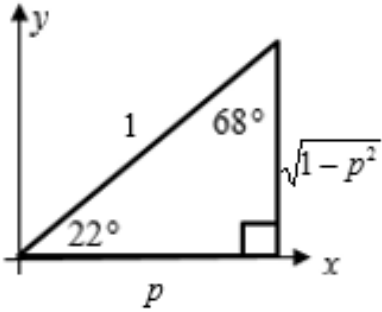
QUESTION 1/VRAAG 1																						
1.1	$a = -4,1536$ $b = 0,958$ $y = -4,1536 + 0,958x$	$\checkmark a = -4,1536$ $\checkmark b = 0,958$ $\checkmark y = -4,1536 + 0,958x$	(3)																			
	Answer Only: Full Marks																					
1.2	$r = 0,98$	$\checkmark r = 0,98$	(1)																			
1.3	Very strong positive correlation/ <i>Baie sterk positiewe korrelasie</i>	$\checkmark$ answer / <i>antwoord</i>	(1)																			
1.4	$y = -4,1536 + 0,958(51)$ $y = 45\%$	$\checkmark$ substitution / <i>vervanging</i> $\checkmark$ answer / <i>antwoord</i>	(2)																			
	Answer Only: Full Marks																					
1.5	$\bar{x} = 60,8$ Standard deviation / <i>Standaardafwyking</i> = 17, 51 $(60,8 - 17,51 ; 60,8 + 17,51)$ $(43,29 ; 78,31)$ 6 learners / <i>leerders</i>	$\checkmark$ Standard deviation/ <i>Standaardafwyking</i> = 17, 51  $\checkmark (43,29 ; 78,31)$ $\checkmark$ 6 learners / <i>leerders</i>	(3)																			
			<b>[10]</b>																			
QUESTION 2/VRAAG 2																						
2.1	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Speed/Speed ( km/h)</th> <th style="text-align: center;">Frequency <i>Frekwensie</i> (f)</th> <th style="text-align: center;">Cumulative Frequency <i>Kumulatiewe Frekwensie</i></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>0 &lt; x \leq 10</math></td> <td style="text-align: center;">10</td> <td style="text-align: center;">10</td> </tr> <tr> <td style="text-align: center;"><math>10 &lt; x \leq 20</math></td> <td style="text-align: center;"><b>20</b></td> <td style="text-align: center;">30</td> </tr> <tr> <td style="text-align: center;"><math>20 &lt; x \leq 30</math></td> <td style="text-align: center;">45</td> <td style="text-align: center;"><b>75</b></td> </tr> <tr> <td style="text-align: center;"><math>30 &lt; x \leq 40</math></td> <td style="text-align: center;">72</td> <td style="text-align: center;"><b>147</b></td> </tr> <tr> <td style="text-align: center;"><math>40 &lt; x \leq 50</math></td> <td style="text-align: center;"><b>23</b></td> <td style="text-align: center;">170</td> </tr> </tbody> </table>		Speed/Speed ( km/h)	Frequency <i>Frekwensie</i> (f)	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>	$0 < x \leq 10$	10	10	$10 < x \leq 20$	<b>20</b>	30	$20 < x \leq 30$	45	<b>75</b>	$30 < x \leq 40$	72	<b>147</b>	$40 < x \leq 50$	<b>23</b>	170	$\checkmark$ freq column / <i>frek. kolom</i>  $\checkmark$ cum freq column <i>kum frek kolom</i>	(2)
Speed/Speed ( km/h)	Frequency <i>Frekwensie</i> (f)	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>																				
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$30 < x \leq 40$	72	<b>147</b>																				
$40 < x \leq 50$	<b>23</b>	170																				



2.3	$Q_1 = 23$ (accept / <i>aanvaar</i> 22 – 24) Median / <i>Mediaan</i> = 31 (accept / <i>aanvaar</i> 30 – 32)	✓ $Q_1$ ✓ Median <i>Mediaan</i>	(2)
2.4		✓ for / <i>vir</i> $Q_3 = 37$ (accept / <i>aanvaar</i> 36 – 38) ✓ correct shape / <i>korrekte vorm</i>	(2)
2.5	$170 - 110 = 60$ cyclists / <i>fietsryers</i> (accept / <i>aanvaar</i> 59 – 61)	✓ answer / <i>antwoord</i>	(1)
			<b>[10]</b>
<b>QUESTION 3 / VRAAG 3</b>			
3.1	$m_{QR} = \frac{-2 - (-4)}{0 - 6} = -\frac{1}{3}$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i>	(2)
3.2	$m_{PQ} = 3$ $m_{PQ} \times m_{QR} = 3 \times \frac{-1}{3} = -1$ $\therefore \hat{PQR} = 90^\circ$	✓ $m_{PQ} = 3$ ✓ $m_{PQ} \times m_{QR} = 3 \times \frac{-1}{3} = -1$	(2)
3.3	Sub/Verv: $y = -x + 2$ into/in $3x - y - 2 = 0$ $\therefore 3x - (-x + 2) - 2 = 0$ $3x + x - 2 - 2 = 0$ $4x = 4$ $x = 1$ $y = 1$ $\therefore P(1;1)$	✓ substitution / <i>vervanging</i> ✓ $x$ - coordinate / $x$ - <i>koördinaat</i> ✓ $y$ - coordinate / $y$ - <i>koördinaat</i>	(3)
3.4	$QR = \sqrt{(0 - 6)^2 + (-2 - (-4))^2}$ $QR = 2\sqrt{10}$ <b>OR/OF</b> $\sqrt{40}$ <b>OR/OF</b> 6, 32 <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;">Answer Only: Full Marks</div>	✓ substitution in correct $f$ <i>vervanging in korrekte <math>f</math></i> ✓ answer / <i>antwoord</i>	(2)

<p>3.5</p>	<p>PR is the diameter (angle subtended by diameter = <math>90^\circ</math>) / <i>PR is die middellyn (hoek onderspan deur middellyn = <math>90^\circ</math>)</i></p> <p>Midpoint of / <i>Middelpunt van</i> PR <math>\left(\frac{7}{2}; -\frac{3}{2}\right)</math></p> <p><math>PR = \sqrt{(1-6)^2 + (1+4)^2}</math></p> <p><math>PR = \sqrt{50}</math></p> <p><math>r = \frac{\sqrt{50}}{2}</math></p> <p><math>\left(x - \frac{7}{2}\right)^2 + \left(x + \frac{3}{2}\right)^2 = \left(\frac{\sqrt{50}}{2}\right)^2</math></p> <p style="text-align: center;"><b>OR/OF</b></p> <p><math>(x - 3,5)^2 + (x + 1,5)^2 = \left(\frac{\sqrt{50}}{2}\right)^2</math></p>	<p>✓ for the statement PR is the diameter / <i>vir stelling PR is die middellyn</i></p> <p>✓✓ Midpoint of PR <i>Middelpunt van PR</i></p> <p>✓ for the radius / <i>vir die radius</i></p> <p>✓ equation / <i>vergelyking</i></p>	<p>(5)</p>
<p>3.6</p>	<p><math>\tan \hat{P}NX = -1</math>  <math>\therefore \hat{P}NX = 135^\circ</math>  <math>\tan \hat{P}MX = 3</math>  <math>\therefore \hat{P}MX = 71,57^\circ</math>  <math>\theta = 135^\circ - 71,57^\circ = 63,43^\circ</math></p>	<p>✓ <math>\tan \hat{P}NX = -1</math>          ✓ <math>\therefore \hat{P}NX = 135^\circ</math>          ✓ <math>\tan \hat{P}MX = 3</math>          ✓ <math>\therefore \hat{P}MX = 71,57^\circ</math>          ✓ answer / <i>antwoord</i></p>	<p>(5)</p>
<p>3.7</p>	<p><math>A = \frac{1}{2} \times PQ \times QR</math></p> <p><math>A_{\Delta PQR} = \frac{1}{2} \times \sqrt{10} \times \sqrt{40}</math></p> <p><math>A_{\Delta PQR} = 10</math> square units / <i>vierkante eenhede</i></p> <p style="text-align: center;"><b>OR/OF</b></p> <p><math>A_{\Delta PQR} = \frac{1}{2} \times PQ \times PR \times \sin 63,43^\circ</math></p> <p><math>A_{\Delta PQR} = \frac{1}{2} \times \sqrt{10} \times \sqrt{50} \times \sin 63,43^\circ</math></p> <p><math>A_{\Delta PQR} = 10</math> square units / <i>vierkante eenhede</i></p>	<p>✓ formula / <i>formule</i></p> <p>✓ <math>\sqrt{10}</math></p> <p>✓ answer / <i>antwoord</i></p>	<p>(3)</p>
			<p>[22]</p>

QUESTION 4 / VRAAG 4		
4.1	$x^2 - 6x + y^2 - 4y + 9 = 0$ $x^2 - 6x + 9 + y^2 - 4y + 4 = -9 + 9 + 4$ $(x - 3)^2 + (y - 2)^2 = 4$ <i>C(3;2) and / en <math>r = 2</math></i>	✓ completing square <i>voltooiing van vierkant</i> ✓ standard form / <i>standaardvorm</i> ✓ 3 ✓ 2
4.2	$m_{\text{tan}} = -2$ $m_{\text{BV}} = \frac{1}{2}$ $y - 2 = \frac{1}{2}(x - 3)$ $y = \frac{1}{2}x + \frac{1}{2}$	✓ $m_{\text{BV}} = \frac{1}{2}$ ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i>
4.3	$y = 4$	✓ answer / <i>antwoord</i>
4.4	TA = 4 units / <i>eenhede</i> TB = TA (tangents from the same point) <i>(raaklyne vanaf dieselfde punt)</i> TB = 4 units / <i>eenhede</i>	✓ length of TA / <i>lengte van TA</i> ✓ S ✓ R ✓ answer / <i>antwoord</i>
4.5	T(-1;4) $y = -2x + k$ $4 = -2(-1) + k$ $k = 2$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i>
4.6	$\tan \hat{S}TA = -2$ $\hat{S}TA = 116,57^\circ$ $\therefore \hat{A}CB = 116,57^\circ$ (ext. angle of a c.q.) <i>(buitehoek van koordevierhoek)</i> <p style="text-align: center;"><b>OR/OF</b></p> Draw/ <i>Trek</i> : CE    OX ; then/ <i>dan</i> $\tan \hat{V}CE = \frac{1}{2}$ $\therefore \hat{V}CE = 26,57^\circ$ $\therefore \hat{A}CB = 180^\circ - (90^\circ - 26,57^\circ) = 116,57^\circ$ <i>(∠s on straight line / ∠e op reguitlyn)</i>	✓ $\tan \hat{S}TA = -2$ ✓ $\hat{S}TA = 116,57^\circ$ ✓ answer / <i>antwoord</i> ✓ reason / <i>rede</i> <p style="text-align: center;"><b>OR/OF</b></p> ✓ $\tan \hat{V}CE = \frac{1}{2}$ ✓ $\therefore \hat{V}CE = 26,57^\circ$ ✓ answer / <i>antwoord</i> ✓ reason / <i>rede</i>
		<b>[18]</b>

QUESTION 5/VRAAG 5			
5.1.1	$\begin{aligned} \cos 158^\circ &= -\cos 22^\circ \\ &= -p \end{aligned}$ 	$\begin{aligned} &\checkmark -\cos 22^\circ \\ &\checkmark -p \end{aligned}$	(2)
5.1.2	$\begin{aligned} \sin 112^\circ &= \sin(90^\circ + 22^\circ) \\ &= \cos 22^\circ \\ &= p \end{aligned}$	$\begin{aligned} &\checkmark \cos 22^\circ \\ &\checkmark p \end{aligned}$	(2)
5.1.3	$\begin{aligned} \sin 38^\circ &= \sin(60^\circ - 22^\circ) \\ &= \sin 60^\circ \cos 22^\circ - \cos 60^\circ \sin 22^\circ \\ &= \frac{\sqrt{3}}{2} p - \frac{1}{2} \sqrt{1-p^2} \end{aligned}$	$\begin{aligned} &\checkmark \sin(60^\circ - 22^\circ) \\ &\checkmark \text{expansion / uitbreiding} \\ &\checkmark \frac{\sqrt{3}}{2} p \quad \checkmark \frac{1}{2} \sqrt{1-p^2} \end{aligned}$	(4)
5.2	$\begin{aligned} \sin P &= \sin 2P \\ \sin P - \sin 2P &= 0 \\ \sin P - 2\sin P \cos P &= 0 \\ \sin P(1 - 2\cos P) &= 0 \\ \sin P &= 0 \text{ or/of } \cos P = \frac{1}{2} \\ P &\in [0^\circ; 60^\circ; 180^\circ; 300^\circ; 360^\circ] \end{aligned}$ <p style="text-align: center;"><b>OR/OF</b></p> $\begin{aligned} P &= 2P + 360^\circ k \text{ or/of } P = 180^\circ - 2P + 360^\circ k, \\ P &\in \mathbb{Z} \\ P &= -360^\circ k \text{ or/of } 3P = 180^\circ + 360^\circ k \\ &\quad P = 60^\circ + 120^\circ k \\ P &\in [0^\circ; 60^\circ; 180^\circ; 300^\circ; 360^\circ] \end{aligned}$	$\begin{aligned} &\checkmark \text{standard form /} \\ &\quad \text{standaardvorm} \\ &\checkmark \text{expansion / uitbreiding} \\ &\checkmark \text{factorisation /} \\ &\quad \text{faktorisering} \\ &\checkmark \text{all correct values of } P \\ &\quad \text{alle korrekte waardes van } P \\ &\checkmark P = 2P + 360^\circ k \\ &\checkmark P = 180^\circ - 2P + 360^\circ k \\ &\checkmark P = 60^\circ + 120^\circ k \\ &\checkmark \text{all correct values of } P \\ &\quad \text{alle korrekte waardes van } P \end{aligned}$	(4)
5.3	$\begin{aligned} A + B + C &= 180^\circ \\ A + B &= 180^\circ - C \\ \cos(A + B) &= \cos(180^\circ - C) \\ \cos(A + B) &= -\cos C \end{aligned}$	$\begin{aligned} &\checkmark A + B = 180^\circ - C \\ &\checkmark \cos(A + B) = \cos(180^\circ - C) \end{aligned}$	(2)

5.4	$\frac{\cos^2 x - \cos x - \sin^2 x}{2 \sin x \cos x + \sin x} = \frac{1}{\tan x} - \frac{1}{\sin x}$ $\text{LHS} / \text{LK} = \frac{\cos^2 x - \cos x - \sin^2 x}{2 \sin x \cos x + \sin x}$ $= \frac{\cos^2 x - \cos x - (1 - \cos^2 x)}{\sin x(2 \cos x + 1)}$ $= \frac{2 \cos^2 x - \cos x - 1}{\sin x(2 \cos x + 1)}$ $= \frac{(2 \cos x + 1)(\cos x - 1)}{\sin x(2 \cos x + 1)}$ $= \frac{\cos x}{\sin x} - \frac{1}{\sin x} = \frac{1}{\tan x} - \frac{1}{\sin x} = \text{RHS} / \text{RK}$	$\checkmark 1 - \cos^2 x$ $\checkmark \sin x(2 \cos x + 1)$  $\checkmark 2 \cos^2 x - \cos x - 1$  $\checkmark (2 \cos x + 1)(\cos x - 1)$  $\checkmark \frac{\cos x}{\sin x} - \frac{1}{\sin x}$	(5)
5.5	$4 + 7 \cos \theta + \cos 2\theta = 0$ $4 + 7 \cos \theta + 2 \cos^2 \theta - 1 = 0$ $2 \cos^2 \theta + 7 \cos \theta + 3 = 0$ $(2 \cos \theta + 1)(\cos \theta + 3) = 0$ $\cos \theta = -\frac{1}{2} \quad \text{or/of} \quad \cos \theta = -3 \text{ (N/A)}$ $\theta = 120^\circ + 360^\circ.k \quad \text{or/of} \quad \theta = 240^\circ + 360^\circ.k, x \in \mathbb{Z}$	$\checkmark 2 \cos^2 - 1$ $\checkmark \text{standard form /}$ $\quad \text{standaardvorm}$ $\checkmark \text{factors / faktore}$  $\checkmark \cos \theta = -\frac{1}{2} \text{ or/of } \cos \theta = -3$ $\checkmark \theta = 120^\circ + 360^\circ.k$ $\checkmark \theta = 240^\circ + 360^\circ.k$	(6)
			<b>[25]</b>



QUESTION 6 / VRAAG 6			
6.1	$b = \frac{1}{2}$	✓ answer / antwoord	(1)
6.2	A(30°;1)	✓ 30° ✓ 1	(2)
6.3	$g(90^\circ) = \cos(90^\circ - 30^\circ)$ $= \cos 60^\circ$ $= \frac{1}{2}$ $Q\left(90^\circ; \frac{1}{2}\right)$	✓ 90° ✓ $\frac{1}{2}$	(2)
6.4	$x = 160^\circ$	✓ $x = 160^\circ$	(1)
6.5	$-1 \leq y \leq 3 \quad y \in R$ <b>OR/OF</b> $y \in [-1;3]$	✓ ✓ answer / antwoord	(2)
			<b>[8]</b>
QUESTION 7 / VRAAG 7			
7.1	$\hat{LNM} = 180^\circ - 2p$ (angles opp. = sides) (hoeke teenoor gelyke sye)	✓ answer / antwoord ✓ reason / rede	(2)
7.2	$\frac{LM}{\sin(180^\circ - 2p)} = \frac{d}{\sin p}$ $\frac{LM}{\sin 2p} = \frac{d}{\sin p}$ $LM = \frac{d \sin 2p}{\sin p}$	✓ for applying the sine rule gebruik van sinusreël  ✓ $\sin 2P$	(2)
7.3	$\tan q = \frac{h}{LM}$ $h = LM \tan q$ $h = \frac{d \sin 2p}{\sin p} \cdot \tan q$ $h = \frac{2d \sin p \cos p \tan q}{\sin p}$ $h = 2d \cos p \tan q$	✓ $\tan q = \frac{h}{LM}$  ✓ $h = \frac{d \sin 2p}{\sin p} \cdot \tan q$  ✓ $h = \frac{2d \sin p \cos p \tan q}{\sin p}$	(3)
			<b>[7]</b>

QUESTION 8 / VRAAG 8			
8.1	bisects the chord / <i>halveer die koord</i>	✓ answer/antwoord	(1)
8.2	$EB = 8 - y$ In $\triangle AEB$ : $10^2 = x^2 + (8 - y)^2 \dots\dots\dots(1)$ Eqn of the circle / <i>Verg. van die sirkel</i> : $x^2 + y^2 = 64$ $x^2 = 64 - y^2 \dots\dots\dots(2)$ Subst./Verv. (2) into/in (1) $100 = 64 - y^2 + 64 - 16y + y^2$ $100 = 128 - 16y$ $16y = 28$ $y = \frac{7}{4}$ $\therefore OE = \frac{7}{4}$	✓ for/vir EB ✓ Pythagoras in $\triangle AEB$  ✓ equation of the circle <i>vergelyking van sirkel</i>  ✓ substitution <i>vervanging</i>  ✓ answer / antwoord	(5)
8.3	<b>Double</b> the size of <b>the angle</b> subtended by the same arc. <b>Dubbel</b> die grootte van <b>die hoek</b> wat deur dieselfde boog onderspan word.	✓ answer / antwoord	(1)
8.4.1	$\hat{O}_2 = 2\hat{B}_2$ ( $\angle$ at centre = $2 \times \angle$ at the circumf) ( <i>Middelpunts <math>\angle = 2 \times</math> Omtrekshoek</i> )	✓ statement / <i>stelling</i> ✓ reason / <i>rede</i>	(2)
8.4.2	$\hat{C}_3 = \hat{D}_1 + \hat{D}_2$ ( $\angle$ s opp = sides) / ( <i><math>\angle</math>e teenoor = sye</i> )	✓ statement / <i>stelling</i> ✓ reason / <i>rede</i>	(2)
8.4.3	$\hat{B}_1 + \hat{B}_2 = 180^\circ - (\hat{D}_1 + \hat{D}_2)$ (opp. $\angle$ s of a cyclic quad) ( <i>teenoorst. <math>\angle</math>e van 'n koordevierhoek</i> )	✓ statement / <i>stelling</i> ✓ reason / <i>rede</i>	(2)
8.4.4	$\hat{D}_1 = \hat{C}_1$ ( $\angle$ s in the same segment) ( <i><math>\angle</math>e in dieselfde segment</i> )	✓ statement / <i>stelling</i> ✓ reason / <i>rede</i>	(2)
			<b>[15]</b>

QUESTION 9 / VRAAG 9		
9.1	$\hat{P}\hat{C}Q = 80^\circ$ ( $\angle$ s opp = sides)/( $\angle$ e teenoor = sye) $\hat{P}\hat{C}B = 100^\circ$ ( $\angle$ s on a straight line) ( $\angle$ e op 'n reguitlyn) $\therefore$ BC is not a diameter (angle between the tangent and BC is not equal to $90^\circ$ ) <i>BC is nie 'n middellyn nie. (hoek tussen die raaklyn en BC is nie gelyk aan <math>90^\circ</math> nie)</i>	✓ statement / <i>stelling</i> ✓ reason / <i>rede</i> ✓ statement / <i>stelling</i> ✓ reason / <i>rede</i> ✓ conclusion / <i>gevolgtrekking</i>
		(5)
9.2	$\hat{P}_1 = \hat{B}$ (alt $\angle$ s, PQ $\parallel$ AB) / ( <i>verw.</i> $\angle$ e, PQ $\parallel$ AB) $\hat{B} = \hat{C}_3$ ( $\angle$ s opp = sides; radii) ( $\angle$ e teenoor = sye: radiusse) $\hat{C}_3 = \hat{C}_1$ (vert. opp. angles) / ( <i>regoorst. hoek</i> ) $\therefore \hat{P}_1 = \hat{C}_1$ $\therefore$ PQ = QC (sides opp = angles) ( <i>sye teenoor = hoek</i> )	✓ statement / <i>stelling</i> ✓ reason / <i>rede</i> ✓ statement / <i>stelling</i> ✓ reason / <i>rede</i>  ✓ statement / <i>stelling</i> ✓ statement and reason <i>stelling en rede</i>
		(6)
9.3	$\hat{A} = \hat{E}_2$ (ext. $\angle$ of a cq) / ( <i>buite <math>\angle</math> van koordev.</i> ) $\hat{D} = 180^\circ - \hat{E}_2$ (co-interior $\angle$ s; BE $\parallel$ CD) ( <i>ko-binne <math>\angle</math> e : BE <math>\parallel</math> CD</i> ) $\hat{D} + \hat{A} = 180^\circ$ $\therefore$ ACDF is a cq (opp $\angle$ s supplementary) / <i>is 'n koordev (teenoorst. <math>\angle</math> e is suppl.)</i>  <p style="text-align: center;"><b>OR/OF</b></p> $\hat{D} = \hat{E}_1$ (corres. $\angle$ s; BE $\parallel$ CD) ( <i>ooreenk. <math>\angle</math> e : BE <math>\parallel</math> CD</i> ) $\hat{E}_2 = 180^\circ - \hat{E}_1$ ( $\angle$ s on a straight line) ( $\angle$ e op 'n reguitlyn) $\hat{A} = 180^\circ - \hat{E}_1$ (opp $\angle$ s of a cq) ( <i>teenoorst. <math>\angle</math> e is suppl.</i> ) $\hat{D} + \hat{A} = 180^\circ$ $\therefore$ ACDF is a cyclic quad./ <i>is 'n koordevierhoek</i> (opp $\angle$ s of a quad. supplementary) ( <i>teenoorst. <math>\angle</math> e van koordev. is supplementêr</i> )	✓ statement / <i>stelling</i> ✓ reason / <i>rede</i> ✓ statement and reason <i>stelling en rede</i>  ✓ statement and reason <i>stelling en rede</i> ✓ reason / <i>rede</i>  ✓ statement / <i>stelling</i>  ✓ reason / <i>rede</i>  ✓ statement and reason <i>stelling en rede</i> ✓ statement and reason <i>stelling en rede</i>  ✓ reason / <i>rede</i>
		(5)
		<b>[16]</b>

QUESTION 10 / VRAAG 10		
10.1	<div style="text-align: center;"> </div> <p>RTP/TE BEWYS: <math>\frac{MS}{SO} = \frac{MT}{TN}</math></p> <p>Construction: Join SN, and OT, and construct perpendicular heights /  <i>Konstruksie: Verbind SN en OT, trek loodregte hoogtes</i></p> <p>Proof / Bewys:</p> $\frac{\text{area } \Delta MST}{\text{area } \Delta OST} = \frac{\frac{1}{2} \times MS \times h}{\frac{1}{2} \times SO \times h} = \frac{MS}{SO}$ $\frac{\text{area } \Delta MST}{\text{area } \Delta TNS} = \frac{\frac{1}{2} \times MT \times k}{\frac{1}{2} \times TN \times k} = \frac{MT}{TN}$ <p>But / Maar <math>\Delta MST</math> is common / gemeen</p> <p>And / En              area of <math>\Delta OST</math> = area of <math>\Delta TNS</math> (same base, same height)  <i>area van <math>\Delta OST</math> = area van <math>\Delta TNS</math> (dies. basis en dies. hoogte)</i></p> $\therefore \frac{MS}{SO} = \frac{MT}{TN}$	<p><i>area / oppervlakte</i></p>           <p>✓ area of the two triangles <i>area van twee driehoeke</i></p> <p>✓ <math>\frac{MS}{SO}</math></p> <p>✓ area of the two triangles <i>area van twee driehoeke</i></p> <p>✓ <math>\frac{MT}{TN}</math></p> <p>✓ statement and reason <i>stelling en rede</i></p>
		(5)

<p>10.2.1</p>	<p>In <math>\triangle APS</math> and/en <math>\triangle BRS</math>  <math>\hat{P}_4 = \hat{R}_1</math> (tan – chord theorem)  <i>(raaklyn-koord Stelling)</i>  <math>\hat{A} = \hat{B}_2 = 90^\circ</math> (given) / (gegee)  <math>\triangle APS \parallel \triangle BRS</math> (AAA) / (<math>\angle\angle\angle</math>)</p>	<p>✓ statement and reason  <i>stelling en rede</i>                  ✓ statement / <i>stelling</i>                  ✓ 3<sup>rd</sup> <math>\angle</math> / 3<sup>de</sup> <math>\angle</math>  <b>OR/OF</b>                  reason for similarity  <i>rede vir gelykvormigheid</i></p>	<p>(3)</p>
<p>10.2.2</p>	<p><math>\frac{AP}{BR} = \frac{PS}{RS} = \frac{AS}{BS}</math> (similar triangles)  <i>(gelykvormige driehoeke)</i>  <math>\therefore AP \cdot RS = BR \cdot PS</math></p>	<p>✓ for the statement  <i>vir die stelling</i></p>	<p>(1)</p>
<p>10.2.3</p>	<p><math>\hat{P}_2 = 90^\circ</math> (<math>\angle</math> s in a semi – circle)  <i>(<math>\angle</math> e in 'n semi-sirkel)</i>                  Let/Laat: <math>\hat{P}_4 = x</math>  <math>\therefore \hat{S}_1 = 90 - x</math> (<math>\angle</math> s of APS) / (<i><math>\angle</math> e van APS</i>)  <math>\therefore \hat{Q} = 90 - x</math> (ext <math>\angle</math> of a cq) / (<i>buite <math>\angle</math> van kv</i>)  <math>\therefore \hat{R}_2 = x</math> (<math>\angle</math> s of QPR) / (<i><math>\angle</math> e van QPR</i>)  <math>\therefore \hat{P}_4 = \hat{R}_2</math></p>	<p>✓ <math>\hat{P}_2 = 90^\circ</math>                  (<math>\angle</math> in a semi – circle) /                  (<i><math>\angle</math> e in 'n semi-sirkel</i>)                    ✓ <math>\hat{S}_1 = 90 - x</math>                  ✓ <math>\hat{Q} = 90 - x</math>                  ✓ <math>\hat{R}_2 = x</math></p>	<p>(4)</p>
<p>10.2.4</p>	<p>In <math>\triangle ASP</math> and/en <math>\triangle PQR</math>  <math>\hat{A} = \hat{P}_2</math> (proven / bewys)  <math>\hat{P}_4 = \hat{R}_2</math> (proven / bewys)  <math>\triangle ASP \parallel \triangle PQR</math> (AAA) / (<math>\angle\angle\angle</math>)    <math>\frac{AS}{PQ} = \frac{SP}{QR} = \frac{AP}{PR}</math> (similar triangles)  <i>(gelykvormige driehoeke)</i>    <math>\therefore AP \cdot QR = SP \cdot PR</math>  <math>\therefore \frac{AP}{PS} = \frac{PR}{RQ}</math>                  But / Maar: <math>\frac{AP}{PS} = \frac{BR}{RS}</math> (from / vanaf 10.2)  <math>\therefore \frac{PR}{RQ} = \frac{BR}{RS}</math>  <math>\therefore BR \cdot RQ = RS \cdot RP</math></p>	<p>✓ statement and reason  <i>stelling en rede</i>                  ✓ statement / <i>stelling</i>                  ✓ reason for similarity  <i>rede vir gelykvormigheid</i>                    ✓ <math>\frac{AP}{PS} = \frac{PR}{RQ}</math>                  ✓ <math>\frac{AP}{PS} = \frac{BR}{RS}</math>                  ✓ <math>\frac{PR}{RQ} = \frac{BR}{RS}</math></p>	<p>(6)</p>
			<p>[19]</p>
			<p><b>TOTAL/TOTAAL: 150</b></p>