



Province of the
EASTERN CAPE
EDUCATION

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

GRADE/*GRAAD* 11

NOVEMBER 2020

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

MARKS/*PUNTE*: 150

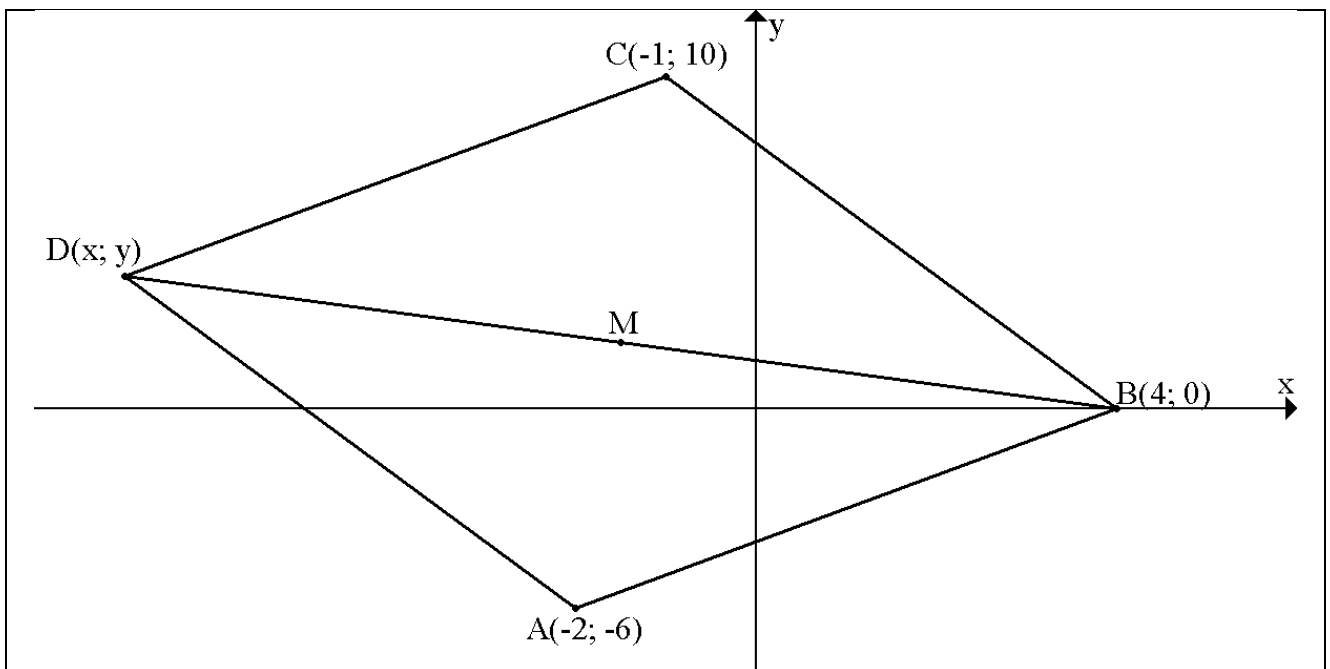
This marking guideline consists of 14 pages./
Hierdie nasienriglyn bestaan uit 14 bladsye.

QUESTION 1/VRAAG 1

1.1	$m_{PS} = \frac{0 - (-2)}{3 - 6} = -\frac{2}{3}$ <p style="text-align: center;">OR/OF</p> $3y + 2x = 6$ $3y = -2x + 6$ $y = -\frac{2}{3}x + 2$ $m_{PS} = -\frac{2}{3}$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> <p style="text-align: center;">OR/OF</p> ✓ $y = -\frac{2}{3}x + 2$ ✓ answer / <i>antwoord</i>	(2)
1.2	$m_{MR} = \frac{4 - 0}{10 - 3} = \frac{4}{7}$ $\tan \hat{RQX} = \frac{4}{7}$ $\hat{RQX} = 29,74^\circ$	✓ $\frac{4-0}{10-3}$ ✓ gradient / <i>gradiënt</i> ✓ $\tan \hat{RQX} = m_{RM}$ ✓ answer / <i>antwoord</i>	(4)
1.3	$\tan \hat{PQX} = -\frac{2}{3}$ $\hat{PQX} = 146,31^\circ$ $\theta = 146,31^\circ - 29,74^\circ$ $\theta = 116,57^\circ$	✓ $\tan \hat{PQX} = -\frac{2}{3}$ ✓ $\hat{PQX} = 146,31^\circ$ ✓ answer / <i>antwoord</i>	(3)
1.4	$m_{RN} = \frac{3}{2}$ $m_{RN} \times m_{PS} = \frac{3}{2} \times -\frac{2}{3} = -1$ $RN \perp PS$	✓ m_{RN} ✓ product / <i>produk</i> ✓ -1	(3)
1.5	$NR = \sqrt{(10 - 6)^2 + (4 + 2)^2}$ $NR = \sqrt{52}$ $QN = \sqrt{13}$ $\text{Area} = \frac{1}{2} \times QN \times NR$ $\text{Area} = \frac{1}{2} \times \sqrt{13} \times \sqrt{52}$ $\text{Area} = 13 \text{ units}^2 / \text{eenhede}^2$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> ✓ length QN / <i>lengte QN</i> ✓ choosing correct sides / <i>kies korrekte sye</i> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i>	(6)

1.6	$\frac{y-0}{x-3} = \frac{4}{7}$ $7y = -12$ $y = -\frac{12}{7}$ <p style="text-align: center;">OR/OF</p> $y = \frac{4}{7}x + c$ <p>Subst./vervang (3; 0)</p> $0 = \frac{4}{7}(3) + c$ $c = -\frac{12}{7}$ $y = -\frac{12}{7}$	$\checkmark x = 0$ \checkmark substitution / <i>vervanging</i> \checkmark equation / <i>vergelyking</i> \checkmark y-coordinate / <i>y-koördinaat</i> <p style="text-align: center;">OR/OF</p> \checkmark equation / <i>vergelyking</i> \checkmark substitution / <i>vervanging</i> \checkmark value of <i>c</i> / <i>waarde van c</i> \checkmark y-coordinate / <i>y-koördinaat</i>	(4)
			[22]

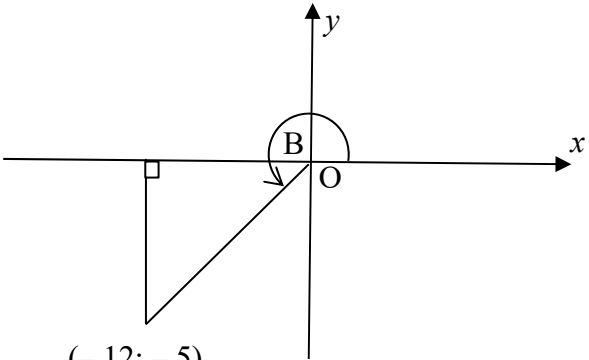
QUESTION 2/VRAAG 2



2.1	$BC = \sqrt{(-1-4)^2 + (10-0)^2}$ $BC = \sqrt{25+100}$ $BC = \sqrt{125} = 5\sqrt{5}$	✓ substitution / <i>vervang</i> ✓ answer / <i>antwoord</i>	(2)
2.2	$m_{AB} = \frac{-6-0}{-2-6}$ $m_{AB} = \frac{3}{4}$	✓ substitution / <i>vervang</i> ✓ answer / <i>antwoord</i>	(2)
2.3	$m_{CD} = m_{AB} = \frac{3}{4}$ $y = mx + c$ $y = \frac{3}{4}x + c$ Sub C(-1;10) $10 = \frac{3}{4}(-1) + c$ $c = \frac{43}{4}$ $y = \frac{3}{4}x + \frac{43}{4}$	✓ gradient / <i>gradiënt</i> ✓ substitution / <i>vervang</i> ✓ answer / <i>antwoord</i>	(3)

2.4	<p>M is the midpoint of both BD and AC / <i>is die middelpunt van beide BC en AC</i> Midpoint of AC and BD / <i>Middelpunt van AC en BD</i></p> $M\left(\frac{-1-2}{2}; \frac{10-6}{2}\right)$ $M\left(\frac{-3}{2}; 2\right)$	<p>✓ statement / <i>stelling</i></p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ answer / <i>antwoord</i></p>	(3)
2.5	$\frac{x+4}{2} = \frac{-3}{2}; \frac{y+0}{2} = 2$ $x+4 = -3; y+0 = 4$ $x = -7; y = 4$	<p>✓ substitution / <i>vervanging</i></p> <p>✓ <i>x-value/waarde</i> ✓ <i>y-value/waarde</i> Answer only: Full marks/ <i>Slegs antwoord: Volpunte</i></p>	(3)
			[13]

QUESTION 3 / VRAAG 3

3.1	 <p style="text-align: center;">(-12; -5)</p> <p>Therefore/d.w.s: $r = 13$</p> $\sin B + \cos B$ $= \frac{-5}{13} + \frac{-12}{13}$ $= \frac{-17}{13}$	<p>✓ diagram / <i>diagram</i></p> <p>✓ value of r / <i>waarde van r</i></p> <p>✓✓ substitution / <i>vervanging</i></p> <p>✓ answer / <i>antwoord</i></p>	(5)
3.2	$\sin 43^\circ = p$		
3.2.1	$\cos 133^\circ$ $\cos(90^\circ + 43^\circ)$ $= -\sin 43^\circ$ $= -p$	<p>✓ $-\sin 43^\circ$</p> <p>✓ answer / <i>antwoord</i></p>	(2)
3.2.2	$\tan(-43^\circ)$ $= -\tan 43^\circ$ $= -\frac{p}{\sqrt{1-p^2}}$	<p>✓ $-\tan 43^\circ$</p> <p>✓✓ answer / <i>antwoord</i></p>	(3)
3.3.1	$\frac{\sin(360^\circ - x)}{\sin(90^\circ - x)} \div \tan(x - 180^\circ)$ $= \frac{-\sin x}{\cos x} \div \tan x$ $= -\tan x \div \tan x$ $= -1$	<p>✓ $-\sin x$</p> <p>✓ $\cos x$</p> <p>✓ $\tan x$</p> <p>✓ $-\tan x$</p> <p>✓ answer / <i>antwoord</i></p>	(5)
3.3.2	$\frac{\sin 210^\circ \cdot \cos 150^\circ \cdot \tan 25^\circ}{\tan 205^\circ \cdot \cos 315^\circ \cdot \sin 135^\circ}$ $= \frac{-\sin 30^\circ \cdot -\cos 30^\circ \cdot \tan 25^\circ}{\tan 25^\circ \cdot \cos 45^\circ \cdot \sin 45^\circ}$ $= \frac{\frac{1}{2} \cdot \frac{\sqrt{3}}{2}}{\frac{1}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}}}$ $= \frac{\frac{\sqrt{3}}{4}}{\frac{1}{2}}$ $= \frac{\sqrt{3}}{2}$	<p>✓ $-\sin 30^\circ$</p> <p>✓ $-\cos 30^\circ$</p> <p>✓ $\tan 25^\circ$</p> <p>✓ $\cos 45^\circ$</p> <p>✓ $\sin 45^\circ$</p> <p>✓ special angles / <i>spesiale hoeke</i></p> <p>✓ answer / <i>antwoord</i></p>	(7)
			[22]

QUESTION 4 / VRAAG 4

4.1	$\frac{\sin \theta - \cos \theta \cdot \sin \theta}{\cos \theta - (1 - \sin^2 \theta)} = \tan \theta$ $\text{LHS} = \frac{\sin \theta(1 - \cos \theta)}{\cos \theta - \cos^2 \theta}$ $= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta(1 - \cos \theta)}$ $= \tan \theta$	<ul style="list-style-type: none"> ✓ factorising / faktoriserings ✓ $\cos^2 \theta$ ✓ common factor / gemene faktor ✓ answer / antwoord 	(4)
4.2	$2 \sin x \cos x - \cos^2 x = 0$ $\cos x(2 \sin x - \cos x) = 0$ $\cos x = 0 \text{ or/of } 2 \sin x = \cos x$ $\cos x = 0 \text{ or/of } \tan x = \frac{1}{2}$ $x = 90^\circ + 360^\circ \cdot k \text{ or/of } x = 270^\circ + 360^\circ \cdot k$ $\text{or/of } x = 26,57^\circ + 180^\circ \cdot k$	<ul style="list-style-type: none"> ✓ factors / faktore ✓ $\cos x = 0$ ✓ $\tan x = \frac{1}{2}$ ✓ $x = 90^\circ + 360^\circ \cdot k$ ✓ $x = 270^\circ + 360^\circ \cdot k$ ✓ $x = 26,57^\circ + 180^\circ \cdot k$ 	(6)
4.3	$2 \cdot \sqrt{\sin \alpha} = 1$ $\sqrt{\sin \alpha} = \frac{1}{2}$ $\sin \alpha = \frac{1}{4}$ $\alpha = 14,48^\circ \text{ or/of } \alpha = 165,52^\circ$	$\sin \alpha = \frac{1}{4}$ $\alpha = 14,48^\circ$ $\alpha = 165,52^\circ$	(3)
4.4	$\tan\left(\frac{x+y}{2}\right) = 1 \text{ and/en } \cos(x-y) = \frac{\sqrt{3}}{2}$ $\frac{x+y}{2} = 45^\circ \text{ and/en } x-y = 30^\circ$ $x+y = 90^\circ \dots\dots\dots(1)$ $x-y = 30^\circ \dots\dots\dots(2)$ $2x = 120^\circ$ $x = 60^\circ$ $y = 30^\circ$	<ul style="list-style-type: none"> ✓ $\frac{x+y}{2} = 45^\circ$ ✓ $x-y = 30^\circ$ ✓ setting up equations/ opstel van vergelykings ✓ x-value/waarde ✓ y-value/waarde 	(5)
			[18]

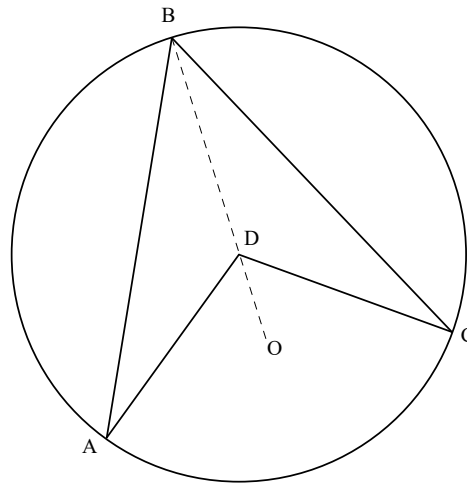
QUESTION 5 / VRAAG 5

5.1.1	$0 \leq y \leq 1$ or $[0;1]$	✓0 ✓1	(2)
5.1.2	Period = 720°	✓answer	(1)
5.2			
	<ul style="list-style-type: none"> ✓ shape / vorm ✓ x-intercept / x-afsnit ✓ y-intercept / y-afsnit ✓ turning points / draaipunte 		
			(4)
5.3	$-180^\circ \leq x \leq -150$ or/of $30^\circ \leq x \leq 180^\circ$	<ul style="list-style-type: none"> ✓✓ $-180^\circ \leq x \leq -150$ ✓ $30^\circ \leq x \leq 180^\circ$ 	(3)
			[10]

QUESTION 6 / VRAAG 6

6.1	$\sin 60^\circ = \frac{PQ}{PS}$ $\sin 60^\circ = \frac{8}{PS}$ $PS = \frac{8}{\sin 60^\circ}$ $PS = \frac{16\sqrt{3}}{3}$	$\checkmark \sin 60^\circ = \frac{8}{PS}$ $\checkmark PS = \frac{8}{\sin 60^\circ}$ $\checkmark PS = \frac{16\sqrt{3}}{3}$	(3)
6.2	<p>In ΔPQS: $\tan 60^\circ = \frac{PQ}{QS}$</p> $QS = \frac{8}{\tan 60^\circ} = \frac{8\sqrt{3}}{3} \text{ m}$ $QR = \frac{8\sqrt{3}}{3} \text{ m}$ <p>In ΔRQS: $RS^2 = QR^2 + QS^2 - 2 \cdot QR \cdot QS \cdot \cos 100^\circ$</p> $= \left(\frac{8\sqrt{3}}{3}\right)^2 + \left(\frac{8\sqrt{3}}{3}\right)^2 - 2 \cdot \left(\frac{8\sqrt{3}}{3}\right) \cdot \left(\frac{8\sqrt{3}}{3}\right) \cos 100^\circ$ $= 50,0756 \dots$ $RS = 7,08 \text{ m}$	$\checkmark QS = \frac{8}{\tan 60^\circ}$ $\checkmark QS = \frac{8\sqrt{3}}{3} \text{ m}$ $\checkmark QR = \frac{8\sqrt{3}}{3} \text{ m}$ $\checkmark \text{formula / formule}$ $\checkmark \text{substitution / vervanging}$ $\checkmark \text{simplification / vereenvoudiging}$ $\checkmark \text{answer / antwoord}$	(7)
			[10]

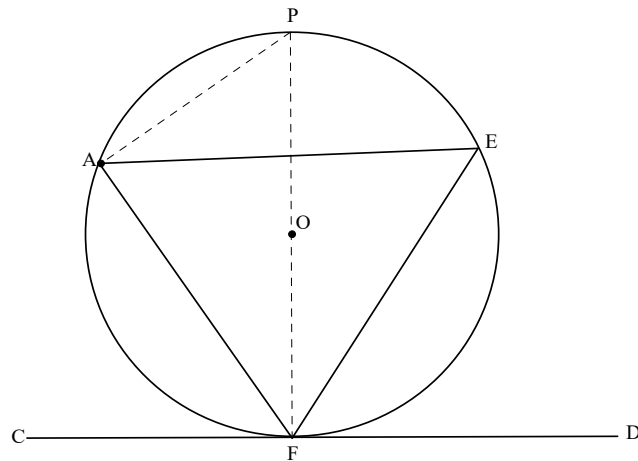
QUESTION 7 / VRAAG 7



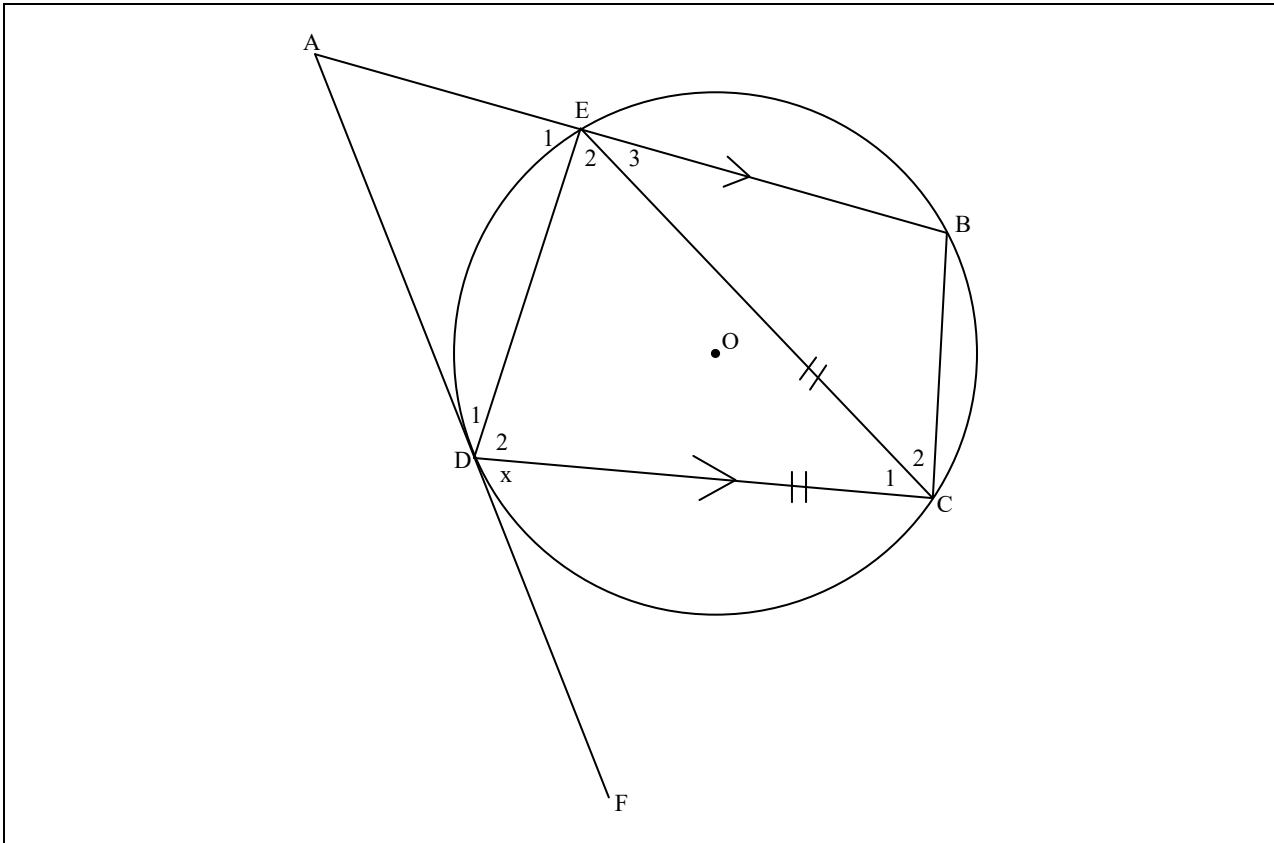
7.1	<p>Let/Laat $\hat{A} = x$</p> <p>$\hat{B}AD = x$ (angles opp = sides)/(hoeke teenoor = sye)</p> <p>$\hat{A}DO = 2x$ (angle at the centre)/(middelpuntshoek)</p> <p>Similarly, if you let / Net so, as jy: $\hat{C} = y$;</p> <p>then/dan: $\hat{C}DO = 2y$</p> <p>$\therefore \hat{A}DC = 2x + 2y = 2(x + y)$</p> <p>$= 2 \hat{A}BC$</p>	<p>✓S and/en R</p> <p>✓✓S and/en R</p> <p>✓S</p> <p>✓S and conclusion en gevolgtrekking</p>	(5)
7.2.1	<p>$\hat{B}_3 = 10^\circ$ (angles opp = sides; $DB = DF$) (hoeke teenoor = sye; $DB = DF$)</p> <p>$\hat{D}_2 = 20^\circ$ (exterior angle of a $\triangle BDF$) (buitehoek van $\triangle BDF$)</p>	<p>✓S ✓R</p> <p>✓S and/en R</p>	(3)
7.2.2	<p>$\hat{A}BD = 90^\circ$ (angles in a semi-circle) (hoek in halwe sirkel)</p> <p>$\hat{A} = 70^\circ$ (angles of a triangle) (hoeke van 'n driehoek)</p>	<p>✓S ✓R</p> <p>✓S ✓R</p>	(4)
7.2.3	<p>$\hat{O}_2 = 140^\circ$ (angle at the centre) / (middelpuntshoek)</p>	<p>✓S ✓R</p>	(2)
7.2.4	<p>$\hat{C}_1 = 110^\circ$ (opposite angles of a c.q.)/(teenoorst. hoeke van k.v)</p> <p>OR / OF</p> <p>$\hat{O}_1 + \hat{O}_4 + \hat{O}_3 = 220^\circ$ (angles around a point)/(omwenteling)</p> <p>$\hat{C}_1 = 110^\circ$ (angle at the centre)/(middelpuntshoek)</p>	<p>✓S ✓R</p> <p>OR / OF</p> <p>✓S and/en R</p> <p>✓S and/en R</p>	(2)

7.2.5	$\hat{E} = 70^\circ$ (angles in the same segment)/(<i>hoeke in dieselfde segment</i>) OR/OF $\hat{E} = 70^\circ$ (opposite angles of a c.q.)/(<i>teenoorst. hoeke van k.v</i>)	\checkmark S \checkmark R OR/OF \checkmark S \checkmark R	(2)
7.2.6	$\hat{C}_2 = 70^\circ$ (ext. \angle of a c.q.)/(<i>buitehoek van k.v</i>) OR/OF $\hat{C}_2 + 110^\circ = 180^\circ$ (\angle s on a straight line)/(<i>hoeke op 'n reguitlyn</i>) $\hat{C}_2 = 70^\circ$	\checkmark S \checkmark R OR/OF \checkmark S \checkmark R	(2)
7.2.7	$\hat{O}_4 = \hat{O}_2 = 140^\circ$ (vertically opp. \angle s)/(<i>regoorstaande \anglee</i>)	\checkmark S \checkmark R	(2)
			[22]

QUESTION 8 / VRAAG 8



8.1	<p>ENG</p> <p>Draw diameter FP and join PA</p> <p>Let $\hat{EFD} = x$</p> <p>$\hat{OFD} = 90^\circ$ (tan \perp radius)</p> <p>$\therefore \hat{OFE} = 90^\circ - x$</p> <p>$\therefore \hat{PAE} = 90^\circ - x$ (angles in the same segment)</p> <p>$\hat{PAF} = 90^\circ$ (angles in a semi circle)</p> <p>$\therefore \hat{EAF} = x$</p> <p>$\therefore \hat{EFD} = \hat{A} = x$</p>	<p>✓ construction</p> <p>✓ S and R</p> <p>✓ S and R</p> <p>✓ S and R</p> <p>✓ conclusion</p>	
8.1 AFR	<p>AFR</p> <p>Teken middellyn FP en verbind PA</p> <p>Laat $\hat{EFD} = x$</p> <p>$\hat{OFD} = 90^\circ$ (raaklyn \perp radius)</p> <p>$\therefore \hat{OFE} = 90^\circ - x$</p> <p>$\therefore \hat{PAE} = 90^\circ - x$ (hoeke in dieselfde segment)</p> <p>$\hat{PAF} = 90^\circ$ (hoeke in 'n halwe sirkel)</p> <p>$\therefore \hat{EAF} = x$</p> <p>$\therefore \hat{EFD} = \hat{A} = x$</p>	<p>✓ konstruksie</p> <p>✓ S en R</p> <p>✓ S en R</p> <p>✓ S en R</p> <p>✓ gevolgtrekking</p>	(5)



8.2.1	$\hat{A} = x$ (corresponding angles; AB DC)/(ooreenkomstige hoek; AB DC) $\hat{E}_2 = x$ (tan-chord) / (raaklyn-koord) $\hat{D}_2 = x$ (angles opposite = sides) / (hoek teenoor = sye) $\hat{E}_1 = x$ (alternate angles, AB DC)/(verwisselende hoek; AB DC) $\hat{C}_{1+2} = \hat{E}_1 = x$ (exterior angle of a c.q.)/(buitehoek van 'n k. v)	✓S ✓R ✓S ✓R ✓S ✓R ✓S ✓R ✓S ✓R	(10)
8.2.2	$\hat{B} = 180^\circ - x$ (opposite angles of a c.q.) (teenoorst. hoek van 'n k. v) $\hat{A} + \hat{B} = x + (180^\circ - x) = 180^\circ$ $\therefore AD \parallel BC$ (co-interior angles formed =) (ko-binne hoek gevorm = 180°) $\therefore ABCD$ is a parallelogram (opp. sides) ABCD is 'n parallelogram (teenoorst. sye)	✓S ✓R ✓R ✓R	(4)
			[19]

QUESTION 9 / VRAAG 9

9.1.1	perpendicular to the chord / loodreg op die koord	✓ answer/antwoord	(1)
9.1.2	interior opposite angle / teenoorstaande binnehoek	✓ answer/antwoord	(1)
9.2			
9.2.1	$\hat{E}_2 = \hat{E}_1 = 90^\circ$ (line from centre) (lyn vanaf die middelpunt) $\hat{FCH} = 90^\circ$ (angles in a semi-circle) (hoeke in 'n halwe sirkel) $\therefore \hat{FCH} = \hat{E}_2$ $\therefore FC \parallel OE$ (corresponding angles formed are =) (ooreenkomstige hoeke wat gevorm word is =)	✓S ✓R ✓S ✓R ✓R	(5)
9.2.2	$\hat{LFO} = 90^\circ$ (tan \perp radius) / (raaklyn \perp radius) $\hat{E}_2 = 90^\circ$ (proven) / (reeds bewys) $\therefore OFLE$ is a c.q. (converse exterior angle of a c.q.) (omgekeerde buitehoek van k.v stelling)	✓S and/en R ✓S and/en R ✓R	(3)
9.2.3	$\hat{H} = x$ (tan - chord) / (raaklyn - koord) $\hat{O}_1 = 2x$ (angle at the centre) (middelpuntshoek)	✓S ✓R ✓S ✓R	(4)
			[14]
TOTAL/TOTAAL:			150