



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2020

**MATHEMATICS P2
EXEMPLAR**

MARKS: 150

TIME: 3 hours



This question paper consists of 10 pages and an answer book of 20 pages.

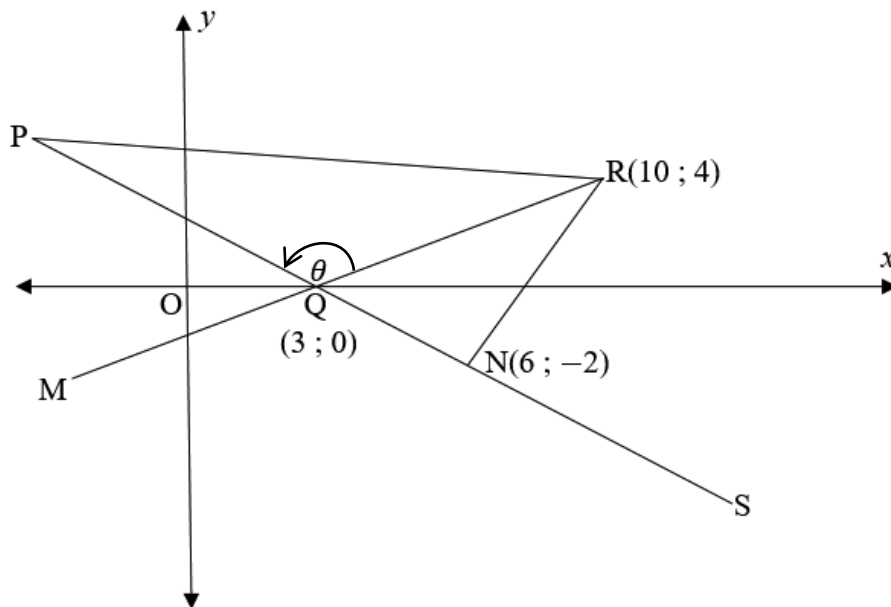
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 9 questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

QUESTION 1

In the diagram below, straight line PS is defined by $3y + 2x = 6$ and cuts the x -axis at $Q(3; 0)$. MQR is a straight line which meets PR at $R(10; 4)$. $N(6; -2)$ is a point on PS and RN is drawn. $\hat{PQR} = \theta$.

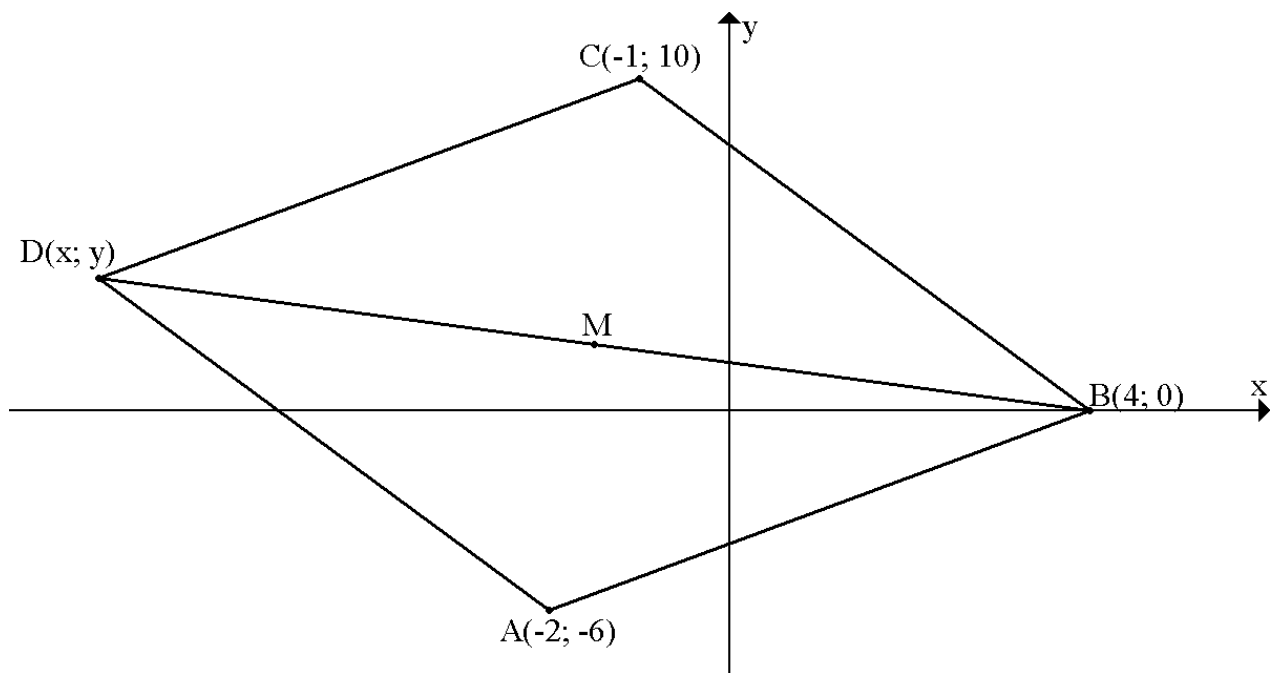


- 1.1 Determine the gradient of PS. (2)
- 1.2 Calculate the inclination angle of MR. (4)
- 1.3 Determine the value of θ . (3)
- 1.4 Prove that $RN \perp PS$. (3)
- 1.5 Calculate the area of $\triangle RQN$. (6)
- 1.6 Calculate the y -intercept of MR. (4)

[22]

QUESTION 2

ABCD is a parallelogram with $A(-2; -6)$, $B(4; 0)$, $C(-1; 10)$ and $D(x; y)$ as shown below.



- 2.1 Calculate the length of BC. (2)
- 2.2 Determine the gradient of AB. (2)
- 2.3 Determine the equation of CD. (3)
- 2.4 Determine the coordinates of M, the midpoint of BD. (3)
- 2.5 Hence or otherwise, determine the values of x and y . (3)

[13]

QUESTION 3

3.1 If $12 \tan B - 5 = 0$ and $90^\circ \leq B \leq 360^\circ$, determine the value of $\sin B + \cos B$ with the aid of a sketch. (5)

3.2 If $\sin 43^\circ = p$, determine the values of the following in terms of p , without a calculator.

3.2.1 $\cos 133^\circ$ (2)

3.2.2 $\tan(-43^\circ)$ (3)

3.3 Simplify each of the following fully, WITHOUT using a calculator:

3.3.1 $\frac{\sin(90^\circ - x)}{\sin(360^\circ - x)} \div \tan(x - 180^\circ)$ (5)

3.3.2 $\frac{\tan 205^\circ \cdot \cos 315^\circ \cdot \sin 135^\circ}{\sin 210^\circ \cdot \cos 150^\circ \cdot \tan 25^\circ}$ (7)
[22]

QUESTION 4

4.1 Prove that:

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

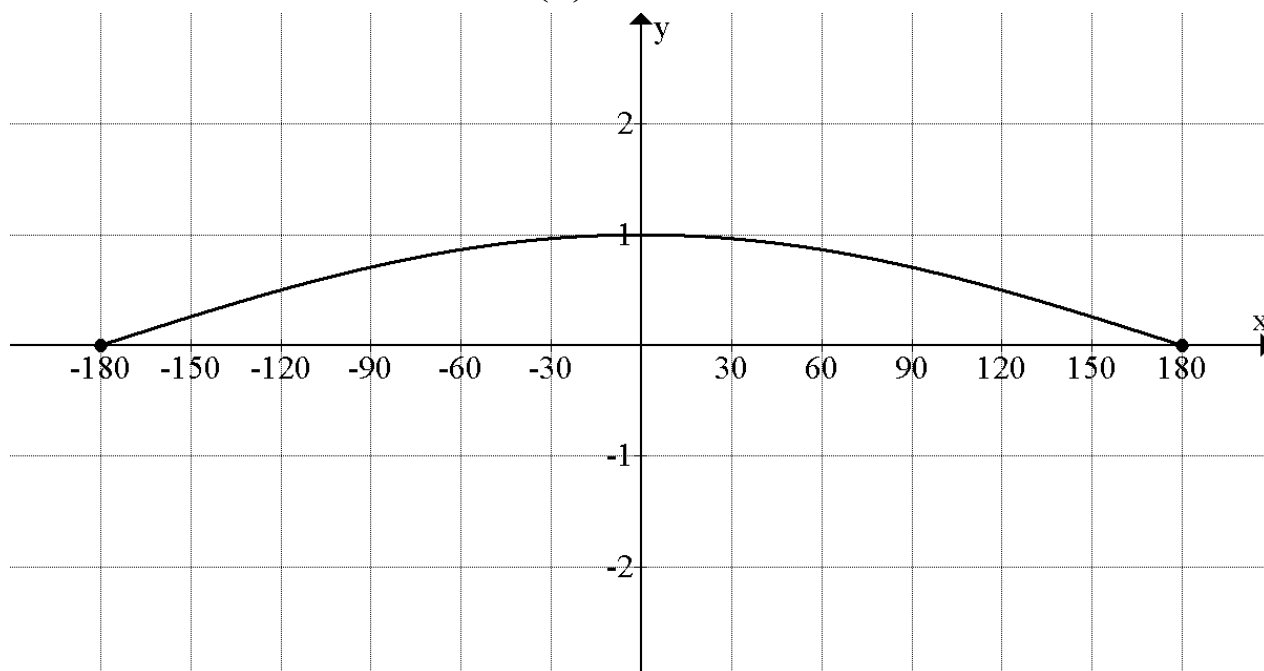
4.2 Determine the general solution of $2 \sin x \cos x - \cos^2 x = 0$ (6)

4.3 Solve for α if: $2\sqrt{\sin \alpha} = 1$, where $\alpha \in [0^\circ; 360^\circ]$ (3)

4.4 If x and y are acute angles such that $\tan\left(\frac{x+y}{2}\right) = 1$ and $\cos(x-y) = \frac{\sqrt{3}}{2}$, find the values of x and y . (5)
[18]

QUESTION 5

Sketched below is a graph of $f(x) = \cos\left(\frac{x}{2}\right)$, where $x \in [-180^\circ; 180^\circ]$.



5.1 For $f(x)$, write down the:

5.1.1 Range (2)

5.1.2 Period (1)

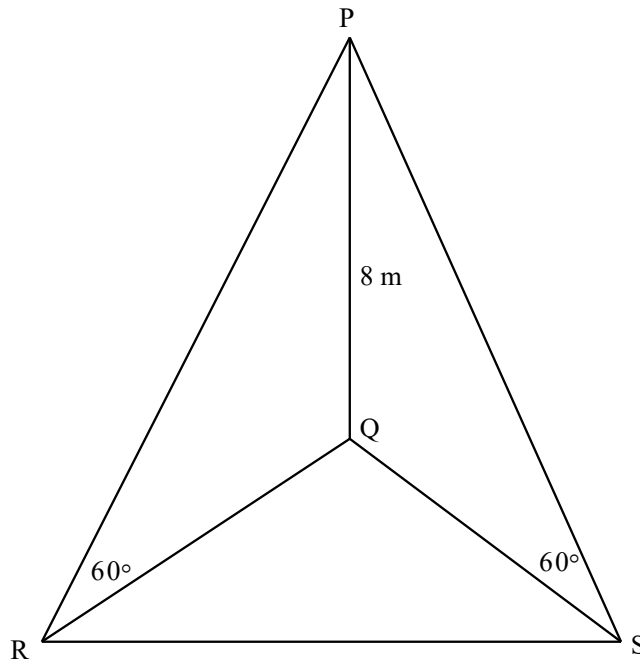
5.2 Draw a graph of $g(x) = \sin(x - 30^\circ)$ for $x \in [-180^\circ; 180^\circ]$ on the axes provided in the ANSWER BOOK. Clearly show all intercepts with the axes, turning point, starting and ending points. (4)

5.3 For which values of $x \in [-180^\circ; 180^\circ]$, is $f(x).g(x) \geq 0$? (3)

[10]

QUESTION 6

A pole, 8 m tall, is held in a vertical position by two steel cables of equal length. In the sketch, PQ is the pole and PS and PR are the steel cables. The angle of elevation of the top of the pole from the anchor points R and S is 60° in both cases.

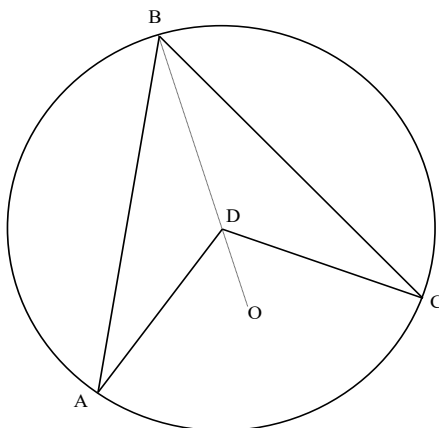


- 6.1 Determine the length of cable PS. Leave your answer in simplified surd form. (3)
- 6.2 Determine the distance between R and S, if $\hat{RQS} = 100^\circ$. Give your answer correct to TWO decimal digits. (7)

[10]

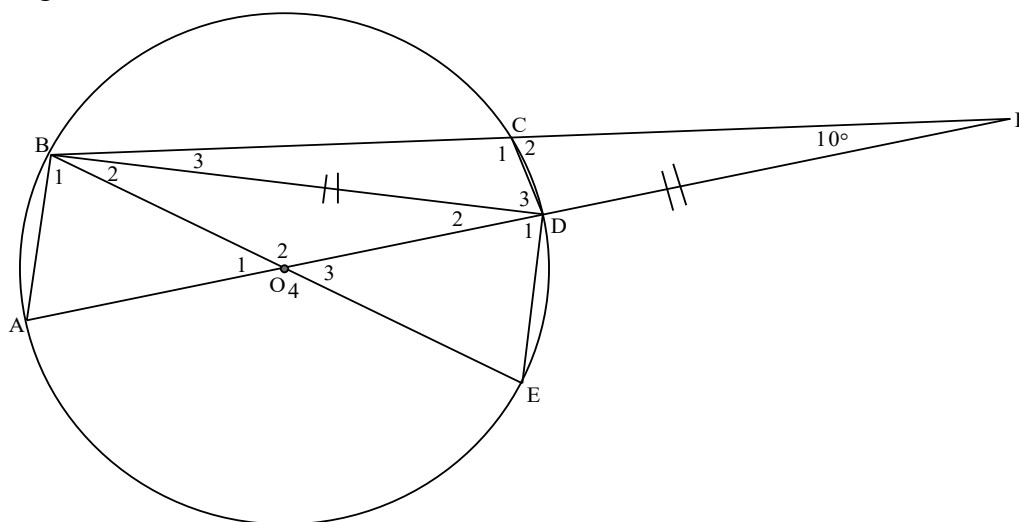
QUESTION 7

7.1 In the diagram below, D is the centre of circle ABC with radius BD produced to O.



Use the diagram to prove the theorem that states $\hat{ADC} = 2 \times \hat{ABC}$. (5)

7.2 In the figure, O is the centre of circle ABCDE. DB = DF. AODF, BOE and BCF are straight lines. $\hat{CFD} = 10^\circ$.



Calculate, giving reasons, the size of the following angles:

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)

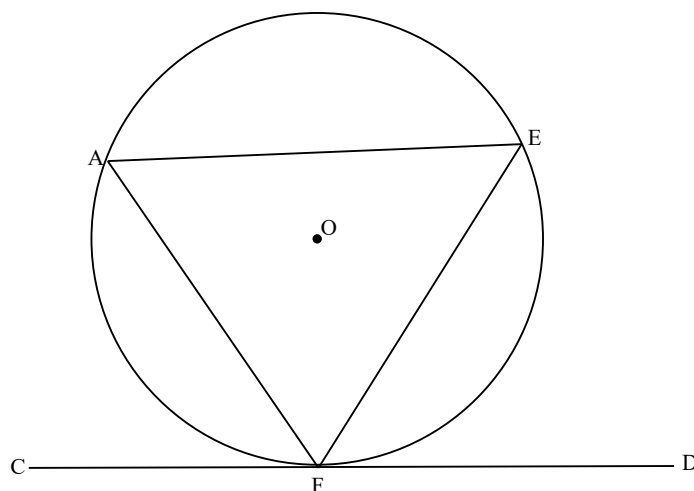
7.2.6 \hat{C}_2 (2)

7.2.7 \hat{O}_3 (2)

[22]

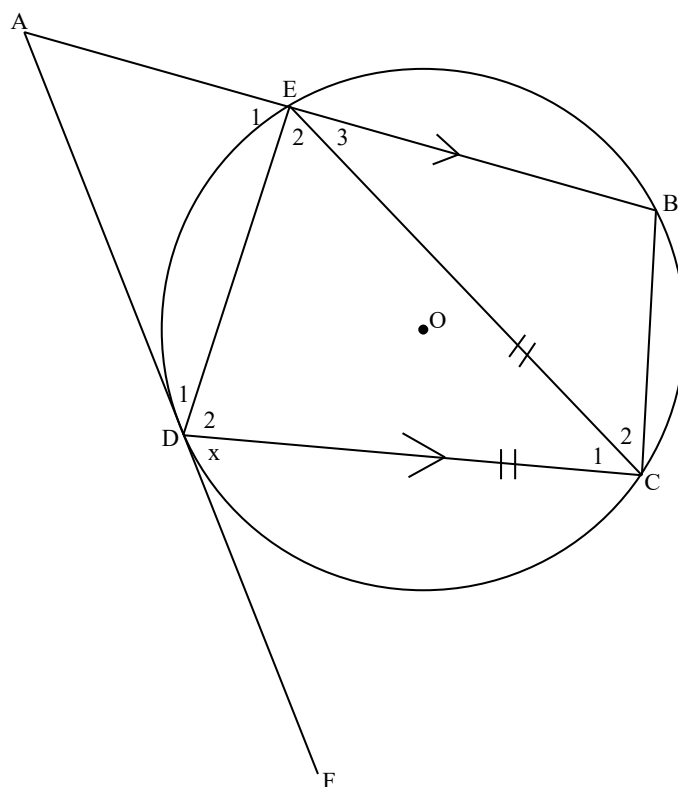
QUESTION 8

8.1 In the diagram below, O is the centre of circle AEF with CFD a tangent at F.



Use the diagram to prove the theorem which states that $\hat{EFD} = \hat{A}$. (5)

8.2 In the diagram below, ADF is a tangent to the circle with points E, B, C and D on the circumference of the circle. $AB \parallel DC$ and $EC = DC$.



8.2.1 If $\hat{CDF} = x$, name with reasons, FIVE other angles equal to x . (10)

8.2.2 Prove that ABCD is a parallelogram. (4)

[19]

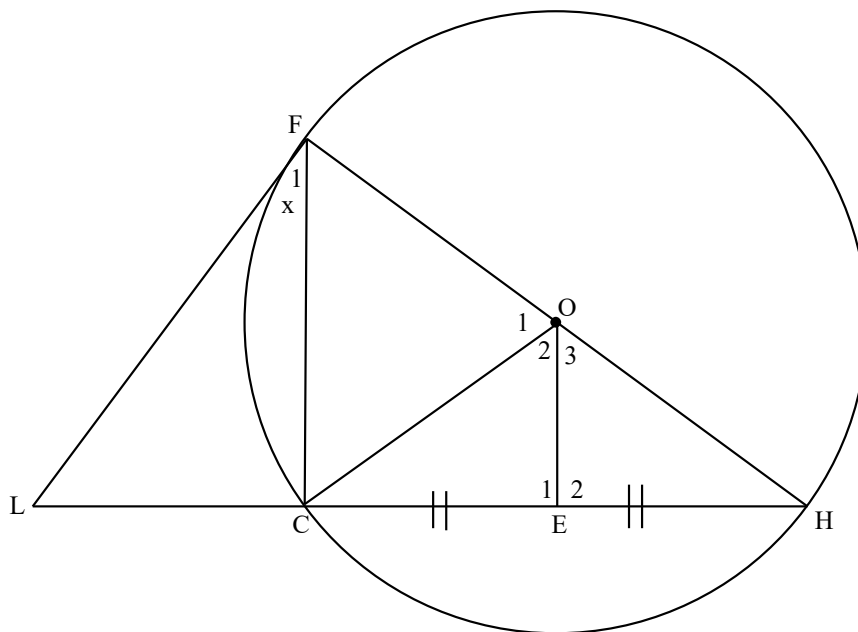
QUESTION 9

9.1 Complete the following theorem statements:

9.1.1 The line drawn from the centre of a circle to the midpoint of a chord is ... (1)

9.1.2 The exterior angle of a cyclic quadrilateral is equal to the ... (1)

9.2 In the diagram, FH is a diameter of the circle FCH with centre O. FC is a chord and LCH is a secant. LF is a tangent to the circle at F. E is a point on CH such that $CE = HE$.



9.2.1 Prove that $FC \parallel OE$. (5)

9.2.2 Prove that OFLE is a cyclic quadrilateral. (3)

9.2.3 If $\hat{F}_1 = x$, express \hat{O}_1 with reasons in terms of x . (4)

[14]

TOTAL: 150



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LEARNER'S NAME:
LEERDERNAAM:

GRADE 11:
GRAAD 11:

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

GRADE 11/*GRAAD 11*

NOVEMBER 2020

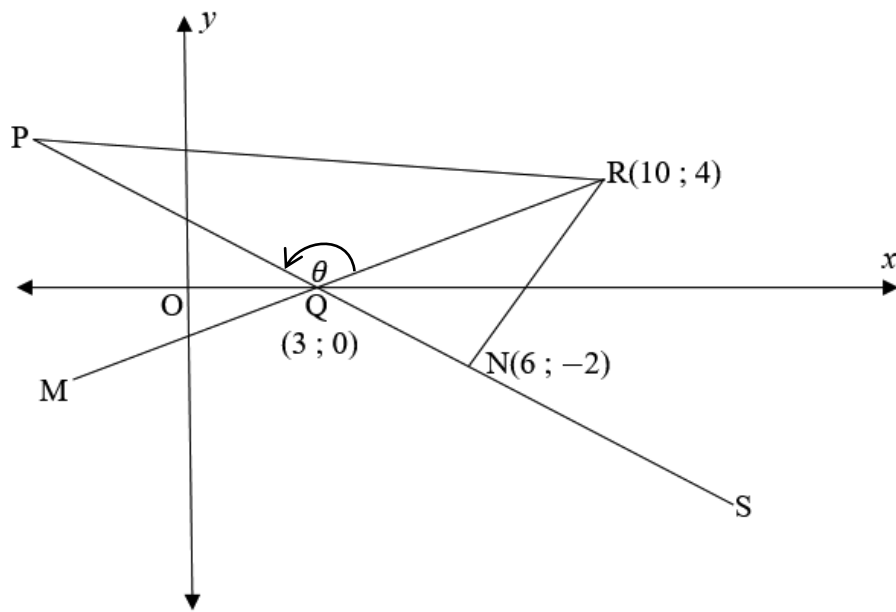
**MATHEMATICS P2/*WISKUNDE V2*
SPECIAL ANSWER BOOK/*SPESIALE ANTWOORDEBOEK*
(*EXEMPLAR/EKSEMPLAAR*)**

Marker/ <i>Merker</i>				Moderator's Initials / <i>Moderator se paraaf</i>											
Question <i>Vraag</i>	Mark <i>Punt</i>	Initial <i>Parafeer</i>	Marks <i>Punte</i>	S <i>M</i>	Marks <i>Punte</i>	D <i>M</i>	Marks <i>Punte</i>	P <i>M</i>	Marks <i>Punte</i>	NM					
1															
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This special answer book consists of 20 pages./
Hierdie spesiale antwoordeboek bestaan uit 20 bladsye.

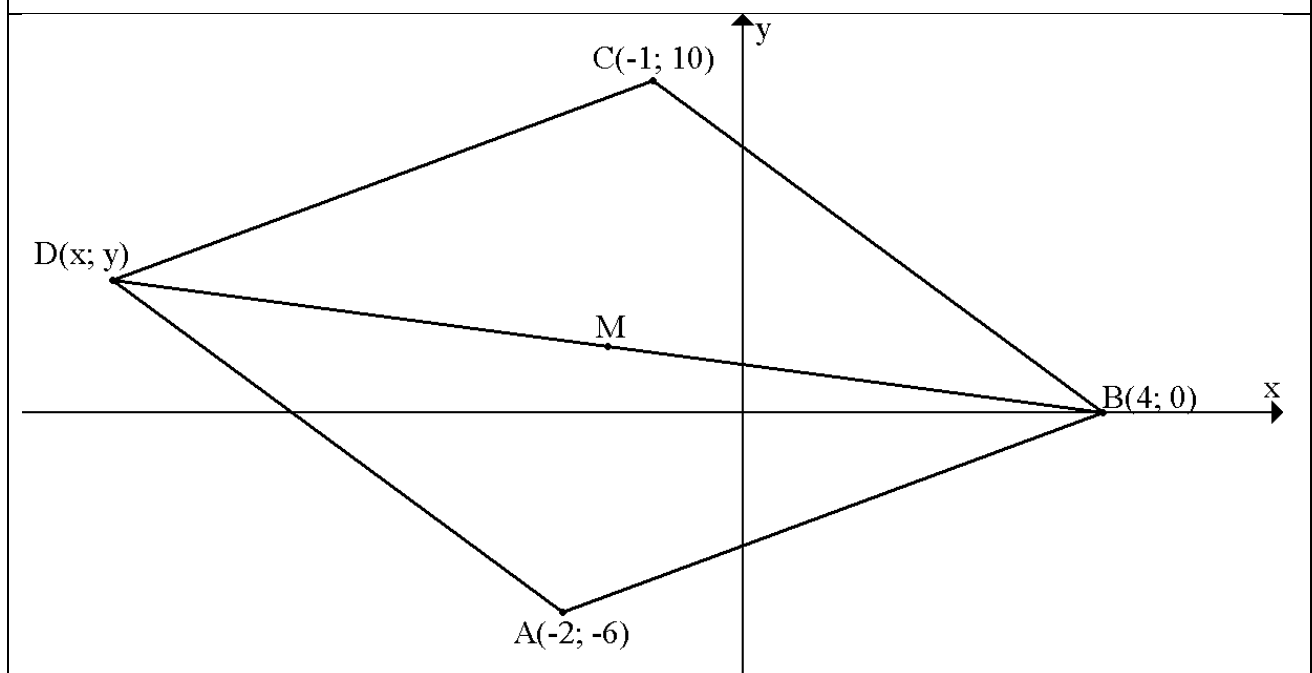
QUESTION 1/VRAAG 1



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]

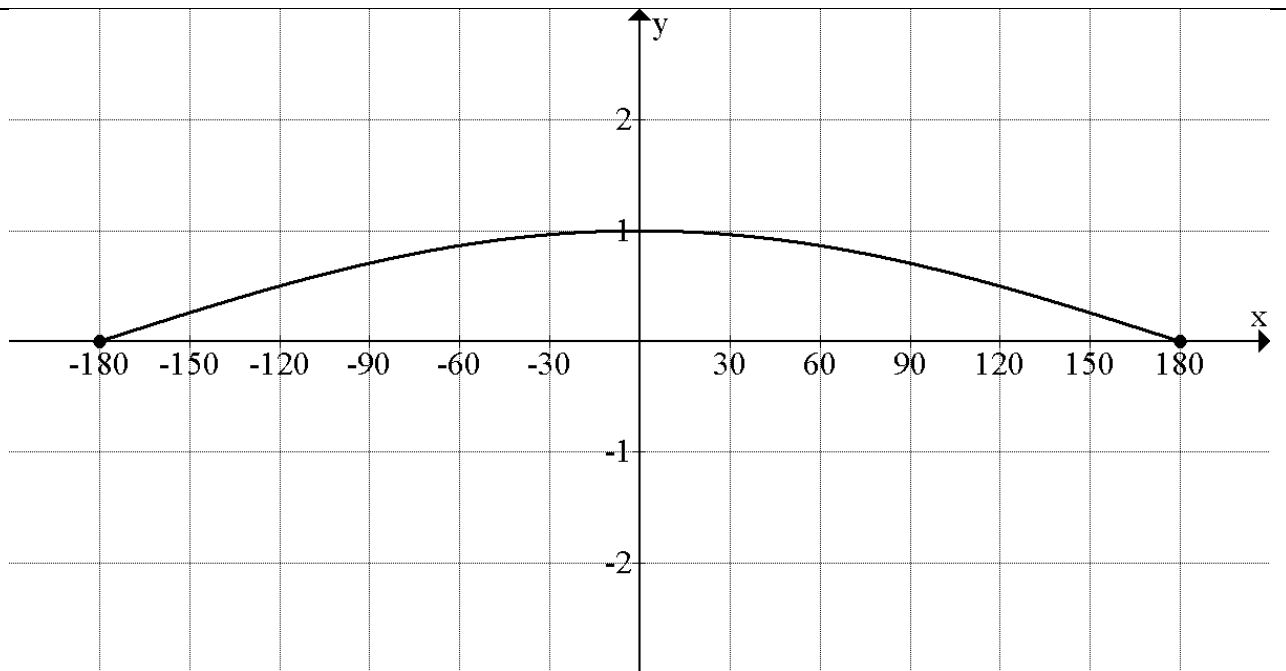
QUESTION 3/VRAAG 3Sketch here/*Teken hier:*

3.1	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	(5)
3.2.1	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	(2)
3.2.2	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	(3)

3.3.1		(5)
3.3.2		(7)
		[22]

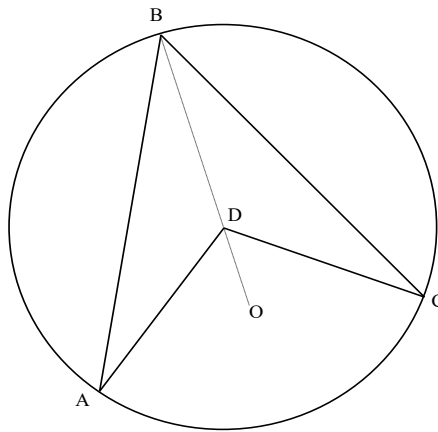
QUESTION 4/ <i>VRAAG 4</i>		
4.1		(4)
	4.2	

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/ <i>VRAAG 6</i>				
6.1				
6.2		(3)		
			(7)	
			[10]	

QUESTION 7/VRAAG 7

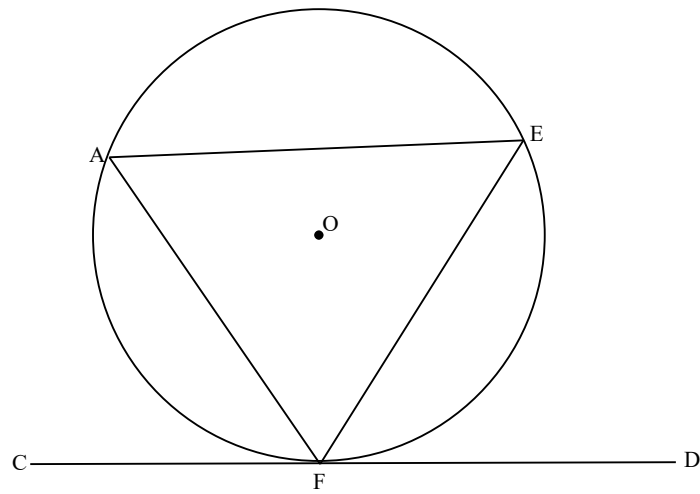
7.1

(5)

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

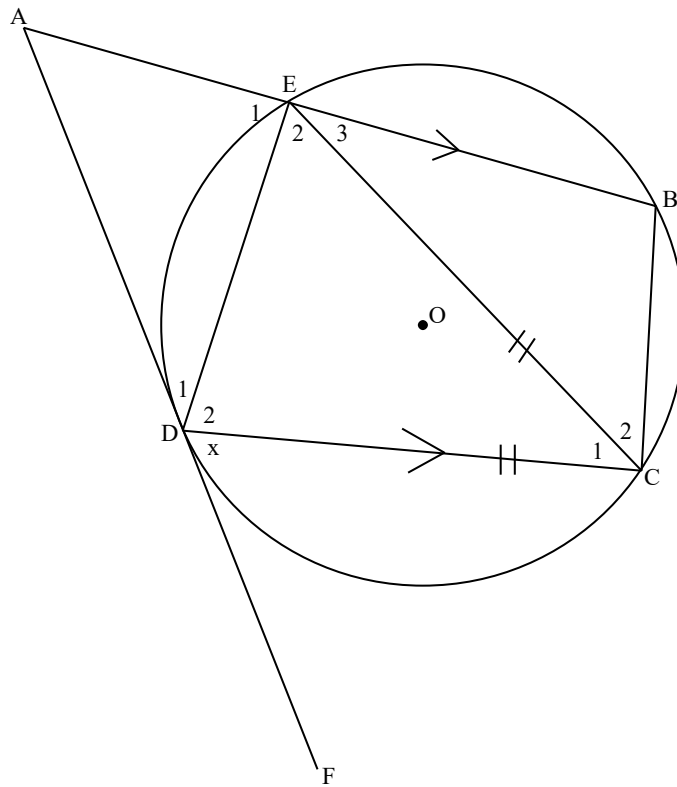
7.2.5		(2)
7.2.6		(2)
7.2.7		(2)
		[22]

QUESTION 8/VRAAG 8



8.1

(5)



8.2.1

(10)

8.2.2

(4)

[19]

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

[illegible]



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GRADE/*GRAAD* 11

NOVEMBER 2020

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

MARKS/*PUNTE*: 150

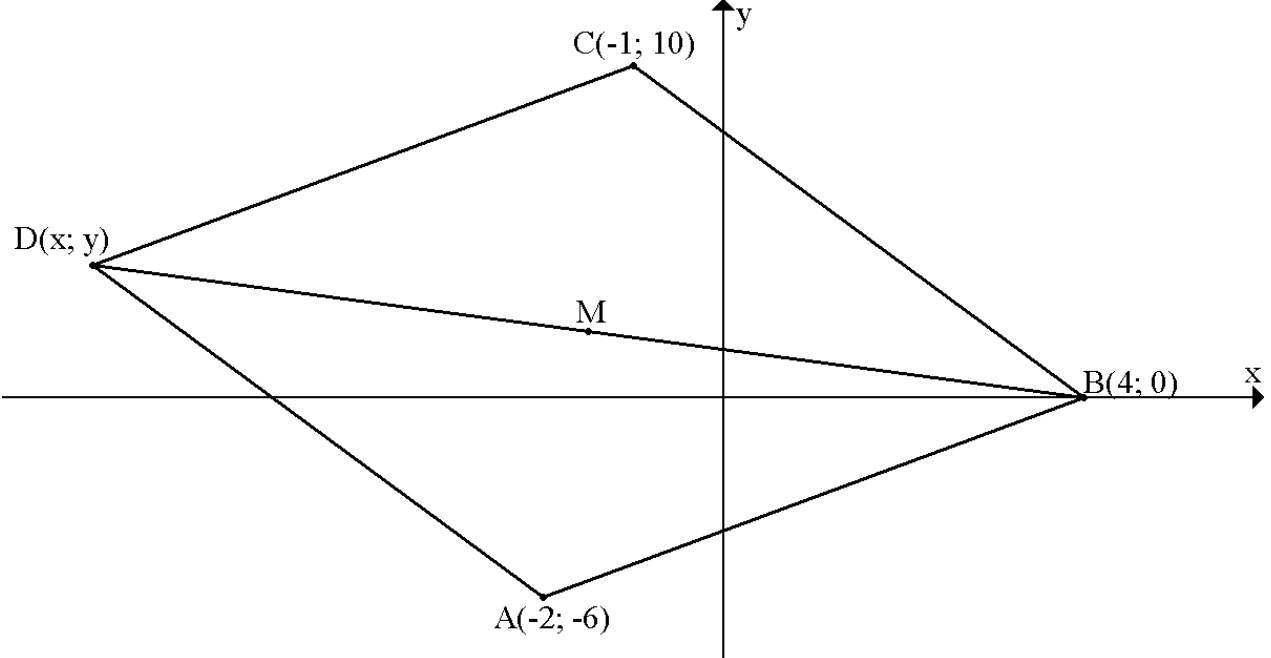
This marking guideline consists of 14 pages./
Hierdie nasienriglyn bestaan uit 14 bladsye.

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>vervang</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	$m_{MR} = \frac{4 - 0}{10 - 3} = \frac{4}{7}$ $\tan R\hat{Q}X = \frac{4}{7}$ $R\hat{Q}X = 29,74^\circ$	✓ $\frac{4-0}{10-3}$ ✓ gradient / <i>gradiënt</i> ✓ $\tan R\hat{Q}X = m_{RM}$ ✓ answer / <i>antwoord</i>	(4)
1.3	$\tan P\hat{Q}X = -\frac{2}{3}$ $P\hat{Q}X = 146,31^\circ$ $\theta = 146,31^\circ - 29,74^\circ$ $\theta = 116,57^\circ$	✓ $\tan P\hat{Q}X = -\frac{2}{3}$ ✓ $P\hat{Q}X = 146,31^\circ$ ✓ 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>vervang</i> ✓ answer / <i>antwoord</i> ✓ length QN / <i>lengte QN</i> ✓ choosing correct sides / <i>kies korrekte sye</i> ✓ substitution / <i>vervang</i> ✓ answer / <i>antwoord</i>	(6)

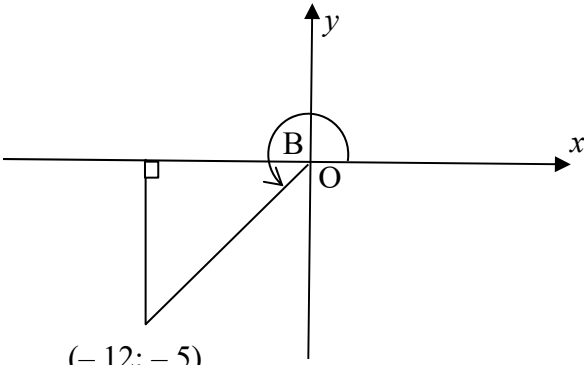
1.6	$\frac{y-0}{x-3} = \frac{4}{7}$ $7y = -12$ $y = -\frac{12}{7}$ <p style="text-align: center;">OR/OF</p> $y = \frac{4}{7}x + c$ <p>Subst./vervang (3; 0)</p> $0 = \frac{4}{7}(3) + c$ $c = -\frac{12}{7}$ $y = -\frac{12}{7}$	$\checkmark x = 0$ \checkmark substitution / vervanging \checkmark equation / vergelyking \checkmark y-coordinate / y-koördinaat <p style="text-align: center;">OR/OF</p> \checkmark equation / vergelyking \checkmark substitution / vervanging \checkmark value of c / waarde van c \checkmark 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 / <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>✓ x- value/waarde ✓ y-value/waarde Answer only: Full marks/ <i>Slegs antwoord: Volpunte</i></p>	(3)
			[13]

QUESTION 3 / VRAAG 3

3.1	 <p>$(-12; -5)$</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	$\frac{\sin \theta - \cos \theta \cdot \sin \theta}{\cos \theta - (1 - \sin^2 \theta)} = \tan \theta$ $\text{LHS} = \frac{\sin \theta(1 - \cos \theta)}{\cos \theta - \cos^2 \theta}$ $= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta(1 - \cos \theta)}$ $= \tan \theta$	✓ factorising / <i>faktorisering</i> ✓ $\cos^2 \theta$ ✓ common factor / <i>gemene faktor</i> ✓ answer / <i>antwoord</i>	(4)
4.2	$2 \sin x \cos x - \cos^2 x = 0$ $\cos x(2 \sin x - \cos x) = 0$ $\cos x = 0 \quad \text{or/of} \quad 2 \sin x = \cos x$ $\cos x = 0 \quad \text{or/of} \quad \tan x = \frac{1}{2}$ $x = 90^\circ + 360^\circ \cdot k \quad \text{or/of} \quad x = 270^\circ + 360^\circ \cdot k$ $\text{or/of} \quad x = 26,57^\circ + 180^\circ \cdot k$	✓ factors / <i>faktore</i> ✓ $\cos x = 0$ ✓ $\tan x = \frac{1}{2}$ ✓ $x = 90^\circ + 360^\circ \cdot k$ ✓ $x = 270^\circ + 360^\circ \cdot k$ ✓ $x = 26,57^\circ + 180^\circ \cdot k$	(6)
4.3	$2\sqrt{\sin \alpha} = 1$ $\sqrt{\sin \alpha} = \frac{1}{2}$ $\sin \alpha = \frac{1}{4}$ $\alpha = 14,48^\circ \quad \text{or/of} \quad \alpha = 165,52^\circ$	$\sin \alpha = \frac{1}{4}$ $\alpha = 14,48^\circ$ $\alpha = 165,52^\circ$	(3)
4.4	$\tan\left(\frac{x+y}{2}\right) = 1 \quad \text{and/en} \quad \cos(x-y) = \frac{\sqrt{3}}{2}$ $\frac{x+y}{2} = 45^\circ \quad \text{and/en} \quad x-y = 30^\circ$ $x+y = 90^\circ \dots\dots\dots(1)$ $x-y = 30^\circ \dots\dots\dots(2)$ $2x = 120^\circ$ $x = 60^\circ$ $y = 30^\circ$	✓ $\frac{x+y}{2} = 45^\circ$ ✓ $x-y = 30^\circ$ ✓ setting up equations/ <i>opstel van vergelykings</i> ✓ <i>x-value/waarde</i> ✓ <i>y-value/waarde</i>	(5)
			[18]

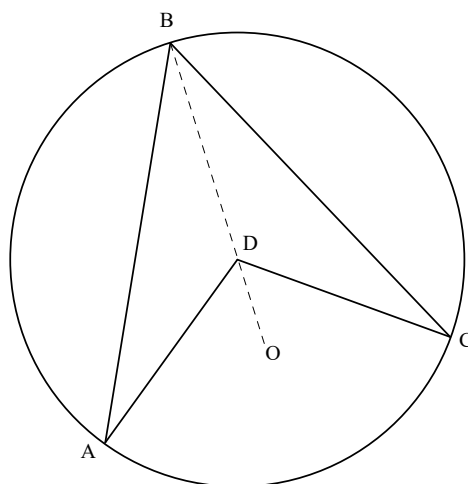
QUESTION 5 / VRAAG 5

5.1.1	$0 \leq y \leq 1$ or $[0;1]$	✓0 ✓1	(2)
5.1.2	Period = 720°	✓answer	(1)
5.2			
	✓ shape / vorm ✓ x-intercept / x-afsnit ✓ y-intercept / y-afsnit ✓ turning points / draaipunte		
			(4)
5.3	$-180^\circ \leq x \leq -150$ or/of $30^\circ \leq x \leq 180^\circ$	✓✓ $-180^\circ \leq x \leq -150$ ✓ $30^\circ \leq x \leq 180^\circ$	(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 $\triangle PQS$: $\tan 60^\circ = \frac{PQ}{QS}$</p> $QS = \frac{8}{\tan 60^\circ} = \frac{8\sqrt{3}}{3} \text{ m}$ $QR = \frac{8\sqrt{3}}{3} \text{ m}$ <p>In $\triangle RQS$: $RS^2 = QR^2 + QS^2 - 2 \cdot QR \cdot QS \cdot \cos 100^\circ$</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]

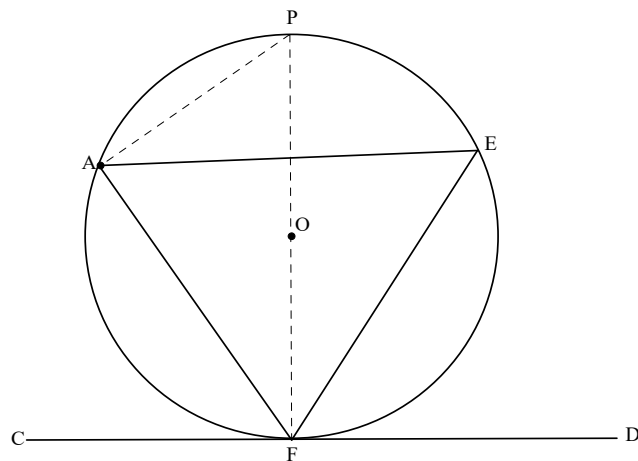
QUESTION 7 / VRAAG 7



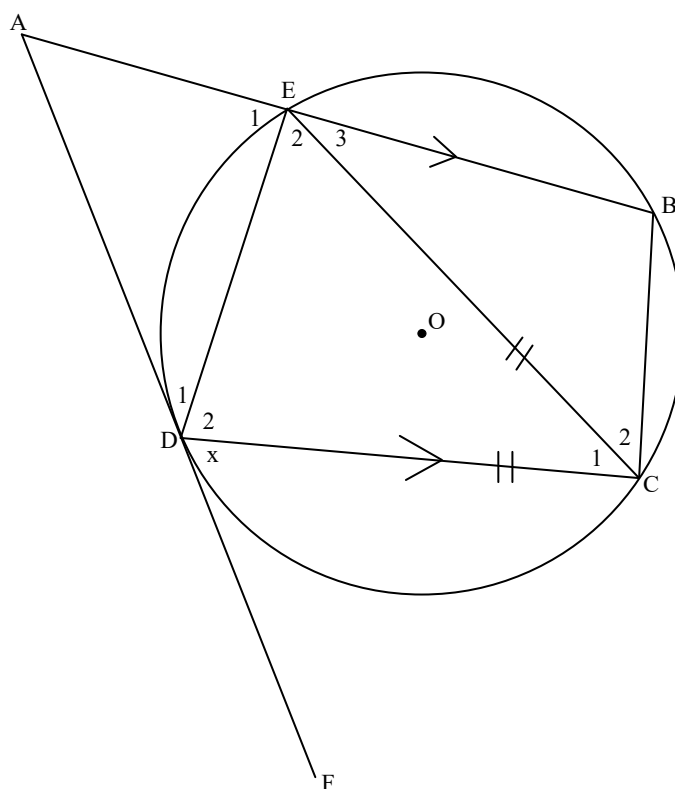
7.1	<p>Let/Laat $\hat{A} = x$</p> <p>$\hat{BAD} = x$ (angles opp = sides)/(hoeke teenoor = sye)</p> <p>$\hat{ADO} = 2x$ (angle at the centre)/(middelpuntshoek)</p> <p>Similarly, if you let / Net so, as jy: $\hat{C} = y$;</p> <p>then/dan: $\hat{CDO} = 2y$</p> <p>$\therefore \hat{ADC} = 2x + 2y = 2(x + y)$</p> <p>$= 2 \hat{ABC}$</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>$\hat{ABD} = 90^\circ$ (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) 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)/(hoeke in dieselfde segment) OR/OF $\hat{E} = 70^\circ$ (opposite angles of a c.q.)/(teenoorst. hoeke van k.v)	\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.)/(buitehoek van k.v) OR/OF $\hat{C}_2 + 110^\circ = 180^\circ$ (\angle s on a straight line)/(hoeke op 'n reguitlyn) $\hat{C}_2 = 70^\circ$	\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)/(regoorstaande \angle e)	\checkmark S \checkmark R	(2)
			[22]

QUESTION 8 / VRAAG 8

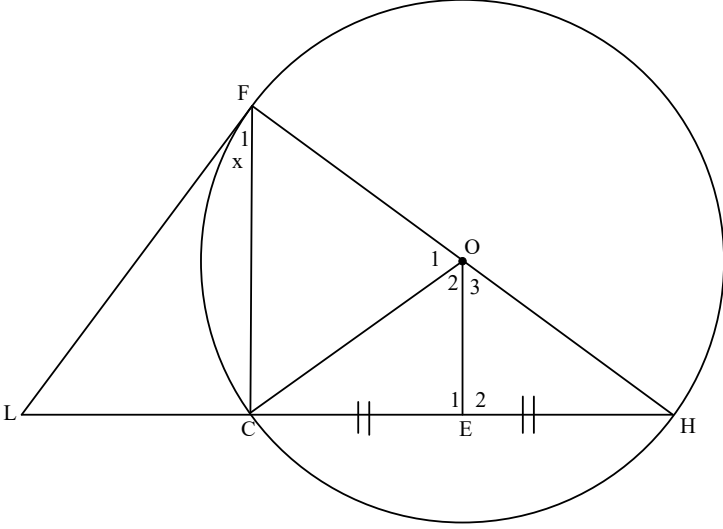


8.1	<p>ENG</p> <p>Draw diameter FP and join PA</p> <p>Let $\hat{EFD} = x$</p> <p>$\hat{OFD} = 90^\circ$ (tan \perp radius)</p> <p>$\therefore \hat{OFE} = 90^\circ - x$</p> <p>$\therefore \hat{PAE} = 90^\circ - x$ (angles in the same segment)</p> <p>$\hat{PAF} = 90^\circ$ (angles in a semi circle)</p> <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 \parallel DC)/(ooreenkomstige hoeke; AB \parallel DC) $\hat{E}_2 = x$ (tan-chord) / (raaklyn-koord) $\hat{D}_2 = x$ (angles opposite = sides) / (hoeke teenoor = sye) $\hat{E}_1 = x$ (alternate angles, AB \parallel DC)/(verwisselende hoeke; AB \parallel DC) $\hat{C}_{1+2} = \hat{E}_1 = x$ (exterior angle of a c.q.)/(buitehoek van 'n k.v)	\checkmark S \checkmark R \checkmark S \checkmark R \checkmark S \checkmark R \checkmark S \checkmark R \checkmark S \checkmark R	(10)
8.2.2	$\hat{B} = 180^\circ - x$ (opposite angles of a c.q.) (teenoorst. hoeke van 'n k.v) $\hat{A} + \hat{B} = x + (180^\circ - x) = 180^\circ$ $\therefore AD \parallel BC$ (co-interior angles formed =) (ko-binne hoeke gevorm = 180°) $\therefore ABCD$ is a parallelogram (opp. sides \parallel) $ABCD$ is 'n parallelogram (teenoorst. sye \parallel)	\checkmark S \checkmark R \checkmark R \checkmark R	(4)
			[19]

QUESTION 9 / VRAAG 9

9.1.1	perpendicular to the chord / <i>loodreg op die koord</i>	✓ answer/antwoord	(1)
9.1.2	interior opposite angle / <i>teenoorstaande binnehoek</i>	✓ 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

