Province of the
EASTERN CAPE
EDUCATION

NASIONALE
SENIOR SERTIFIKAAT

GRAAD 11

NOVEMBER 2020

WISKUNDE V2
EKSEMPLAAR

PUNTE: **150**

TYD: **3 uur**

Hierdie vraestel bestaan uit 10 bladsye en 'n antwoordeboek van 20 bladsye.

INSTRUKSIES EN INLIGTING

Lees die volgende instruksies aandagtig deur voordat die vrae beantwoord word.

1. Hierdie vraestel bestaan uit 9 vrae.

2. Beantwoord AL die vrae in die SPESIALE ANTWOORDEBOEK wat verskaf word.

3. Dui ALLE berekeninge, diagramme, grafieke, ensovoorts wat jy gebruik in die beantwoording van die vrae, duidelik aan.

4. Slegs antwoorde sal NIE noodwendig volpunte verdien NIE.

5. Jy mag ’n goedgekeurde wetenskaplike sakrekenaar gebruik, (nieprogrammeerbaar en niegrafies) tensy anders vermeld.

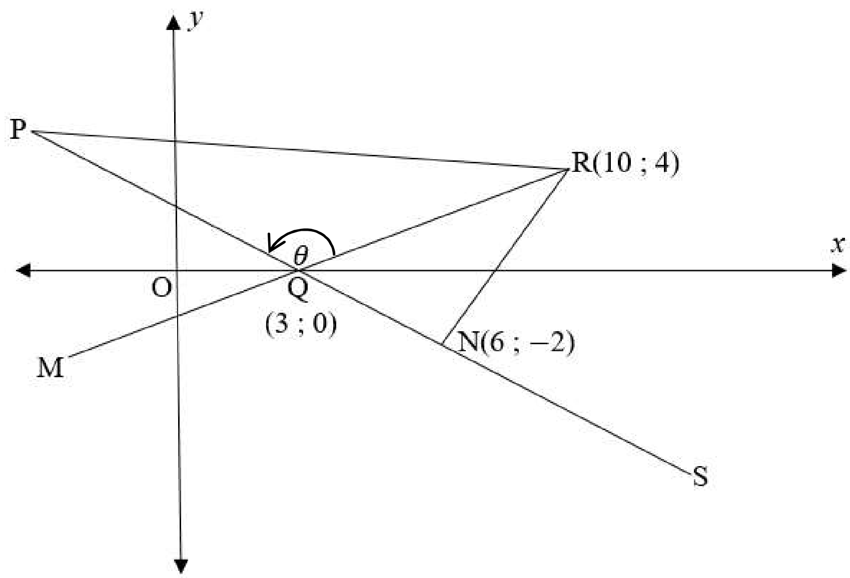
6. Indien nodig, rond antwoorde tot TWEE desimale plekke af, tensy anders vermeld.

7. Diagramme is NIE noodwendig volgens skaal geteken NIE.

8. Skryf netjies en leesbaar.

VRAAG 1

In die diagram hieronder, word reguitlyn PS deur $3y+2x=6$ gedefinieer, en sny die x-as by Q(3; 0). MQR is 'n reguitlyn wat PR by R(10; 4) ontmoet. N(6; -2) is 'n punt op PS en RN is getrek. $\hat{PQR} = \theta$.



1.1 Bepaal die gradiënt van PS. (2)

1.2 Bereken die inklinasiehoek van MR. (4)

1.3 Bepaal die waarde van θ. (3)

1.4 Bewys dat $RN \perp PS$. (3)

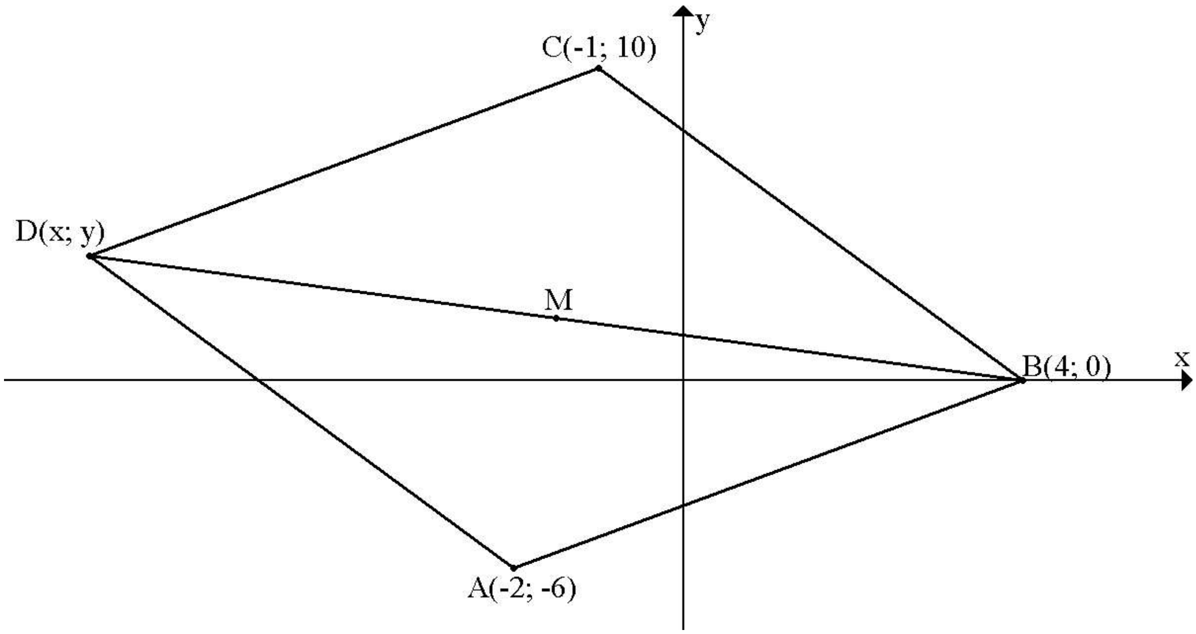
1.5 Bereken die oppervlakte van $\triangle RQN$. (6)

1.6 Bereken die y-afsnit van MR. (4)

[22]

VRAAG 2

ABCD is 'n parallelogram met A(-2; -6), B(4; 0), C(– 1; 0) en D(x ; y) soos hieronder aangetoon.



2.1	Bereken die lengte van BC.	(2)
2.2	Bepaal die gradiënt van AB.	(2)
2.3	Bepaal die vergelyking van CD.	(3)
2.4	Bepaal die koördinate van M, die middelpunt van BD.	(3)
2.5	Bepaal, vervolgens of andersins, die waardes van x en y.	(3)
		[13]

VRAAG 3

3.1 As $12\tan B - 5 = 0$ en $90° \leq B \leq 360°$, bepaal die waarde van $\sin B + \cos B$ met behulp van 'n skets. (5)

3.2 As $\sin 43° = p$, bepaal die waardes van die volgende in terme van p, sonder 'n sakrekenaar.

3.2.1 $\cos 133°$ (2)

3.2.2 $\tan(-43°)$ (3)

3.3 Vereenvoudig elk van die volgende volledig, SONDER om 'n sakrekenaar te gebruik:

3.3.1 $\dfrac{\sin(360° - x)}{\sin(90° - x)} \div \tan(x - 180°)$ (5)

3.3.2 $\dfrac{\sin 210°.\cos 150°.\tan 25°}{\tan 205°.\cos 315°.\sin 135°}$ (7)

[22]

VRAAG 4

4.1 Bewys dat:

$$\frac{\sin\theta - \cos\theta.\sin\theta}{\cos\theta - (1 - \sin^2\theta)} = \tan\theta$$ (4)

4.2 Bepaal die algemene oplossing van $2\sin x\cos x - \cos^2 x = 0$ (6)

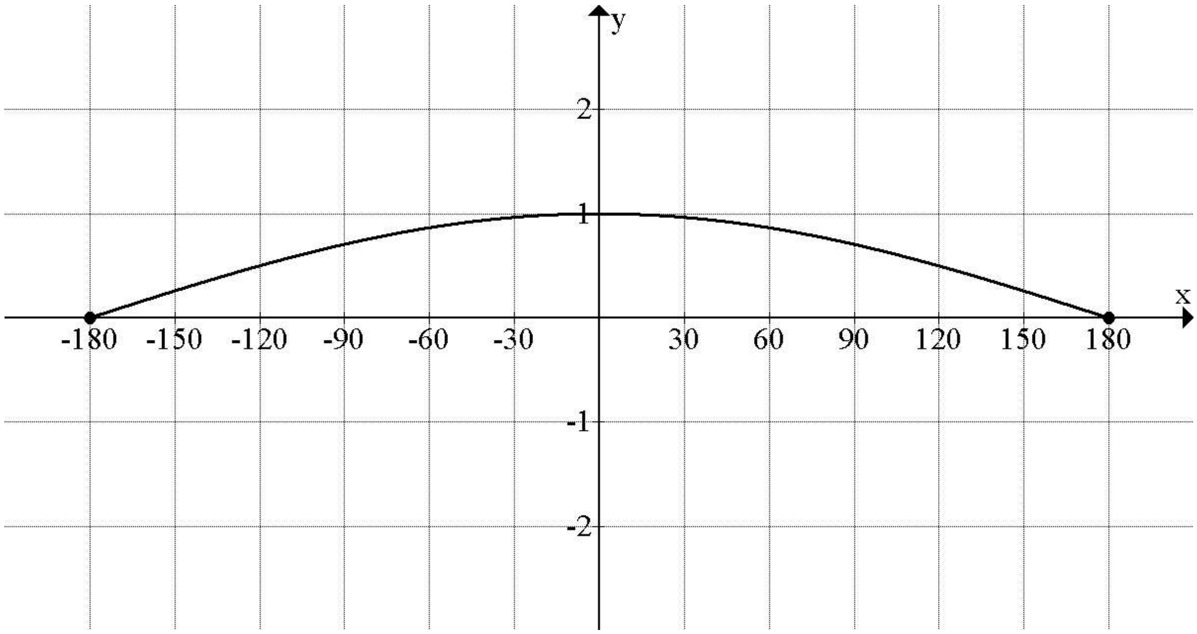
4.3 Los op vir α as: $2.\sqrt{\sin\alpha} = 1$, waar $\alpha \in [0°;360°]$ (3)

4.4 As x en y skerphoeke is sodat $\tan\left(\dfrac{x+y}{2}\right) = 1$ en $\cos(x - y) = \dfrac{\sqrt{3}}{2}$, bepaal die waardes van x en y. (5)

[18]

VRAAG 5

Hieronder geskets is 'n grafiek van $f(x)=\cos\left(\frac{x}{2}\right)$, waar $x\in[-180°;180°]$.



5.1 Vir $f(x)$, skryf neer die:

5.1.1 Waardeversameling (2)

5.1.2 Periode (1)

5.2 Teken 'n grafiek van $g(x)=\sin(x-30°)$ vir $x\in[-180°;180°]$ op die assestelsel in die ANTWOORDEBOEK voorsien. Toon die draaipunt, begin en eindpunte, sowel as alle afsnitte met die asse, duidelik aan. (4)

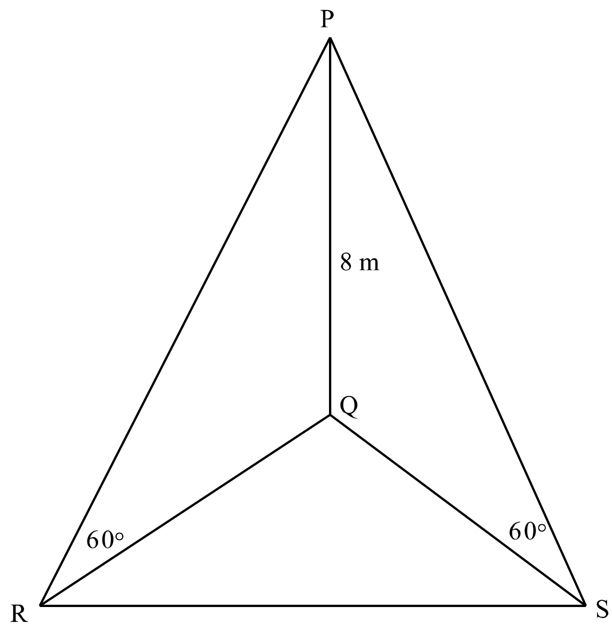
5.3 Vir watter waardes van $x\in[-180°;180°]$ is $f(x).g(x)\geq 0$? (3)

[10]

Kopiereg voorbehou

VRAAG 6

'n Paal, 8 m lank, word deur twee staalkabels van gelyke lengte in 'n vertikale posisie gehou. In die skets, stel PQ die paal, PS en PR die staalkabels voor. Die hoogtehoeke vanaf die ankerpunte R en S na die bopunt van die paal is in beide gevalle, $60°$.



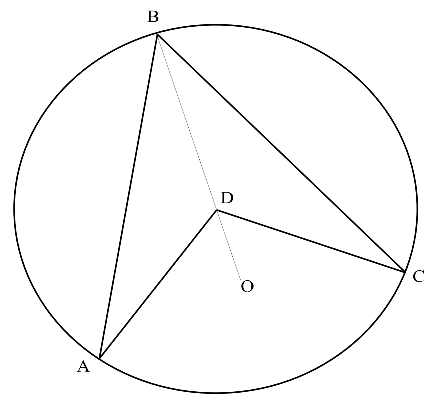
6.1 Bepaal die lengte van kabel PS. Laat jou antwoord in eenvoudigste wortelvorm. (3)

6.2 Bepaal die afstand tussen R en S, indien $R\hat{Q}S = 100°$. Gee jou antwoord korrek tot TWEE desimale syfers. (7)

[10]

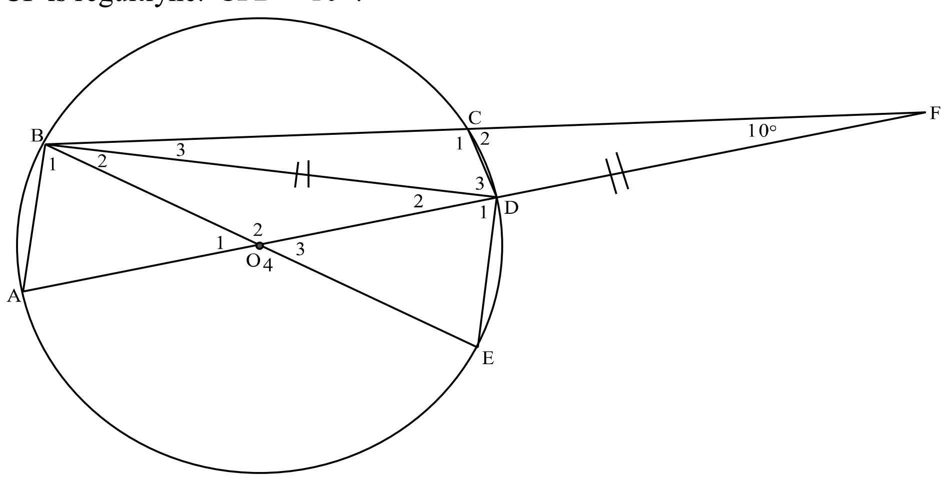
VRAAG 7

7.1 In die diagram hieronder is D die middelpunt van sirkel ABC met radius BD verleng na O.



Gebruik die diagram om die stelling wat meld dat $A\hat{D}C = 2 \times A\hat{B}C$ te bewys. (5)

7.2 In die figuur is O die middelpunt van sirkel ABCDE. DB = DF. AODF, BOE en BCF is reguitlyne. $C\hat{F}D = 10°$.



Bereken, met redes, die grootte van die volgende hoeke:

7.2.1 $\hat{D}_2$ (3)

7.2.2 $\hat{A}$ (4)

7.2.3 $\hat{O}_2$ (2)

7.2.4 $\hat{C}_1$ (2)

7.2.5 $\hat{E}$ (2)

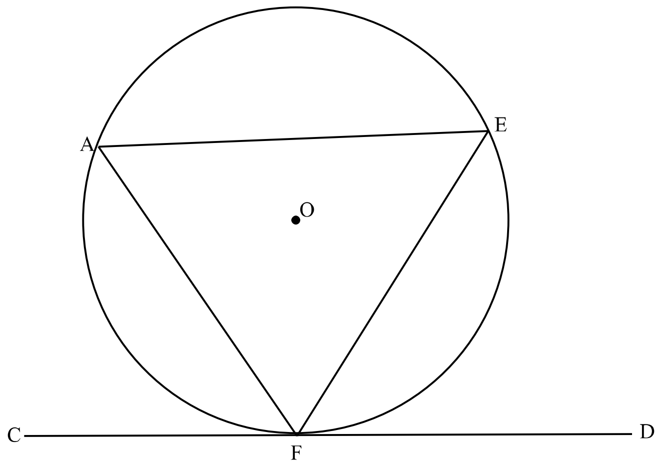
7.2.6 $\hat{C}_2$ (2)

7.2.7 $\hat{O}_3$ (2)

[22]

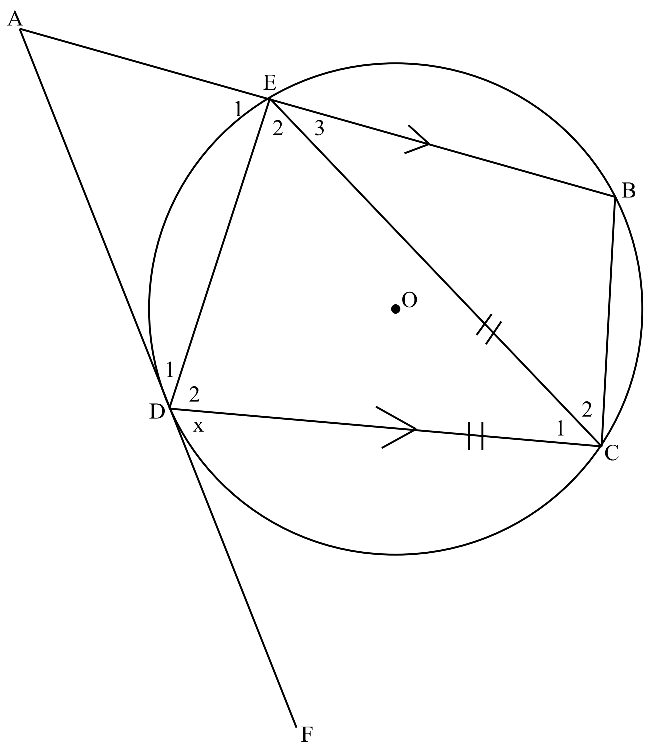
VRAAG 8

8.1 In die diagram hieronder is O die middelpunt van sirkel AEF met CFD 'n raaklyn by F.



Gebruik die diagram om die stelling wat meld dat $E\hat{F}D = \hat{A}$ te bewys. (5)

8.2 In die diagram hieronder, is ADF 'n raaklyn aan die sirkel met punte E, B, C en D op die omtrek van die sirkel. AB || DC en EC = DC.



8.2.1 As $C\hat{D}F = x$, noem met redes, VYF ander hoeke gelyk aan x. (10)

8.2.2 Bewys dat ABCD 'n parallelogram is. (4)

[19]

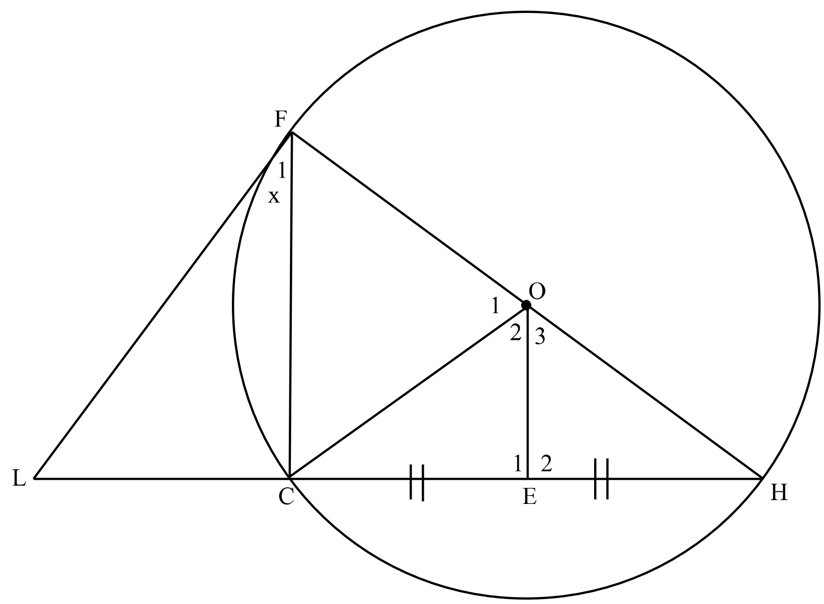
VRAAG 9

9.1 Voltooi die volgende stellings:

9.1.1 Die lynstuk vanaf die middelpunt van ’n sirkel na die middelpunt van ’n koord getrek is ... (1)

9.1.2 Die buitehoek van ’n koordevierhoek is gelyk aan die ... (1)

9.2 In die diagram is FH ’n middellyn van sirkel FCH met middelpunt O. FC is ’n koord en LCH is ’n snylyn. LF is ’n raaklyn aan die sirkel by F. E is ’n punt op CH sodat CE = HE.



9.2.1 Bewys dat FC || OE. (5)

9.2.2 Bewys dat OFLE ’n koordevierhoek is. (3)

9.2.3 As $\hat{F}_1 = x$, druk $\hat{O}_1$, met redes, in terme van x uit. (4)

[14]

TOTAAL: 150

Province of the
EASTERN CAPE
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LEARNER'S NAME: *LEERDERNAAM:*	

GRADE 11: *GRAAD 11:*	

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CERTIFICATE/*SERTIFIKAAT*

GRADE 11/*GRAAD 11*

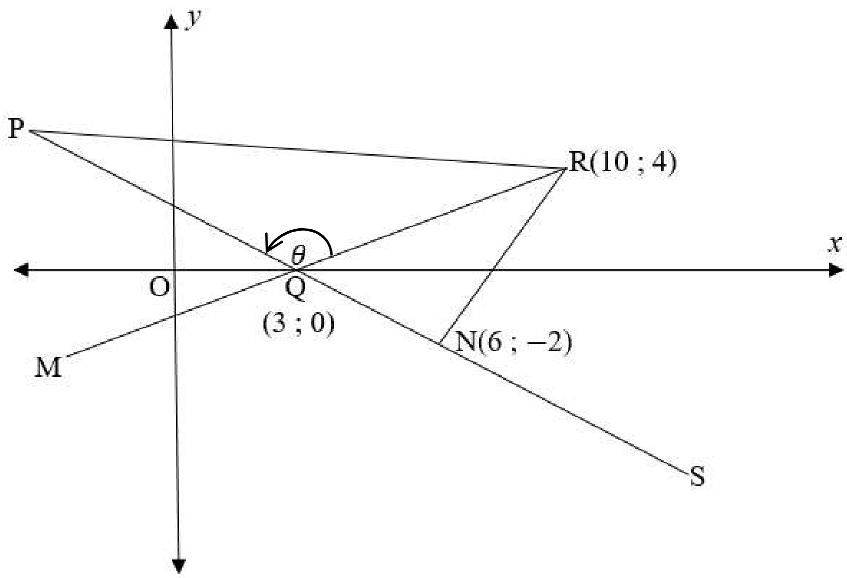
NOVEMBER 2020

MATHEMATICS P2/*WISKUNDE V2*
SPECIAL ANSWER BOOK/*SPESIALE ANTWOORDEBOEK*
(EXEMPLAR/*EKSEMPLAAR)*

Marker/*Merker*			Moderator's Initials / *Moderator se paraaf*							
Question *Vraag*	**Mark** *Punt*	**Initial Parafeer**	**Marks** *Punte*	**S M**	**Marks** *Punte*	**D M**	**Marks** *Punte*	**P M**	**Marks** *Punte*	**NM**
1										
2										
3										
4										
5										
6										
7										
8										
9										
TOTAL *TOTAAL*										

This special answer book consists of 20 pages./
Hierdie spesiale antwoordeboek bestaan uit 20 bladsye.

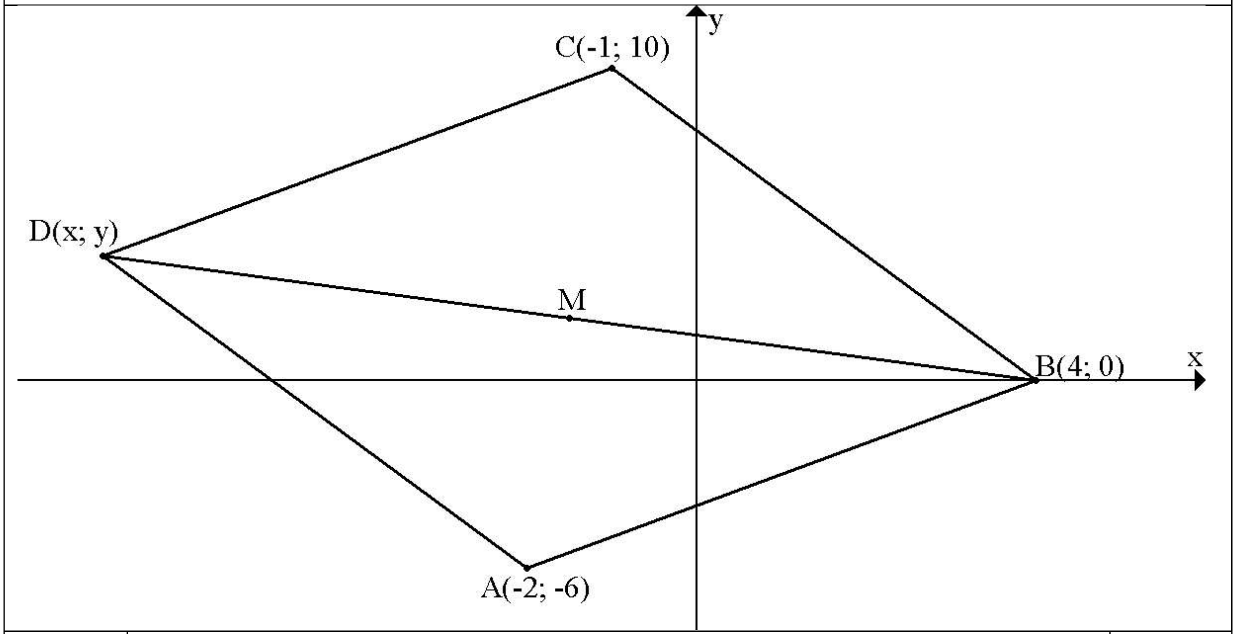
QUESTION 1/*VRAAG 1*



1.1		(2)
1.2		(4)
1.3		(3)

1.4		
		(3)
1.5		
		(6)
1.6		
		(4)
		[22]

QUESTION 2/*VRAAG 2*



2.1		(2)
2.2		(2)
2.3		(3)

2.4		
		(3)
2.5		
		(3)
		[13]

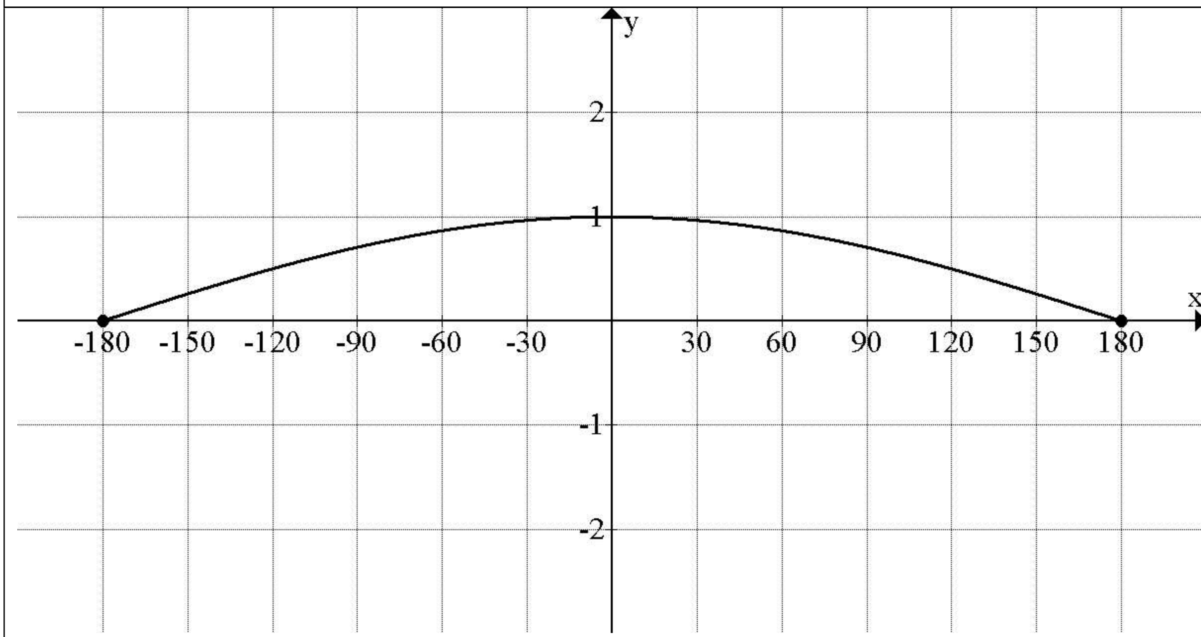
QUESTION 3/*VRAAG 3*		
Sketch here/*Teken hier*:		
3.1		(5)
3.2.1		(2)
3.2.2		(3)

3.3.1		(5)
3.3.2		(7)
		[22]

QUESTION 4/*VRAAG 4*		
4.1		(4)
4.2		(6)

4.3		(3)
4.4		(5)
		[18]

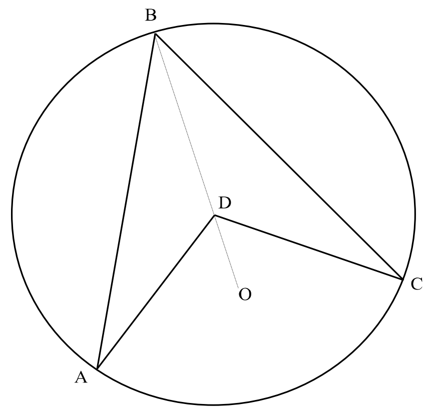
QUESTION 5/*VRAAG 5*



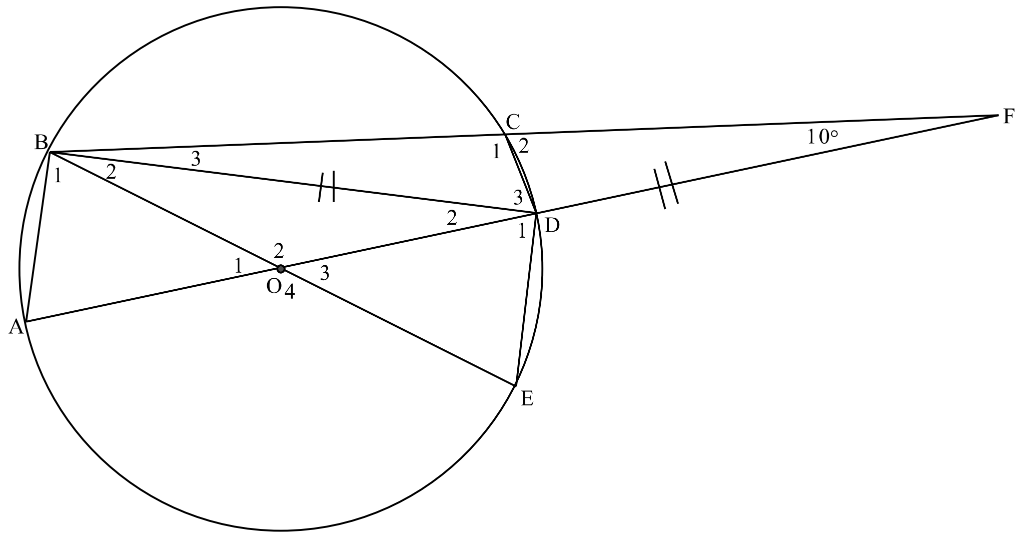
5.1.1		(2)
5.1.2		(1)
5.2		(4)
5.3		(3)
		[10]

QUESTION 6/*VRAAG 6*		
6.1		(3)
6.2		(7)
		[10]

QUESTION 7/*VRAAG 7*



7.1		
		(5)

7.2		
7.2.1		(3)
7.2.2		(4)
7.2.3		(2)
7.2.4		(2)

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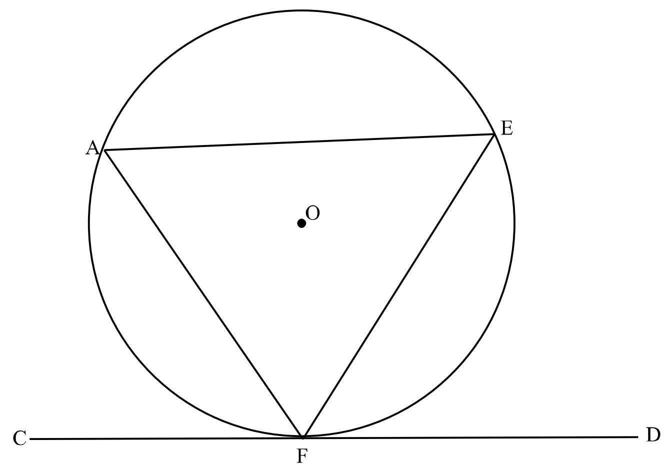
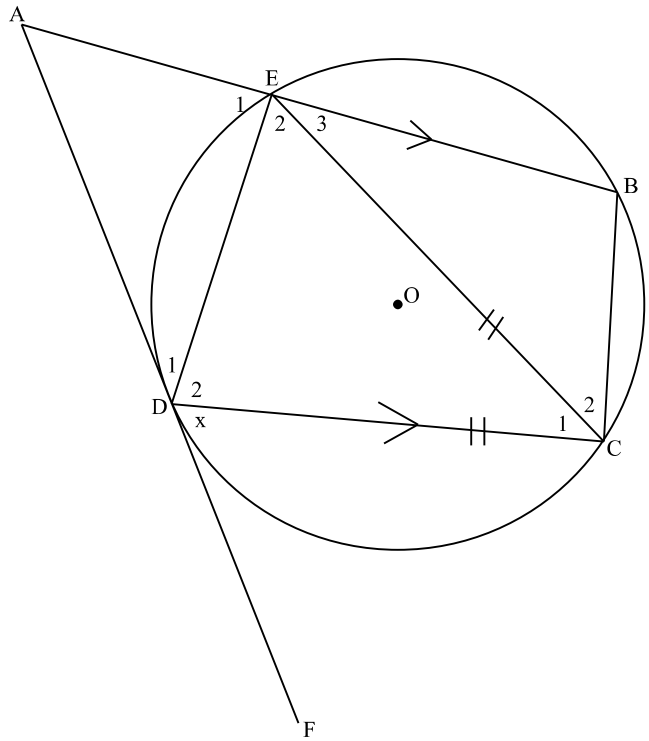
7.2.5		
		(2)
7.2.6		
		(2)
7.2.7		
		(2)
		[22]

QUESTION 8/*VRAAG 8*



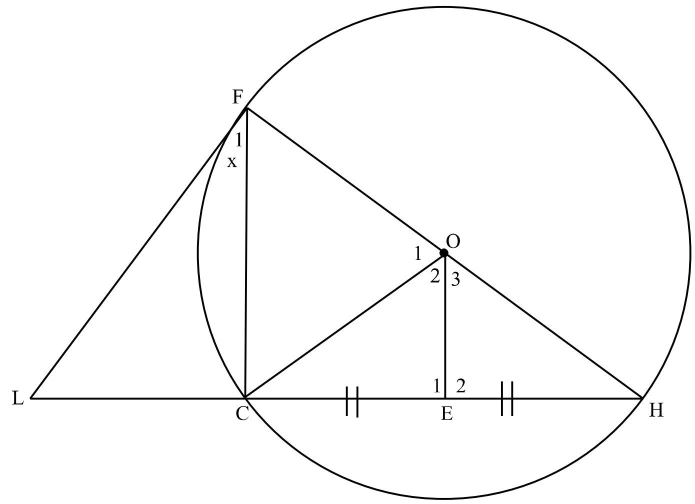
8.1

(5)



8.2.1		(10)
8.2.2		(4)
		[19]

QUESTION 9/*VRAAG 9*		
9.1.1		
		(1)
9.1.2		
		(1)



9.2.1		
		(5)

9.2.2		
		(3)
9.2.3		
		(4)
		[14]
	TOTAL/TOTAAL:	**150**

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NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 11

NOVEMBER 2020

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

MARKS/*PUNTE*: 150

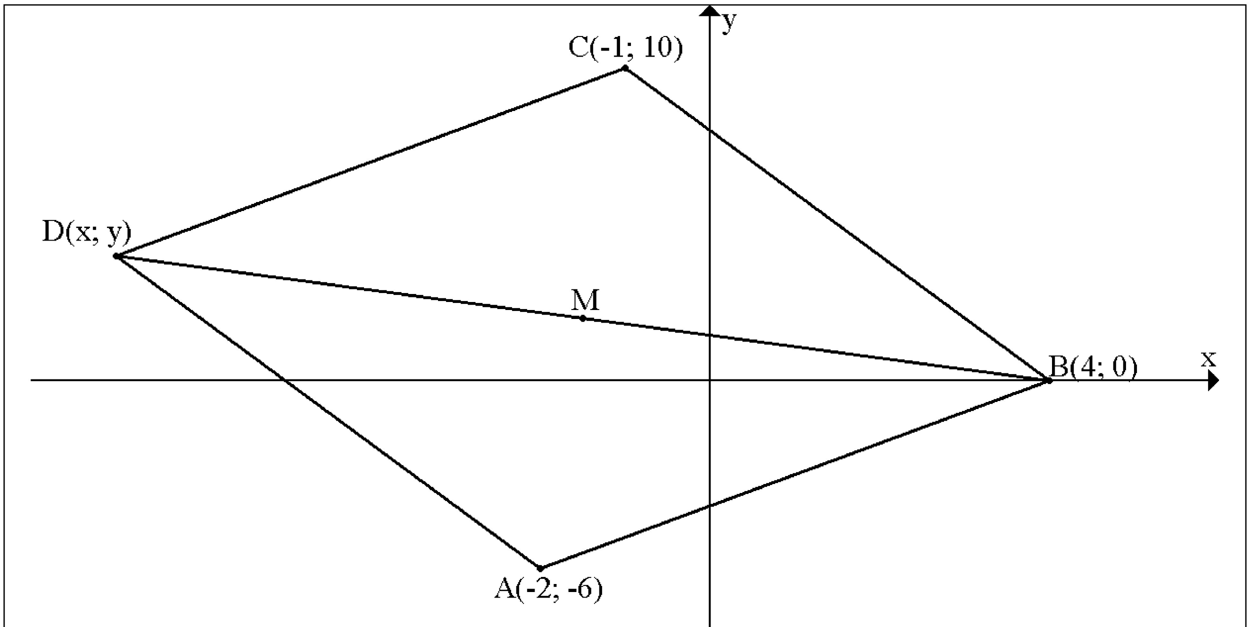
This marking guideline consists of 14 pages./
Hierdie nasienriglyn bestaan uit 14 bladsye.

QUESTION 1/*VRAAG 1*

1.1	$m_{PS} = \frac{0-(-2)}{3-6} = -\frac{2}{3}$ **OR/*OF*** $3y+2x=6$ $3y=-2x+6$ $y=-\frac{2}{3}x+2$ $m_{PS} = -\frac{2}{3}$	✓ substitution / *vervanging* ✓ answer / *antwoord* **OR/*OF*** ✓ $y=-\frac{2}{3}x+2$ ✓ answer / *antwoord*	(2)
1.2	$m_{MR} = \frac{4-0}{10-3} = \frac{4}{7}$ $\tan R\hat{Q}X = \frac{4}{7}$ $R\hat{Q}X = 29{,}74°$	✓$\frac{4-0}{10-3}$ ✓gradient / *gradiënt* ✓$\tan R\hat{Q}X = m_{RM}$ ✓answer / *antwoord*	(4)
1.3	$\tan P\hat{Q}X = -\frac{2}{3}$ $P\hat{Q}X = 146{,}31°$ $\theta = 146{,}31° - 29{,}74°$ $\theta = 116{,}57°$	✓$\tan P\hat{Q}X = -\frac{2}{3}$ ✓ $P\hat{Q}X = 146{,}31°$ ✓answer / *antwoord*	(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 / *produk* ✓-1	(3)
1.5	$NR = \sqrt{(10-6)^2 + (4+2)^2}$ $NR = \sqrt{52}$ $QN = \sqrt{13}$ Area = $\frac{1}{2} \times QN \times NR$ Area = $\frac{1}{2} \times \sqrt{13} \times \sqrt{52}$ Area = 13 units^2 / *eenhede*^{2}	✓substitution / *vervanging* ✓answer / *antwoord* ✓length QN / *lengte* QN ✓choosing correct sides / *kies korrekte sye* ✓substitution / *vervanging* ✓answer / *antwoord*	(6)

1.6	$\frac{y-0}{x-3}=\frac{4}{7}$ $7y=-12$ $y=-\frac{12}{7}$ **OR/*OF*** $y=\frac{4}{7}x+c$ Subst./*vervang* (3; 0) $0=\frac{4}{7}(3)+c$ $c=-\frac{12}{7}$ $y=-\frac{12}{7}$	✓$x=0$ ✓substitution / vervanging ✓equation / vergelyking ✓y-coordinate / y-*koördinaat* **OR/*OF*** ✓equation / *vergelyking* ✓substitution / *vervanging* ✓value of c / *waarde van* c ✓y-coordinate / y-*koördinaat*	(4)
			[22]

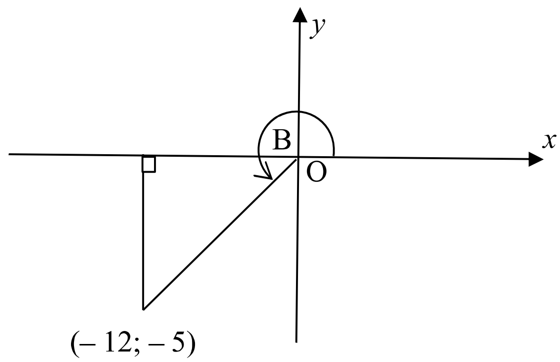
QUESTION 2/*VRAAG 2*



2.1	$BC = \sqrt{(-1-4)^2 + (10-0)^2}$ $BC = \sqrt{25+100}$ $BC = \sqrt{125} = 5\sqrt{5}$	✓substitution / *vervanging* ✓answer / *antwoord*	(2)
2.2	$m_{AB} = \frac{-6-0}{-2-6}$ $m_{AB} = \frac{3}{4}$	✓substitution / *vervanging* ✓answer / *antwoord*	(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 / *gradiënt* ✓substitution / *vervanging* ✓answer / *antwoord*	(3)

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

QUESTION 3 / *VRAAG 3*

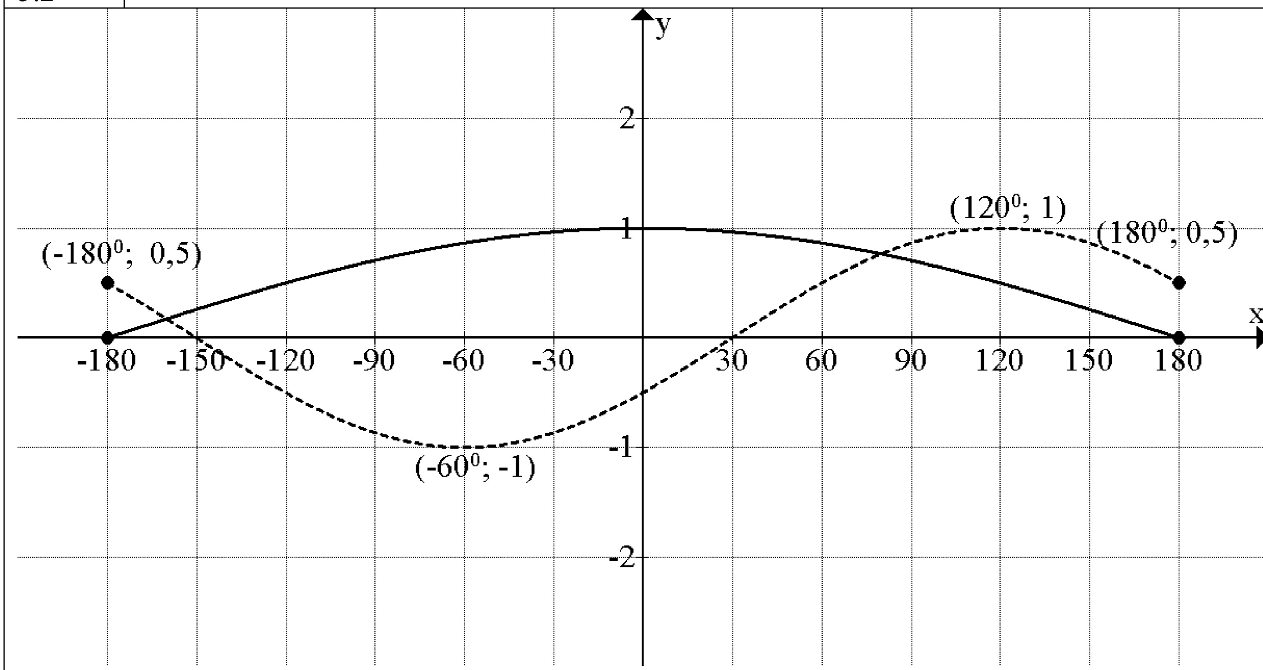
3.1	 Therefore/*d.w.s*: $r = 13$ $\sin B + \cos B$ $= \frac{-5}{13} + \frac{-12}{13}$ $= \frac{-17}{13}$	✓diagram / *diagram* ✓value of *r* / *waarde van r* ✓✓substitution / *vervanging* ✓answer / *antwoord*	(5)
3.2	$\sin 43° = p$		
3.2.1	$\cos 133°$ $\cos(90° + 43°)$ $= -\sin 43°$ $= -p$	✓ $-\sin 43°$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

QUESTION 4 / *VRAAG 4*

4.1	$\dfrac{\sin\theta-\cos\theta.\sin\theta}{\cos\theta-(1-\sin^2\theta)}=\tan\theta$ LHS = $\dfrac{\sin\theta(1-\cos\theta)}{\cos\theta-\cos^2\theta}$ $=\dfrac{\sin\theta(1-\cos\theta)}{\cos\theta(1-\cos\theta)}$ $=\tan\theta$	✓factorising / *faktorisering* ✓ $\cos^2\theta$ ✓common factor / *gemene faktor* ✓answer / *antwoord*	(4)
4.2	$2\sin x\cos x-\cos^2 x=0$ $\cos x(2\sin x-\cos x)=0$ $\cos x=0$ or/*of* $2\sin x=\cos x$ $\cos x=0$ or/*of* $\tan x=\dfrac{1}{2}$ $x=90°+360°.k$ or/*of* $x=270°+360°.k$ or/*of* $x=26,57°+180°.k$	✓factors / *faktore* ✓ $\cos x=0$ ✓ $\tan x=\dfrac{1}{2}$ ✓ $x=90°+360°.k$ ✓ $x=270°+360°.k$ ✓ $x=26,57°+180°.k$	(6)
4.3	$2.\sqrt{\sin\alpha}=1$ $\sqrt{\sin\alpha}=\dfrac{1}{2}$ $\sin\alpha=\dfrac{1}{4}$ $\alpha=14,48°$ or/*of* $\alpha=165,52°$	$\sin\alpha=\dfrac{1}{4}$ $\alpha=14,48°$ $\alpha=165,52°$	(3)
4.4	$\tan\left(\dfrac{x+y}{2}\right)=1$ and/*en* $\cos(x-y)=\dfrac{\sqrt{3}}{2}$ $\dfrac{x+y}{2}=45°$ and/*en* $x-y=30°$ $x+y=90°$ ....(1) $x-y=30°$ ....(2) $2x=120°$ $x=60°$ $y=30°$	✓ $\dfrac{x+y}{2}=45°$ ✓ $x-y=30°$ ✓setting up equations/ *opstel van vergelykings* ✓ *x-value/waarde* ✓*y-value/waarde*	(5)
			[18]

QUESTION 5 / *VRAAG 5*

5.1.1	$0 \le y \le 1$ or $[0;1]$	✓0 ✓1	(2)
5.1.2	Period = $720°$	✓answer	(1)
5.2			



✓ shape / *vorm*
✓ *x*-intercept / *x-afsnit*
✓ *y*-intercept / *y-afsnit*
✓ turning points / *draaipunte*

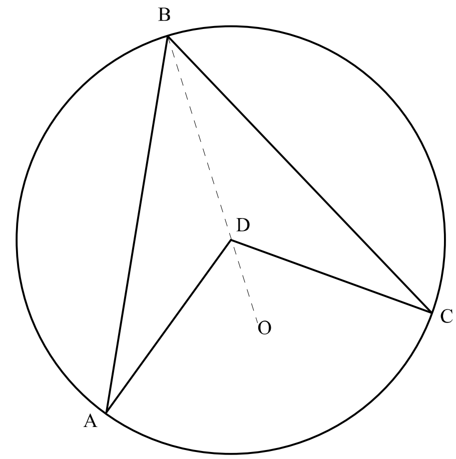
(4)

5.3	$-180° \le x \le -150$ or/*of* $30° \le x \le 180°$	✓✓ $-180° \le x \le -150$ ✓ $30° \le x \le 180°$	(3)
			[10]

QUESTION 6 /*VRAAG 6*

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

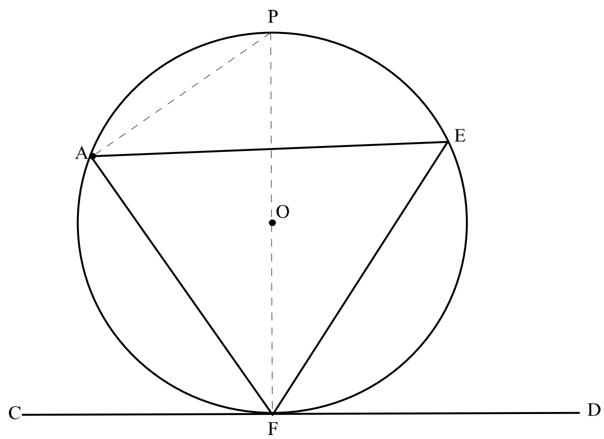
QUESTION 7 / *VRAAG 7*



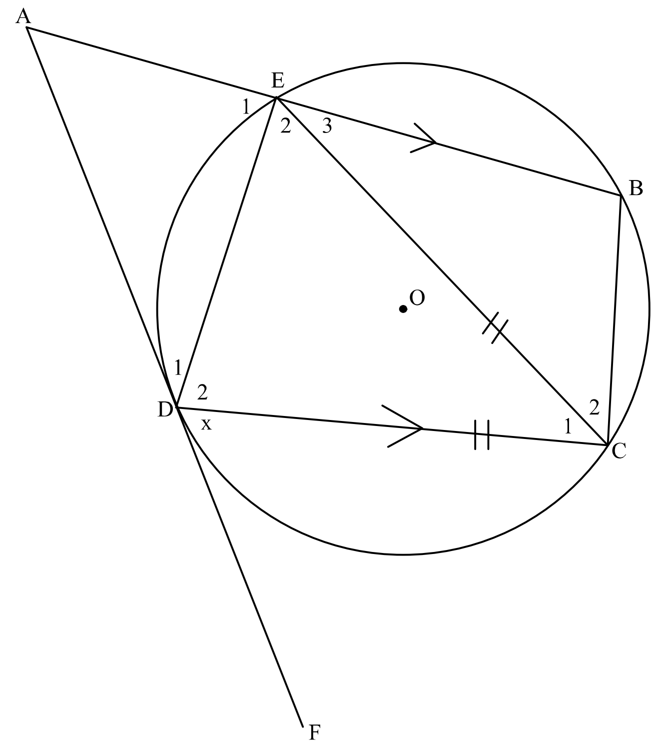
7.1	Let/*Laat* $\hat{A} = x$ $B\hat{A}D = x$ (angles opp = sides)/(*hoeke teenoor = sye*) $A\hat{D}O = 2x$ (angle at the centre)/(*middelpuntshoek*) Similarly, if you let / *Net so, as jy*: $\hat{C} = y$; then/*dan*: $C\hat{D}O = 2y$ $\therefore A\hat{D}C = 2x + 2y = 2(x + y)$ $= 2\ A\hat{B}C$	✓S and/*en*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

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

QUESTION 8 / *VRAAG 8*

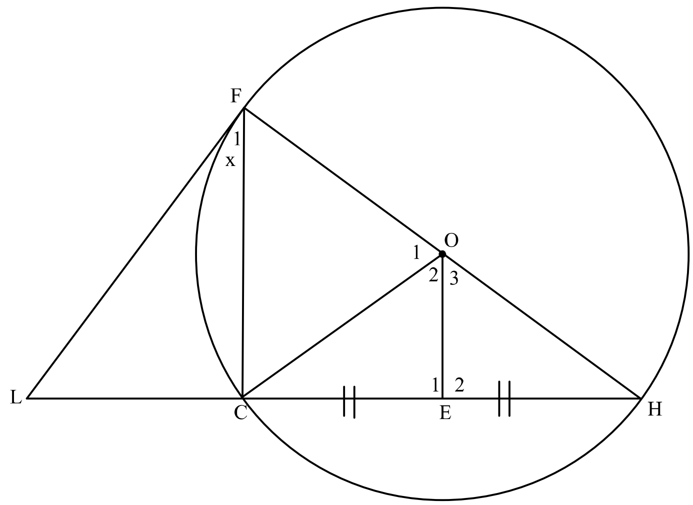


8.1	ENG Draw diameter FP and join PA Let $E\hat{F}D = x$ $O\hat{F}D = 90°$ (tan $\perp$ radius) $\therefore O\hat{F}E = 90° - x$ $\therefore P\hat{A}E = 90° - x$ (angles in the same segment) $P\hat{A}F = 90°$ (angles in a semi circle) $\therefore E\hat{A}F = x$ $\therefore E\hat{F}D = \hat{A} = x$	✓construction ✓S and R ✓S and R ✓S and R ✓conclusion	
8.1 **AFR**	*AFR* *Teken middellyn* FP *en verbind* PA *Laat* $E\hat{F}D = x$ $O\hat{F}D = 90°$ (*raaklyn* $\perp$ *radius*) $\therefore O\hat{F}E = 90° - x$ $\therefore P\hat{A}E = 90° - x$ (*hoeke in dieselfde segment*) $P\hat{A}F = 90°$ (*hoeke in 'n halwe sirkel*) $\therefore E\hat{A}F = x$ $\therefore E\hat{F}D = \hat{A} = x$	✓ *konstruksie* ✓ S *en* R ✓ S *en* R ✓ S *en* R ✓ *gevolgtrekking*	(5)



8.2.1	$\widehat{A} = x$ (corresponding angles; AB ∥ DC)/(*ooreenkomstige hoeke*; AB ∥ DC) $\widehat{E}_2 = x$ (tan-chord) / (*raaklyn-koord*) $\widehat{D}_2 = x$ (angles opposite = sides) / (*hoeke teenoor* = sye) $\widehat{E}_1 = x$ (alternate angles, AB ∥ DC)/(*verwisselende hoeke*; AB ∥ DC) $\widehat{C}_{1+2} = \widehat{E}_1 = x$ (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	$\widehat{B} = 180° - x$ (opposite angles of a c.q.) (*teenoorst. hoeke van 'n k.v*) $\widehat{A} + \widehat{B} = x + (180° - x) = 180°$ ∴ AD ∥ BC (co-interior angles formed =) (*ko-binne hoeke gevorm* = 180°) ∴ 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	$\hat{E}_2 = \hat{E}_1 = 90°$ (line from centre) (*lyn vanaf die middelpunt*) $F\hat{C}H = 90°$ (angles in a semi-circle) (*hoeke in 'n halwe sirkel*) $\therefore F\hat{C}H = \hat{E}_2$ $\therefore$ FC ∥ OE (corresponding angles formed are =) (*ooreenkomstige hoeke wat gevorm word is* =)	✓S ✓R ✓S ✓R ✓R	(5)
9.2.2	$L\hat{F}O = 90°$ (tan ⊥ radius) / (*raaklyn ⊥ radius*) $\hat{E}_2 = 90°$ (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**