education

Department of Education
FREE STATE PROVINCE

PREPARATORY EXAMINATION
VOORBEREIDINGSEKSAMEN

GRADE/*GRAAD* 12

MATHEMATICS/*WISKUNDE* P2

SEPTEMBER 2019

MARKS/*PUNTE*: 150

MARKING GUIDELINES/*NASIENRIGLYNE*

This marking guidelines consists of 17 pages.
Hierdie nasienriglyne bestaan uit 17 bladsye.

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NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of the marking memorandum.
- Assuming answers/values in order to solve a problem is NOT acceptable.

NOTA:

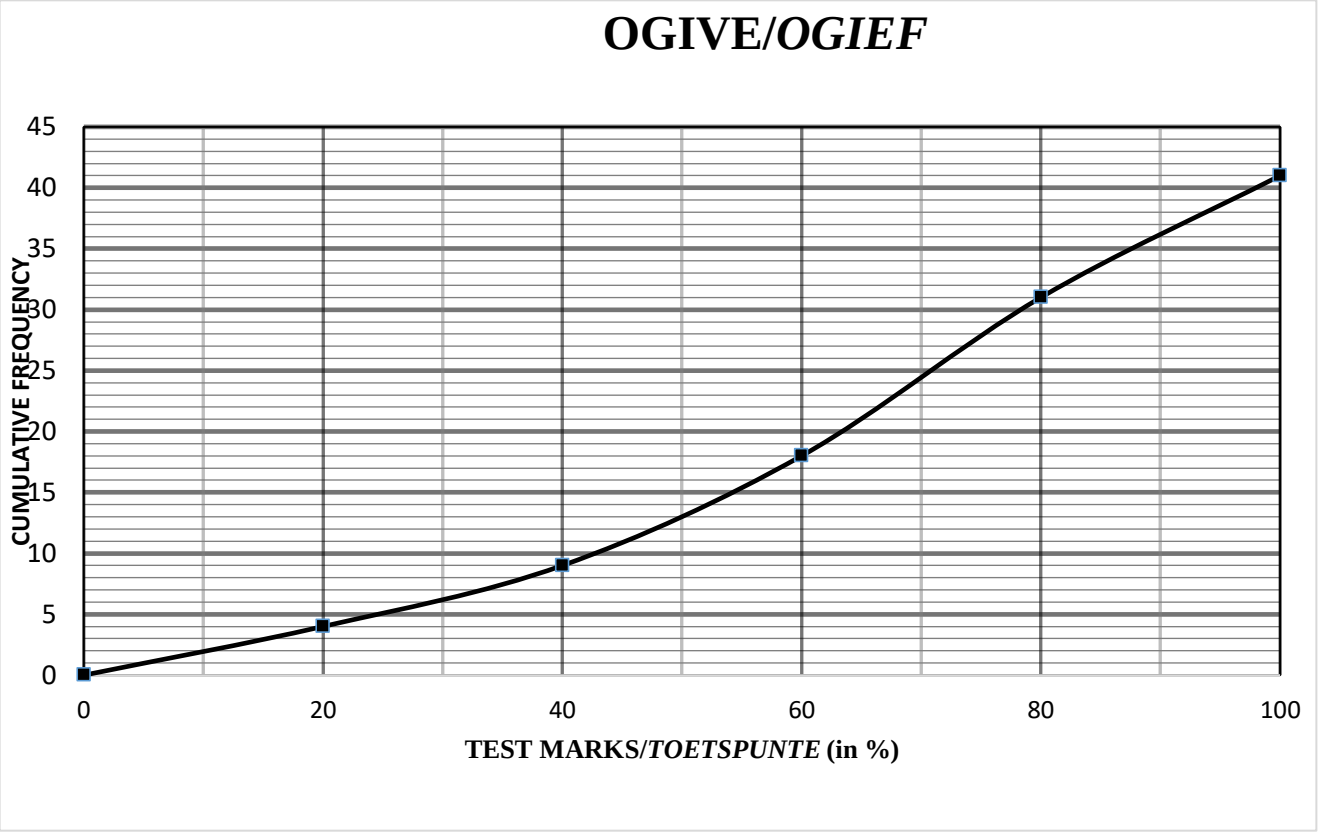
- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n poging om die vraag te beantwoord, doodgetrek het en nie dit oorgedoen het nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienmemorandum toegepas.*
- *Aanvaarding van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.*

GEOMETRY/*MEETKUNDE*	
S	**A mark for the correct statement.** **(A statement mark is independent of a reason)**
	'n Punt vir 'n korrekte bewering. ***('n Punt vir 'n bewering is onafhanklik van die rede)***
R	**A mark for a correct reason.** **(A reason mark may only be awarded if the statement is correct)**
	'n Punt vir 'n korrekte rede. ***('n Punt word slegs vir die rede toegeken as die bewering korrek is)***
S/R	**Award a mark if the statement AND reason are both correct.**
	Ken 'n punt toe as beide die bewering EN rede korrek is.

QUESTION/*VRAAG* 1

<table>
<tr><th></th><th>SUGGESTED ANSWER/
VOORGESTELDE ANTWOORD</th><th>DESCRIPTORS/
BESKRYWERS</th></tr>
<tr><td>1.1</td><td>$60 \leq x < 80$</td><td>✓ answer/*antwoord*
(1)</td></tr>
<tr><td>1.2</td><td>
<table>
<tr><th>INTERVAL OF TEST MARKS/
INTERVAL VAN TOETSPUNTE</th><th>NUMBER OF LEARNERS/
AANTAL LEERDERS</th><th>$X.f$</th></tr>
<tr><td>$0 \leq x < 20$</td><td>4</td><td>40</td></tr>
<tr><td>$20 \leq x < 40$</td><td>5</td><td>150</td></tr>
<tr><td>$40 \leq x < 60$</td><td>9</td><td>450</td></tr>
<tr><td>$60 \leq x < 80$</td><td>13</td><td>910</td></tr>
<tr><td>$80 \leq x < 100$</td><td>10</td><td>900</td></tr>
<tr><td>Totals/*Totale*</td><td>**41**</td><td>$\sum 2450$</td></tr>
</table>
$\bar{x} = \frac{\sum Xf}{n} = \frac{2450}{41} = 59{,}76$
ANSWER ONLY: FULL MARKS/
SLEGS ANTWOORD: VOLPUNTE</td><td>✓ All correct values/*Alle korrekte waardes*
✓ 2450
✓ $\bar{x} = 59{,}76$
(3)</td></tr>
<tr><td>1.3</td><td>
<table>
<tr><th>INTERVAL OF TEST MARKS/
INTERVAL VAN TOETSPUNTE</th><th>NUMBER OF LEARNERS/
AANTAL LEERDERS</th><th>CUMULATIVE FREQUENCY/
KUMULATIEWE-FREKWENSIE</th></tr>
<tr><td>$0 \leq x < 20$</td><td>4</td><td>4</td></tr>
<tr><td>$20 \leq x < 40$</td><td>5</td><td>9</td></tr>
<tr><td>$40 \leq x < 60$</td><td>9</td><td>18</td></tr>
<tr><td>$60 \leq x < 80$</td><td>13</td><td>31</td></tr>
<tr><td>$80 \leq x < 100$</td><td>10</td><td>41</td></tr>
</table>
Max of 1/2 for 3 correct values in the table/
Maksimum van 1/2 vir 3 korrekte waardes in die tabel</td><td>✓✓ ALL correct values in the table/ *ALLE korrekte waardes in die tabel*
(2)</td></tr>
</table>

1.4



✓ using the cumulative frequency/*gebruik die kumulatiewefrekwensie*
✓ smooth curve/*gladde kurwe*
✓ using upper limits/*gebruik boonste limiete*

(3)

1.5	$IQR = Q_3 - Q1$ $= 68 - 33$ $= 35$	ACCEPT/***AANVAAR***: • 32 **OR/OF** 34 lower quartile/*laer kwartiel* • 67 **OR/OF** 69 upper quartile/*boonste kwartiel*	✓L Q ✓U Q ✓ *IQR* (3)

[12]

QUESTION/*VRAAG* 2

2.1	$y = A + Bx$ $y = 25{,}42 + 1{,}32x$	✓ 25,42 ✓ 1,32 ✓ $y = 25{,}42 + 1{,}32x$ (3)
2.2	$y = 25{,}42 + 1{,}32(36)$ $y = 72{,}94$	✓ correct substitution/*korrekte vervanging* ✓ answer/*antwoord* (2)
2.3	$r = 0{,}81$ Strong positive/*Sterk positiewe*	✓ $r = 0{,}81$ ✓ Strong/*Sterk* ✓ Positive/*Positiewe* (3)
		[8]

QUESTION/*VRAAG* 3

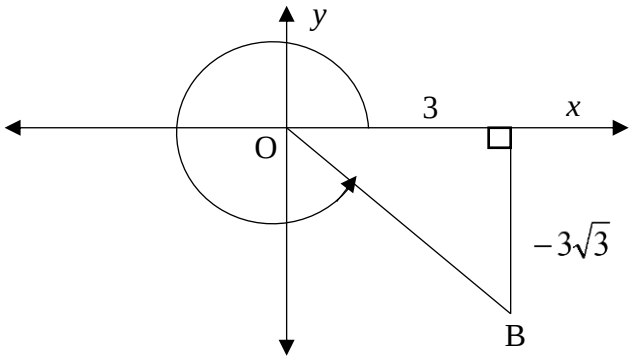
3.1	$m_{BG} = \frac{-4-4}{-3-1}$ $= 2$	✓ substitution/*vervanging* ✓ $m_{BG} = 2$ (2)
3.2	$y = 2x + c$ $sub(-3;-4)$ $-4 = 2(-3) + c$ $\therefore c = 2$ $y = 2x + 2$ **OR/*OF*** $y = 2x + c$ $sub(1;4)$ $4 = 2(1) + c$ $\therefore c = 2$ $y = 2x + 2$ **OR/*OF*** $y - y_1 = m(x - x_1)$ $y + 4 = 2(x - (-3)$ $y = 2x + 2$ **OR/*OF*** $y - y_1 = m(x - x_1)$ $y - 4 = 2(x - 1)$ $y = 2x + 2$	✓ substitution/*vervanging* (–3; –4)/(1,4) ✓equation/*vergelyking* (2) **OR/*OF*** ✓ substitution/*vervanging* (–3; –4)/(1,4) ✓ equation/*vergelyking* (2)
3.3.1	$m_{BC} = -\frac{1}{2}$ $-\frac{1}{2} = \frac{k-(-4)}{2-(-3)}$ $-\frac{1}{2} = \frac{k+4}{5}$ $-5 = 2k + 8$ $2k = -13$ $k = -\frac{13}{2} = -6\frac{1}{2}$	✓ $m_{BC} = -\frac{1}{2}$ ✓ correct substitution/*korrekte vervanging* ✓simplification/*vereenvoudiging* ✓ k value/*k-waarde* (4)
3.3.2	By translation/*Deur translasie* $(x;y) \rightarrow \left(x+5; y-2\frac{1}{2}\right)$ $(1;4) \rightarrow \left(6; 1\frac{1}{2}\right)$ $D\left(6; \frac{3}{2}\right)$	✓ method/*metode* ✓ x value/*x-waarde* ✓ y value/*y-waarde* (3)

	OR/*OF*	**OR/*OF***
	$\frac{y-\left(-\frac{13}{2}\right)}{x-2}=\frac{2}{1}$ $y=2x-\frac{21}{2}$ .....(i) $\frac{y-4}{x-1}=-\frac{1}{2}$ $2y-8=-x+1$ $2\left(2x-\frac{21}{2}\right)-8=-x+1$ $4x-21-8=-x+1$ $\therefore x=6$ $y=2(6)-\frac{21}{2}$ $\therefore y=\frac{3}{2}$ $\mathrm{D}\left(6;\frac{3}{2}\right)$	✓ method/*metode* ✓*x* value/*x-waarde* ✓*y* value/*y-waarde* (3)
3.3.3	$m_{CD}=2$ $\tan \mathrm{D\hat{H}X}=2$ $\mathrm{D\hat{H}X}=\tan^{-1}(2)$ $\mathrm{D\hat{H}X}=63{,}49^{\circ}$ $\beta=63{,}49^{\circ}$ [vertically opposite angles/*vertikaalteenoorgestelde hoeke*]	✓ $m_{CD}=2$ ✓ $\mathrm{D\hat{H}X}$ ✓ $\beta=63{,}49^{\circ}$ (3)
3.3.4	$y=2x+c$ $-\frac{13}{2}=2(2)+c$ $-\frac{21}{2}=c$ $y=2x-\frac{21}{2}$ $0=2x-\frac{21}{2}$ $\therefore x=5{,}25$ $GH=6{,}25$ **OR/*OF*** $Area/Oppvl=\frac{1}{2}GH.y_D$ $=\frac{1}{2}\times 6{,}25\times 1{,}5$ $=4{,}69$ square units/*vierkanteeenhede* $HD=\sqrt{(6-5{,}25)^2+\left(0-\frac{3}{2}\right)^2}$ $=\frac{3\sqrt{5}}{4}$ $\mathrm{G\hat{H}D}=180^{\circ}-63{,}49^{\circ}$ [$\angle^{e}$s in straight line/$\angle^{e}$ *in reguitlyn*] $=116{,}51^{\circ}$ Area of/*Oppvl van* $\mathrm{GHD}=\frac{1}{2}(GH)(HD)\sin \mathrm{G\hat{H}D}$ $=\frac{1}{2}(6{,}25)\left(\frac{3\sqrt{5}}{4}\right)\sin 116{,}51^{\circ}$ $=4{,}69$ square units/*vierkanteeenhede*	✓ substitution/ *vervanging* $\left(2;-\frac{13}{2}\right)$ ✓ $y=0$ ✓ $GH=6{,}25$ ✓ method/*metode* ✓ y_D ✓substitution/*vervanging* ✓ answer/*antwoord* (7)
		[21]

QUESTION/*VRAAG* 4

4.1.1	centre/*middelpunt* $\text{E}(3;1)$ $(x-3)^2+(y-1)^2=r^2$ $(5-3)^2+(-5-1)^2=r^2$ $40=r^2$ $(x-3)^2+(y-1)^2=40$ $x^2-6x+9+y^2-2y+1=40$ $x^2-6x+y^2-2y=30$	✓ substitution/*vervanging* E(3; 1) ✓ substitution/*vervanging* P(5; –5) ✓ $40=r^2$ ✓standard form/*standaardvorm* (4)
4.1.2	$m_{rad}=\frac{1-(-5)}{3-5}$ $=\frac{6}{-2}\qquad=-3$ $m_{\tan}=\frac{1}{3}\qquad[\text{radius}\perp\tan]$ $y=\frac{1}{3}x+c$ $-5=\frac{1}{3}(5)+c$ $c=\frac{-20}{3}$ $y=\frac{1}{3}x-\frac{20}{3}$	✓ correct substitution/*korrekte vervanging* ✓ $m_{rad}=-3$ ✓ $m_{rad}=\frac{1}{3}$ ✓ substitution/*vervanging* (5; –5) ✓ equation/*vergelyking* (5)
4.2.1	centre/*middelpunt* $=\frac{x_1+x_2}{2};\frac{y_1+y_2}{2}$ $=\frac{3+5}{2};\frac{1-5}{2}$ centre/*middelpunt*: $(4;-2)$	✓ method/*metode* ✓ x value/*x-waarde* ✓ y value/*y-waarde* (3)
4.2.2	$(x-4)^2+(y+2)^2=r^2$ $(3-4)^2+(1+2)^2=r^2$ $10=r^2$ $r=\sqrt{10}$	✓substitution of centre/*vervanging van middelpunt* ✓ substitution/*vervanging* $(3;1)$ ✓ $=\sqrt{10}$ (3)
4.3	$r=\sqrt{40}$ $\text{EC}=\sqrt{(9-3)^2+(3-1)^2}$ $=2\sqrt{10}$ C is on the circumference/C *is op die omtrek*	✓ $r=\sqrt{40}$ ✓distance/*afstand* EC ✓motivation/*motivering* (3)
		[18]

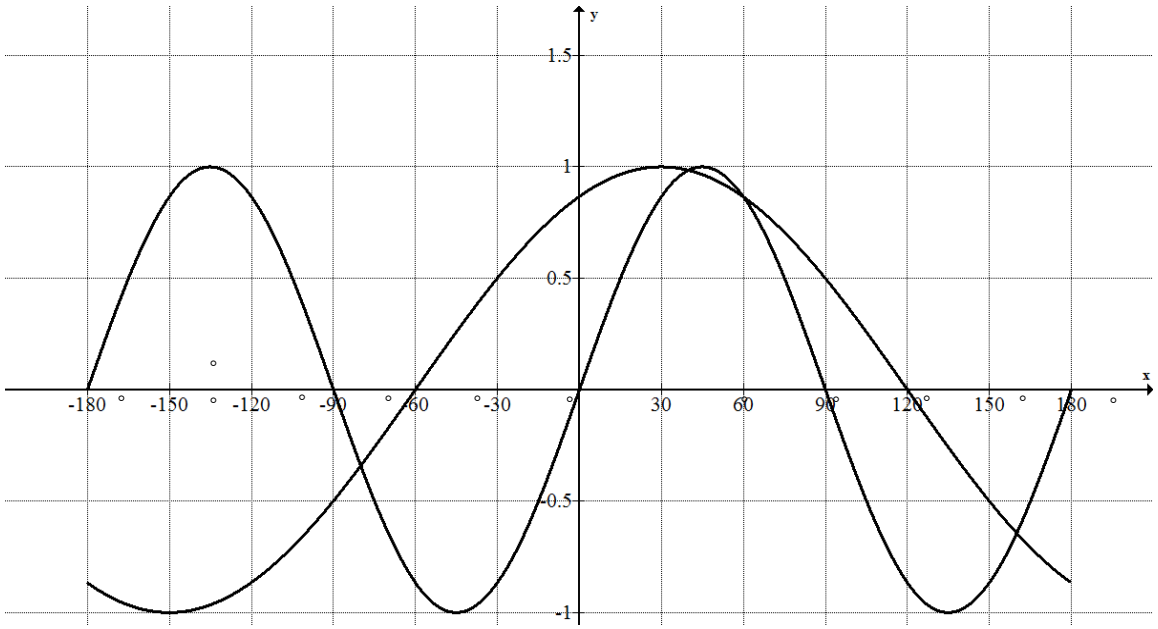
QUESTION/V*RAAG* 5

5.1.1	 $(3)^2 + \left(-3\sqrt{3}\right)^2 = OB^2$ $OB = 6$	✓Pythagoras ✓OB (2)
5.1.2	$\cos(\alpha + 30^\circ)$ $= \cos\alpha\cos 30^\circ - \sin\alpha\sin 30^\circ$ $= \left(\frac{3}{6}\right)\left(\frac{\sqrt{3}}{2}\right) - \left(\frac{-3\sqrt{3}}{6}\right)\left(\frac{1}{2}\right)$ $= \left(\frac{\sqrt{3}}{2}\right)$	✓expansion/*uitbreiding* ✓✓ratios/*verhoudings* ✓answer/*antwoord* (4)
5.2	$\frac{\sin^2(90^\circ - x)\tan(360^\circ - x)}{\sin(-x)}$ $= \frac{\cos^2 x\,(-\tan x)}{(-\sin x)}$ $= \frac{\cos^2 x\left(-\frac{\sin x}{\cos x}\right)}{-\sin x}$ $= \cos x$	✓$\cos^2 x$ ✓$-\tan x$ ✓$-\sin x$ ✓$\frac{\sin x}{\cos x}$ (4)

5.3	$\cos(60^\circ+\theta)-\cos(60^\circ-\theta)$ $=\left[\cos 60^\circ\cos\theta-\sin 60^\circ\sin\theta\right]-\left[\cos 60^\circ\cos\theta+\sin 60^\circ\sin\theta\right]$ $=-2\sin 60^\circ\sin\theta$ $=-2.\frac{\sqrt{3}}{2}.\sin\theta$ $=-\sqrt{3}\sin\theta$ **OR/*OF*** $\cos(60^\circ+\theta)-\cos(60^\circ-\theta)$ $=\left[\cos 60^\circ\cos\theta-\sin 60^\circ\sin\theta\right]-\left[\cos 60^\circ\cos\theta+\sin 60^\circ\sin\theta\right]$ $=\frac{1}{2}\cos\theta-\frac{\sqrt{3}}{2}\sin\theta-\frac{1}{2}\cos\theta-\frac{\sqrt{3}}{2}\sin\theta$ $=-2\left(\frac{\sqrt{3}}{2}\right)\sin\theta$ $=-\sqrt{3}\sin\theta$	✓ method/*metode* ✓ ratios/*verhoudings* ✓ answer/*antwoord* (3) **OR/*OF*** ✓ method/*metode* ✓ratios/verhoudings ✓ answer/*antwoord* (3)
5.4.1	$LHS=\frac{1-\sin 2A}{\sin A-\cos A}$ $=\frac{1-2\sin A\cos A}{\sin A-\cos A}$ $=\frac{\sin^2 A+\cos^2 A-2\sin A\cos A}{\sin A-\cos A}$ $=\frac{(\sin A-\cos A)(\sin A-\cos A)}{\sin A-\cos A}$ $=\sin A-\cos A$ **OR/*OF*** $RHS=\sin A-\cos A\times\frac{\sin A-\cos A}{\sin A-\cos A}$ $=\frac{\sin^2 A-2\sin A.\cos A+\cos^2 A}{\sin A-\cos A}$ $=\frac{1-2\sin A.\cos A}{\sin A-\cos A}$	✓ $2\sin A\cos A$ ✓ $\sin^2 A+\cos^2 A$ ✓factors/*faktore* ✓ answer/*antwoord* (4) **OR/*OF*** ✓ $\frac{\sin A-\cos A}{\sin A-\cos A}$ ✓identities/*identiteite* ✓ simplification/ *vereenvoudiging* ✓ answer/*antwoord* (4)
5.4.2	$\sin A-\cos A=0$ $\sin A=\cos A$ $\tan A=1$ $A=45^\circ$	✓ $\sin A-\cos A=0$ ✓ answer/*antwoord* (2)
		[19]

QUESTION/*VRAAG* 6

6.1	$\sin 2x = \sin\left(90^\circ - \left(x - 30^\circ\right)\right) + 360.k$ $2x = 90^\circ - x + 30^\circ + 360.k$ $2x = 120^\circ - x + 360.k$ $x + 2x = 120^\circ + 360.k$ $3x = 120^\circ + 360.k$ $x = 40^\circ + 120^\circ k, k \in z$ **OR/*OF*** $2x = 180^\circ - \left(120^\circ - x\right)$ $2x = 180^\circ - 120^\circ + x$ $2x - x = 60^\circ$ $x = 60^\circ + 360^\circ k$ **ALTERNATIVE/*ALTERNATIEF*:** $\cos(90^\circ - 2x) = \cos\left(x - 30^\circ\right) + 360.k$ $90^\circ - 2x = x - 30^\circ + 360.k$ $-3x = -120^\circ + 360.k$ $x = 40^\circ - 120^\circ k, k \in z$ **OR/ *OF*** $90^\circ - 2x = 360^\circ - \left(x - 30^\circ\right)$ $-x = 300^\circ + 360^\circ.k$ $x = -300^\circ + 360^\circ.k$ $x = 60^\circ + 360^\circ k$	✓ method/*metode* ✓ $2x = 90^\circ - x + 30^\circ + 360.k$ ✓ $x = 40^\circ + 120^\circ k, k \in z$ ✓ $2x = 180^\circ - \left(120^\circ - x\right)$ ✓ $x = 60^\circ + 360^\circ k$ (5) **ALTERNATIVE/*ALTERNATIEF:*** ✓ method/*metode* ✓ $90^\circ - 2x = x - 30^\circ + 360.k$ ✓ $x = 40^\circ - 120^\circ k, k \in z$ ✓ $90^\circ - 2x = 360^\circ - \left(x - 30^\circ\right)$ ✓ $x = 60^\circ + 360^\circ k$ (5)
6.2.1	Period $= 360^\circ$	✓ answer/*antwoord* (1)
6.2.2	$-150^\circ < x < 30^\circ$	✓values/*waardes* ✓inequalities/*ongelykhede* (2)

6.2.3	 ✓ *x* intercepts/*x-afsnitte* ✓turning points/*draaipunte* ✓shape/*vorm* (3)	
6.2.4	$-180^\circ \le x \le -90^\circ$; $-60^\circ \le x \le 0^\circ$; $90^\circ \le x \le 120^\circ$	✓ $-180^\circ \le x \le -90^\circ$ ✓ $-60^\circ \le x \le 0^\circ$ ✓ $90^\circ \le x \le 120^\circ$ (3)
		[14]

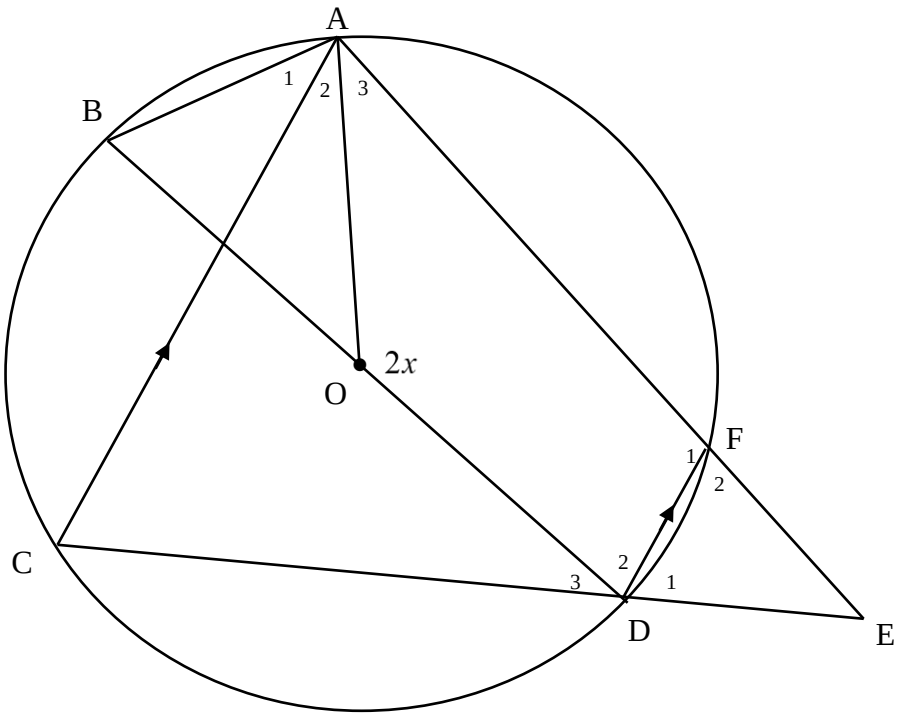
QUESTION/*VRAAG* 7

7.1	$\hat{BDC} = 180^\circ - 2\alpha$ $\frac{y}{\sin\alpha} = \frac{x}{\sin 180^\circ - 2\alpha}$ $y = \frac{x\sin\alpha}{\sin(180^\circ - 2\alpha)}$ $y = \frac{x\sin\alpha}{2\sin\alpha\cos\alpha}$ $y = \frac{x}{2\cos\alpha}$ $\cos\theta = \frac{BD}{AB}$ $AB\cos\theta = BD$ $AB = \frac{BD}{\cos\theta}$ $AB = \frac{x}{2\cos\alpha} \div \cos\theta$ $AB = \frac{x}{2\cos\alpha} \times \frac{1}{\cos\theta}$ $AB = \frac{x}{2\cos\alpha\cos\theta}$	✓ $\hat{BDC} = 180^\circ - 2\alpha$ ✓ method/*metode* ✓ substitution/*vervanging* ✓ $2\sin\alpha\cos\alpha$ ✓ $AB = \frac{BD}{\cos\theta}$ ✓ substitution/*vervanging* BD ✓ simplification/*vereenvoudiging* (7)
		[7]

QUESTION/*VRAAG* 8

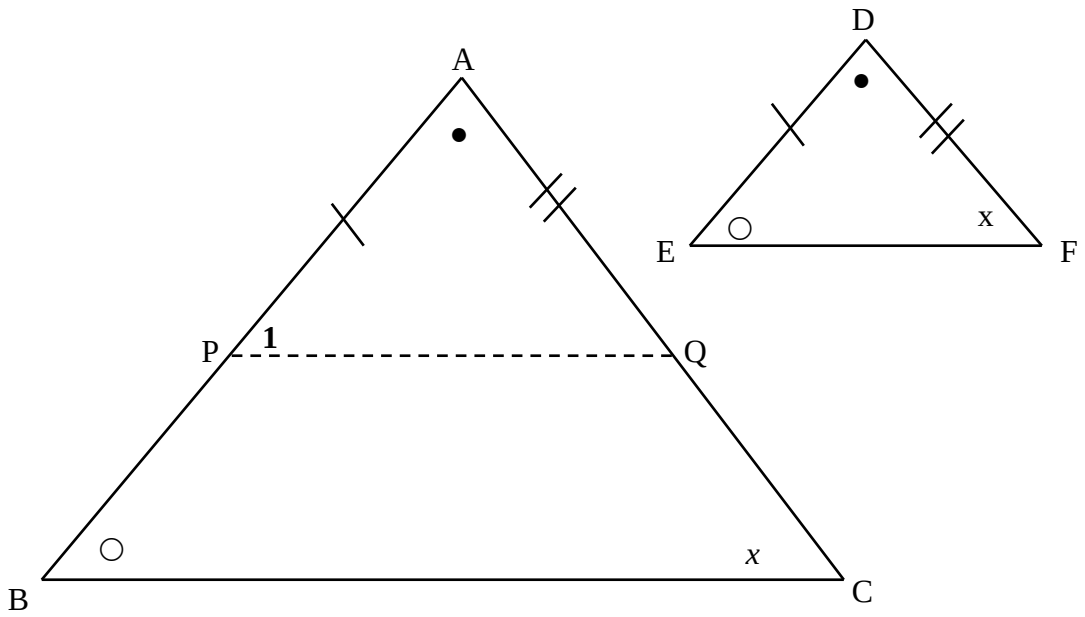
8.1.1	$\hat{H}_3 = 35^\circ$ [tan chord theorem/*tan koordteorie*] $\hat{E}_4 = \hat{H}_3 = 35^\circ$ [$\angle$ opp = sides/$\angle$*e teenoor = sye*]	✓S ✓R ✓S/R (3)
8.1.2	$E\hat{K}H = 180^\circ - 2(35^\circ)$ [sum of $\angle$'s in Δ/*som van* $\angle$*e* in Δ] $= 110^\circ$	✓S ✓ answer/*antwoord* (2)
8.1.3	$\hat{G} = 180^\circ - 110^\circ$ [opp $\angle$ of cyclic quad/$\angle$*e teenoor van kdvh*] $= 70^\circ$	✓S ✓R (2)
8.1.4	$\hat{O}_1 = 220^\circ$ [$\angle$ at centre = 2 × $\angle$ at circumference/midpts $\angle^e = 2$ *omtreks* $\angle^e$]	✓S ✓R (2)
8.2	$(x-4)^2 + 12^2 = x^2$ [Pythagoras] $x^2 - 8x + 16 + 144 = x^2$ $-8x = -160$ $x = 20$	✓S/R ✓expansion/ *uitbreiding* ✓ simplification/ *vereenvoudiging* ✓answer/*antwoord* (4)
		[13]

QUESTION/*VRAAG* 9

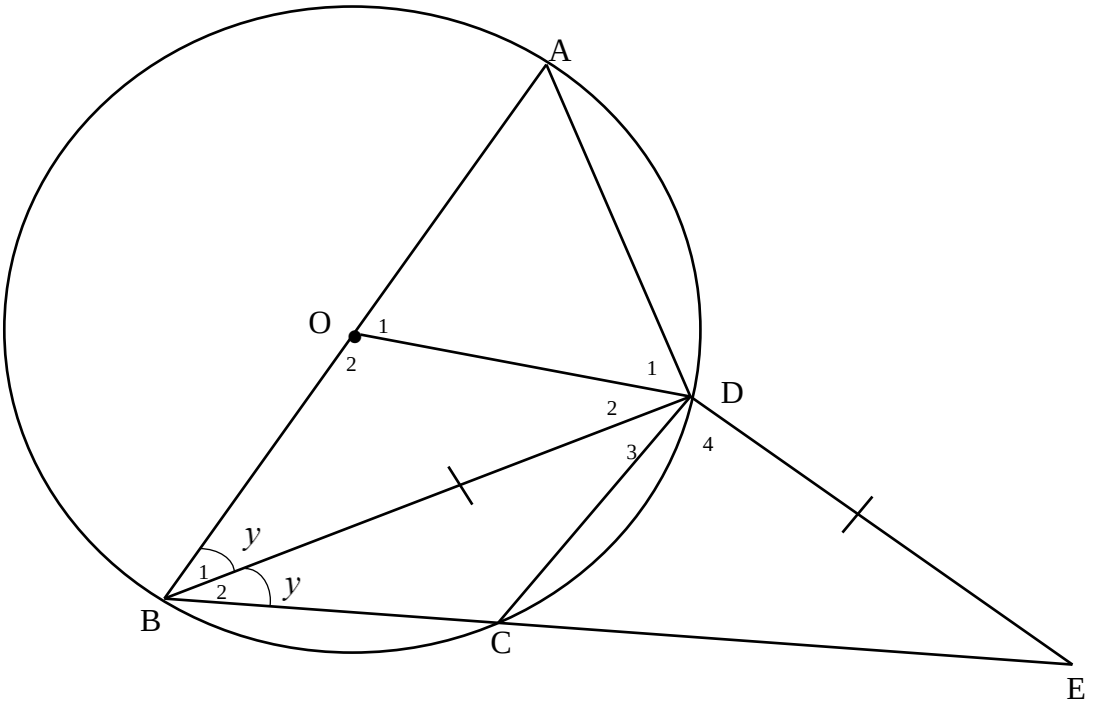


9.1.1	$\hat{C} = x$ [∠ at centre = 2 × ∠ at circumference/midpts ∠ = 2 × *omtreks* ∠] $\hat{B} = x$ [∠*s* in same segment/∠*e in dieselfde segment*] $\hat{D}_1 = x$ [corresp ∠s /*ooreenkomstige* ∠e; AC || DF] $B\hat{A}F = x$ [exterior ∠ of cyclic quad/*buite* ∠*kdvh*]	✓S/R ✓S/R ✓S✓R ✓S✓R (6)
9.1.2	$\hat{D}_1 = \hat{F}_2 = x$ ∴ DE = FE [$\angle^s$ opp = sides/∠*e teenoor = sye*] $\hat{E} = 180^o - 2x$ [sum of $\angle^s$ in Δ /*som van* $\angle^e$ in Δ]	✓ $\hat{D}_1 = \hat{F}_2$ ✓ $\hat{E} = 180^o - 2x$ (2)
9.1.3	$\hat{E} = 180^o - 2x$ [sum of $\angle^s$ in Δ /*som van* $\angle^e$ in Δ] $A\hat{O}D = 2x$ ∴ AODE is a cyclic quadrilateral/*is 'n kdvh* [converse of a cyclic quad/*omgek van kdvh*]	✓S ✓R (2)
9.2	$\frac{AF}{FE} = \frac{CD}{DE}$ [prop theorem/*eweredigh*] $\frac{12}{8} = \frac{AF}{10}$ AF = 15	✓S ✓R ✓ answer/*antwoord* (3)
		[13]

QUESTION/*VRAAG* 10

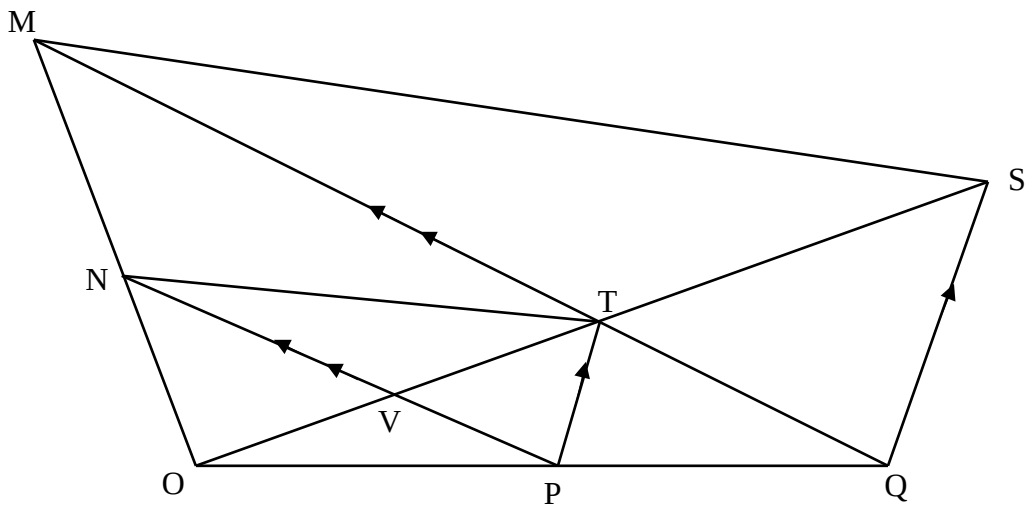


10.1	$\hat{A} = \hat{D}$ [given/*gegee*] AQ = DF [construction/*konstruksie*] AP = DE [construction/*konstruksie*] $\therefore \Delta APQ \equiv \Delta DEF$ [S∠S] $\hat{P}_1 = \hat{E}$ $\hat{P}_1 = \hat{B}$ [$\hat{E} = \hat{B}$] PQ || BC [corresp∠'s/*ooreenkomstige∠e*] $\frac{AP}{AB} = \frac{AQ}{AC}$ [PQ || BC] But/*maar* AP = DE and/*en* AQ = DF $\therefore \frac{DE}{AB} = \frac{DF}{AC}$	✓construction/*konstruksie* ✓S/R ✓ $\hat{P}_1 = \hat{E}$ ✓S/R ✓S (5)



10.2.1	$A\hat{D}B = 90^o$ $[\angle$ in semi-circle/*semi-sirkel* $]$ $\hat{A} = 90^o - y$ $[\angle$ in semi-circle/*semi-sirkel* $]$ $\hat{B}_2 = \hat{E}$ $[\angle^s$ opp = sides/*∠e teenoor = sye* $]$ $D\hat{C}E = \hat{A} = 90^o - y$ $\left[\begin{array}{l}\text{ext.}\angle \text{ of a cyclic quad} = \textit{int.opp}\angle \\ \textit{/verlengde}\angle\ \textit{van 'n Kdvh} = \textit{binne teenoorg}\angle\end{array}\right]$ $\therefore \hat{D}_4 = 90^o$ $[\text{sum of } \angle^s \text{ in } \Delta$ */ som van* $\angle^e$ in $\Delta]$	✓S/R ✓S ✓S/R ✓S/R ✓S/R (5)
10.2.2	$\hat{B}_1 = \hat{D}_2 = y$ $[\angle$ opp = sides/*∠e teenoor = sye* $]$ $\hat{B}_1 = \hat{B}_2$ [given/*gegee*] $\hat{E} = \hat{D}_2$ [proven/*bewys*] $\therefore \Delta BOD \text{ ||| } \Delta BDE$ $[\angle\angle\angle]$	✓S/R ✓S ✓R (3)
10.2.3	$\frac{DE}{OD} = \frac{BE}{BD}$ $[\text{|||}\ \Delta]$ but/*maar* $BD = DE$ [given/*gegee*] $\therefore \frac{DE}{OD} = \frac{BE}{DE}$ $DE^2 = BE.OD$	✓S ✓R ✓S ✓substitution/ *vervanging* (4)
		[17]

QUESTION/*VRAAG* 11



11.1	$\frac{ON}{NM}=\frac{OT}{TS}$ [prop theorem/*eweredigh*] $\frac{ON}{NM}=\frac{OP}{PQ}$ [prop theorem/*eweredigh*] $\therefore \frac{OT}{TS}=\frac{OP}{PQ}$ $\therefore NT \parallel MS$	✓S ✓ R ✓S ✓S (4)
11.2	$\frac{ON}{NM}=\frac{OT}{TS}=\frac{3}{5}$ [prop theorem/*eweredigh*] $OT=\frac{3}{8}\times 32$ $=12$ $VT=\frac{5}{8}\times 12$ $=\frac{15}{2}$ or 7,5	✓S/R ✓OT ✓method/*metode* ✓ answer/*antwoord* (4)
		[8]

TOTAL/*TOTAAL*: 150

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