



Province of the
EASTERN CAPE
EDUCATION



NASIONALE SENIOR SERTIFIKAAT

GRAAD 11

NOVEMBER 2022

WISKUNDE V2

PUNTE: 150

TYD: 3 uur

Hierdie vraestel bestaan uit 14 bladsye, insluitend 'n
inligtingsblad en 'n antwoordeboek van 20 bladsye.

INSTRUKSIES EN INLIGTING

Lees die volgende instruksies sorgvuldig deur voordat jy die vrae beantwoord.

1. Hierdie vraestel bestaan uit 10 vrae.
2. Beantwoord AL die vrae in die SPESIALE ANTWOORDEBOEK wat voorsien is.
3. Toon duidelik aan ALLE berekeninge, diagramme, grafieke, ensovoorts wat jy gebruik het om jou antwoorde te bepaal.
4. Antwoorde alleen sal NIE noodwendig volpunte toegeken word NIE.
5. Jy mag 'n goedgekeurde wetenskaplike sakrekenaar (nieprogrammeerbare en niegrafies) gebruik, tensy anders vermeld word.
6. Indien nodig, rond antwoorde af tot TWEE desimale plekke, tensy anders vermeld word.
7. Diagramme is NIE noodwendig volgens skaal geteken NIE.
8. 'n Inligtingsblad met formules is aan die einde van die vraestel ingesluit.
9. Skryf netjies en leesbaar.

VRAAG 1

Die volgende tabel toon 'n slaappatroon-opname, in ure, van tien graad 11-leerders:

Leerder	1	2	3	4	5	6	7	8	9	10
Aantal ure geslaap	7	8	8	5	6	3	4	8	7	10

- 1.1 Bereken die gemiddelde aantal ure wat leerders geslaap het. Gee die antwoord korrek tot TWEE desimale plekke. (1)
- 1.2 Skryf die vyf-getal-opsomming van hierdie data neer. (2)
- 1.3 Teken 'n mond-en-snordigram vir hierdie datastel. (2)
- 1.4 Verwys na jou diagram en lewer kommentaar oor die skeefheid van die data en gee 'n rede vir jou antwoord. (2)
- 1.5 Bereken die standaardafwyking vir hierdie data. Gee jou antwoord korrek tot TWEE desimale plekke. (2)
- 1.6 'n Leerder sal beskou word dat hy goed geslaap het, indien sy slaaptyd meer as een standaardafwyking bo die gemiddelde is. Hoeveel leerders het goed geslaap? (2)

[11]

VRAAG 2

Die verskillende ouderdomme van onderwysers by 'n sekere skool in die Oos-Kaap word in die tabel hieronder gegee.

2.1 Voltooi die volgende tabel in jou ANTWOORDEBOEK.

OUERDOM	FREKWENSIE	KUMULATIEWE FREKWENSIE
$25 < A \leq 30$	2	
$30 < A \leq 35$	8	
$35 < A \leq 40$	4	
$40 < A \leq 45$	5	
$45 < A \leq 50$	11	
$50 < A \leq 55$	19	
$55 < A \leq 60$	20	
$60 < A \leq 65$	6	

(2)

2.2 Teken 'n ogief, op die assestelsel wat in jou ANTWOORDEBOEK voorsien is, om die data in die tabel voor te stel.

(4)

2.3 Gebruik jou grafiek om die geskatte mediaan ouderdom te vind.

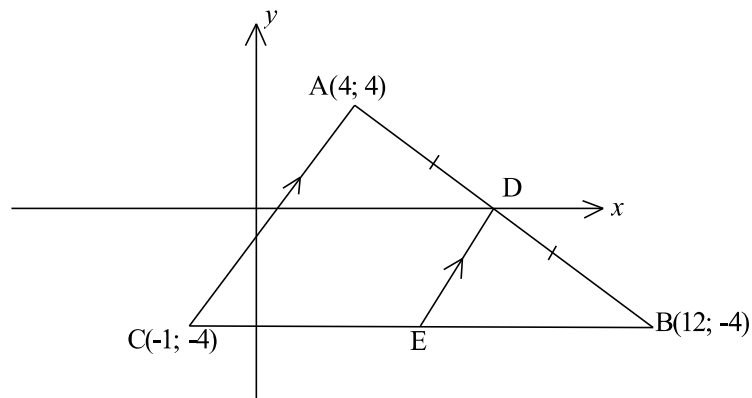
(2)

2.4 Die skool wil graag vir al die onderwysers ouer as 57 'n spesiale geskenk gee. Gebruik jou grafiek om 'n skatting vir die persentasie van onderwysers ouer as 57 jaar te vind.

(2)
[10]

VRAAG 3

In die diagram hieronder, word die koördinate van $A(4; 4)$, $B(12; -4)$ en $C(-1; -4)$ gegee. $AC \parallel DE$ en CEB is 'n reguitlyn. D is die middelpunt van AB .



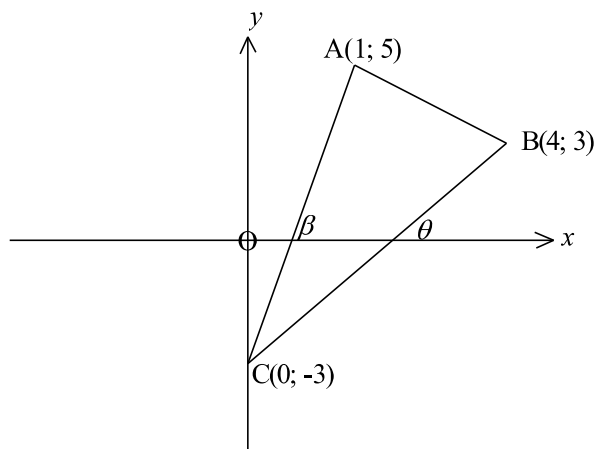
Bepaal:

- 3.1 Die lengte van AB . Gee jou antwoord korrek tot TWEE desimale plekke. (2)
- 3.2 Die koördinate van D , die middelpunt van AB (2)
- 3.3 Die vergelyking van lyn DE (4)
- 3.4 Die koördinate van E (3)

[11]

VRAAG 4

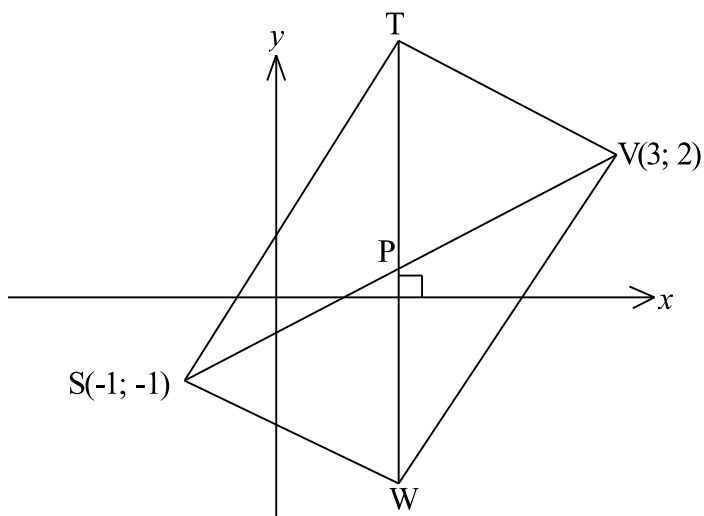
$A(1; 5)$, $B(4; 3)$ and $C(0; -3)$ is hoekpunte van die driehoek hieronder gegee.



- 4.1 Bepaal, deur enige metode te gebruik, die koördinate van D as ABCD 'n parallelogram is. (2)
- 4.2 Indien die afstand tussen C en $F(8; p)$, 12 eenhede is, bepaal die waarde(s) van p (tot die naaste heelgetal). (5)
- 4.3 Bepaal die grootte van $\widehat{ACB}$. (5)
- [12]**

VRAAG 5

In die diagram hieronder is die hoeklyne van STVW gelyk in lengte en halveer mekaar by P. Bereken die koördinate van T en W.



(6)

VRAAG 6

- 6.1 As $-3 \sin \beta - 2 = 0$ en $\beta \in [0^\circ; 270^\circ]$, gebruik 'n skets in die korrekte kwadrant om die waarde van: $1 + \tan^2 \beta$ sonder die gebruik van 'n sakrekenaar te bepaal. (5)

- 6.2 As $\cos 75^\circ = m$, druk elk van die volgende in terme van m uit.
Toon al jou bewerkings:

6.2.1 $\cos^2 105^\circ$ (2)

6.2.2 $\sin 15^\circ$ (2)

6.2.3 $\tan 15^\circ$ (2)

- 6.3 Gegee die uitdrukking:

$$\frac{\cos(180^\circ - k) \cdot \sin(k - 90^\circ) - 1}{\tan^2(540^\circ + k) \cdot \sin(90^\circ + k) \cdot \cos(-k)}$$

- 6.3.1 Vereenvoudig die uitdrukking. (7)

- 6.3.2 Bepaal die waardes van $k \in [0^\circ; 360^\circ]$ waarvoor die uitdrukking ongedefinieerd is. (6)

- 6.4 Bewys dat:

$$\frac{1 + \sin \theta}{1 - \sin \theta} - \frac{1 - \sin \theta}{1 + \sin \theta} = \frac{4 \tan \theta}{\cos \theta} \quad (5)$$

- 6.5 Bepaal die algemene oplossing van:

$$6 \sin^2 \theta + \cos \theta = 4 \quad (7)$$

- 6.6 As $p = \tan A + \sin A$ en $q = \tan A - \sin A$, bewys dat:

$$pq = \tan^2 A \cdot \sin^2 A \quad (5)$$

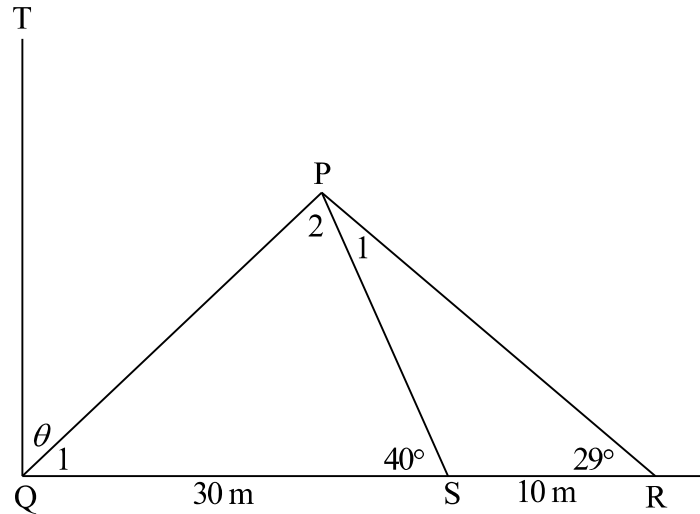
[41]

VRAAG 7

Bestudeer die diagram hieronder en beantwoord dan die vrae wat volg.

$\widehat{TQR} = 90^\circ$, $\widehat{QSP} = 40^\circ$, $\widehat{SRP} = 29^\circ$, $QS = 30$ m en $SR = 10$ m.

Dit is ook gegee dat $\widehat{TQP} = \theta$.



7.1 Gee 'n rede waarom $\widehat{P}_1 = 11^\circ$. (1)

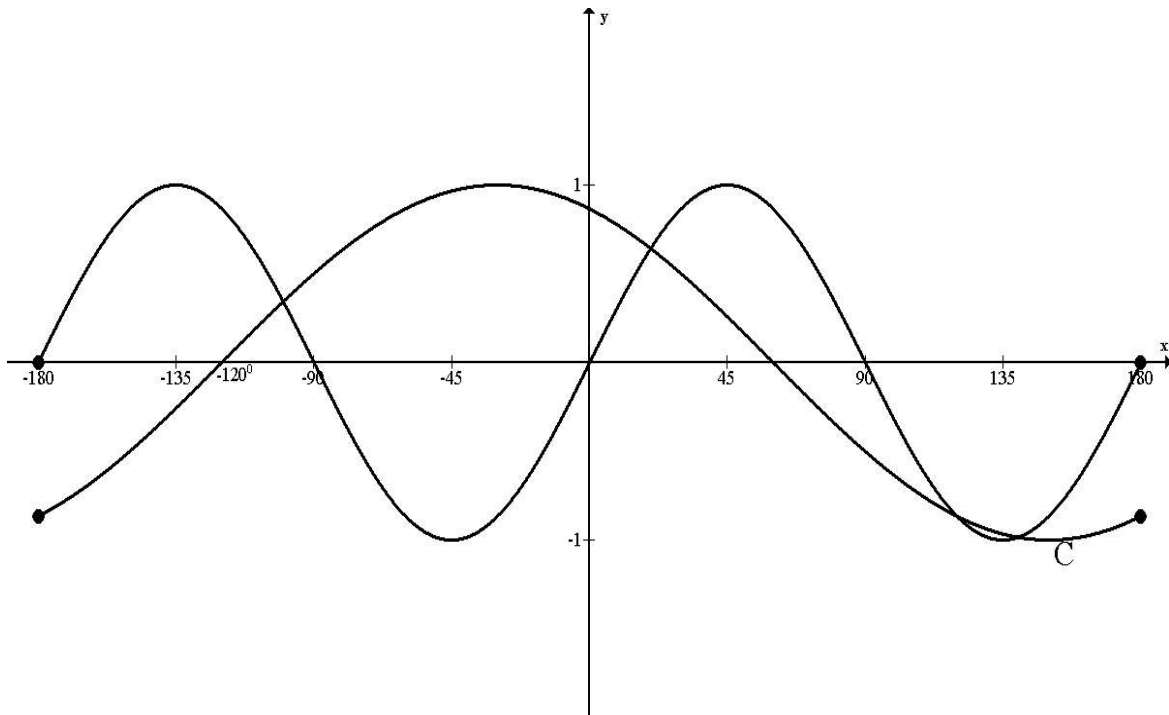
7.2 Bereken die lengte van PS. (3)

7.3 Bepaal die waarde van θ , korrek tot die naaste grade. (5)

[9]

VRAAG 8

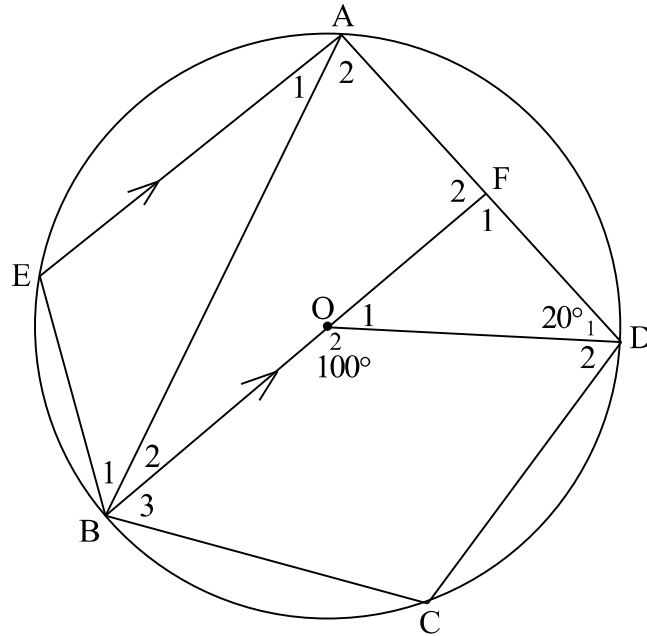
Die sketsgrafieke van $f(x) = \sin ax$ en $g(x) = \cos(x - b)$ is hieronder gegee.



- 8.1 Bepaal die waardes van a en b . (2)
 - 8.2 Bepaal die koördinate van C, 'n draaipunt op $g(x)$. (2)
 - 8.3 Vir watter waardes van x , waar $x < 0$, is $f(x) \cdot g(x) \geq 0$? (3)
 - 8.4 Bepaal die vergelyking van $f(x)$ as die y -as 30° na links beweeg word. (1)
- [8]**

VRAAG 9

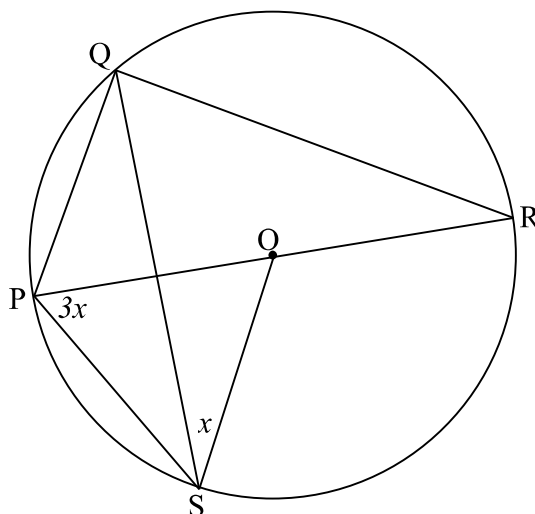
- 9.1 In diagram hieronder is O die middelpunt van sirkel AEBCD, met lyn BOF $\parallel$ EA. F lê op AD, $\widehat{BOD} = 100^\circ$ en $\widehat{D}_1 = 20^\circ$. Die groottes van sommige hoeke word in die tabel hieronder gegee. Verskaf, in elke geval, 'n geldige rede.



	STELLING	REDE
9.1.1	$\widehat{A}_2 = 50^\circ$	
9.1.2	$\widehat{O}_1 = 80^\circ$	
9.1.3	$\widehat{F}_1 = 80^\circ$	
9.1.4	$\widehat{A}_1 = 30^\circ$	
9.1.5	$\widehat{B}_2 = 30^\circ$	

(5)

- 9.2 P, Q en R is punte op die omtrek van die sirkel met middelpunt O. PR is die middellyn van die sirkel. $\widehat{QSO} = x$ en $\widehat{OPS} = 3x$.



Druk elk van die volgende in terme van x uit, en gee 'n rede vir jou antwoord.

9.2.1 $\widehat{SQR}$ (2)

9.2.2 $\widehat{PQS}$ (3)

9.2.3 $\widehat{PSQ}$ (3)

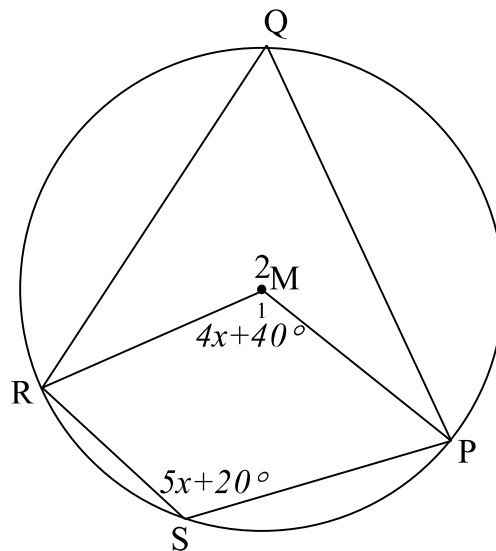
9.2.4 $\widehat{PRQ}$ (2)

9.2.5 $\widehat{QPR}$ (2)

[17]

VRAAG 10

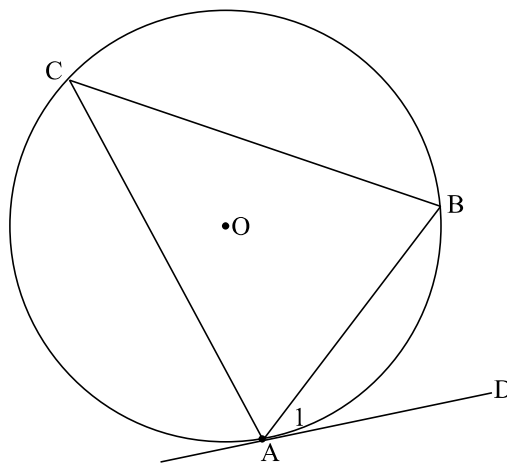
- 10.1 In die figuur is P, Q, R en S punte op die omtrek van sirkel met middelpunt M.
Dit word gegee dat $\widehat{M}_1 = 4x + 40^\circ$ en $\widehat{S} = 5x + 20^\circ$.



Bereken, met redes, die grootte van $\widehat{Q}$.

(5)

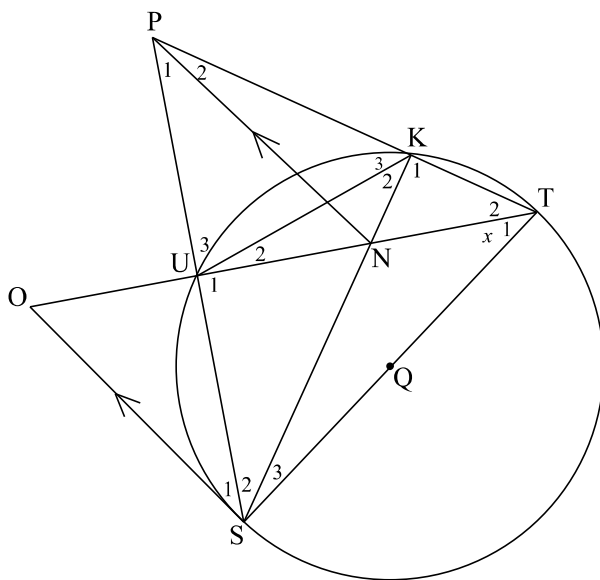
- 10.2 In die diagram hieronder gaan die sirkel met middelpunt deur punte A, B en C.
AD is 'n raaklyn aan die sirkel by A.



Gebruik die diagram om die stelling te bewys wat meld dat $\widehat{A}_1 = \widehat{C}$.

(6)

- 10.3 Verwys na die diagram hieronder. ST is 'n middellyn van die sirkel. $OS \parallel PN$, TO halveer $\widehat{STP}$. Laat $\widehat{T_1} = x$.



- 10.3.1 Bewys dat PUNK 'n koordevierhoek is. (5)
- 10.3.2 Bewys dat SO 'n raaklyn aan sirkel KUST is. (6)
- 10.3.3 Bewys dat POST 'n koordevierhoek is. (3)
- [25]**

[25]

TOTAAL: 150

INLICHTINGSBLAD: WISKUNDE

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$T_n = a + (n - 1)d$$

$$S_n = \frac{n}{2}(2a + (n - 1)d)$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1} ; \quad r \neq 1 \quad S_\infty = \frac{a}{1 - r} ; \quad -1 < r < 1$$

$$F = \frac{x[(1 + i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1 + i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

In $\triangle ABC$:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\text{area } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2 \sin \alpha \cdot \cos \alpha$$

$$\bar{x} = \frac{\sum x}{n}$$

$$\hat{\sigma}^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ of } B) = P(A) + P(B) - P(A \cap B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$



Province of the
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LEARNER'S NAME:
LEERDER SE NAAM:

GRADE 11/GRAAD 11

**NATIONAL/NASIONALE
SENIOR
CERTIFICATE/SERTIFIKAAT**

GRADE 11/GRAAD 11

NOVEMBER 2022

**MATHEMATICS P2/WISKUNDE V2
SPECIAL ANSWER BOOK/SPEZIALE ANTWOORDEBOEK**

Marker/Merker			Moderator's initials / Moderator se voorletters									
Question Vraag	Mark Punt	Initial Voorletters	Marks Punte	S M	Marks Punte	D M	Marks Punte	P M	Marks Punte	N M		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
TOTAL/ TOTAAL												

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

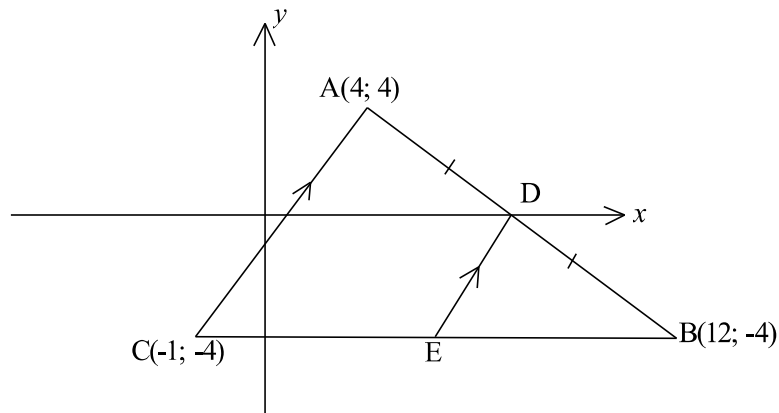
QUESTION 1/*VRAAG 1*

1.1		(1)
1.2		(2)
1.3		(2)
1.4		(2)
1.5		(2)
1.6		(2)
		[11]

QUESTION 2/VRAAG 2

2.1	<table border="1"> <thead> <tr> <th>Age <i>Ouderdom</i></th> <th>Frequency <i>Frekwensie</i></th> <th>Cumulative Frequency <i>Kumulatiewe Frekwensie</i></th> </tr> </thead> <tbody> <tr><td>$25 < A \leq 30$</td><td>2</td><td></td></tr> <tr><td>$30 < A \leq 35$</td><td>8</td><td></td></tr> <tr><td>$35 < A \leq 40$</td><td>4</td><td></td></tr> <tr><td>$40 < A \leq 45$</td><td>5</td><td></td></tr> <tr><td>$45 < A \leq 50$</td><td>11</td><td></td></tr> <tr><td>$50 < A \leq 55$</td><td>19</td><td></td></tr> <tr><td>$55 < A \leq 60$</td><td>20</td><td></td></tr> <tr><td>$60 < A \leq 65$</td><td>6</td><td></td></tr> </tbody> </table>	Age <i>Ouderdom</i>	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>	$25 < A \leq 30$	2		$30 < A \leq 35$	8		$35 < A \leq 40$	4		$40 < A \leq 45$	5		$45 < A \leq 50$	11		$50 < A \leq 55$	19		$55 < A \leq 60$	20		$60 < A \leq 65$	6		(2)
Age <i>Ouderdom</i>	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>																											
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2.2	Age of Teachers <i>Ouderdom van Onderwysers</i>	(4)																											
2.3	<table border="1" style="width: 100%;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>					(2)																							
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		[10]																											

QUESTION 3/VRAAG 3



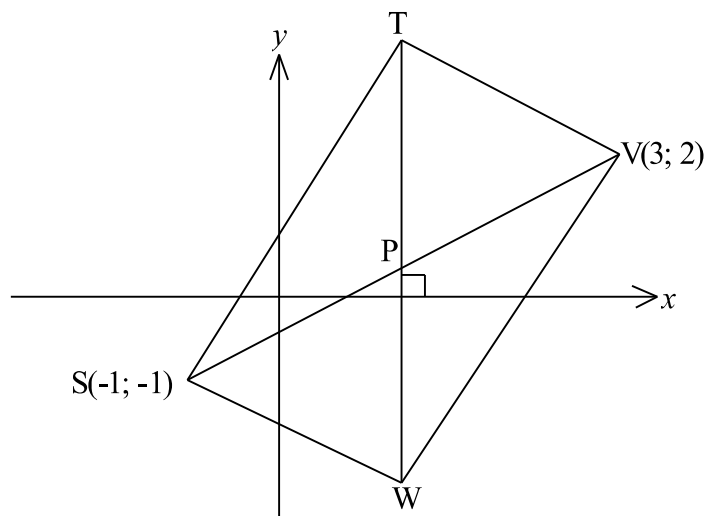
3.1		(2)
3.2		(2)
3.3		(4)
3.4		(3)
		[11]

QUESTION 4/VRAAG 4

4.1		(2)
4.2		(5)

4.3		(5)
		[12]

QUESTION 5/VRAAG 5



		(6)
		[6]

(6)

6.4		(5)
6.5		(7)

6.6		(5)
		[41]

QUESTION 7/VRAAG 7

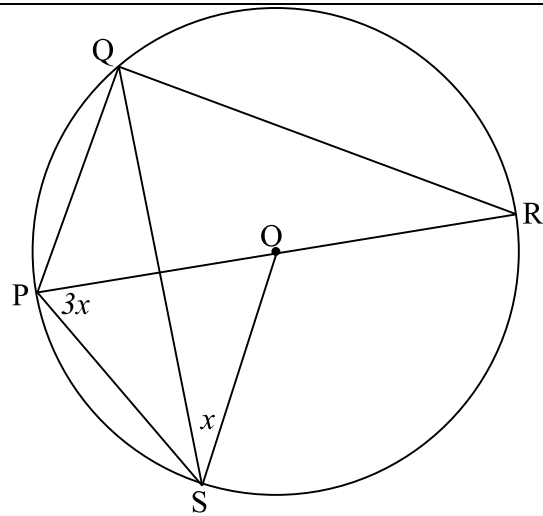
7.1		
		(1)
7.2		
		(3)
7.3		
		(5)
		[9]

QUESTION 8/VRAAG 8

8.1		(2)
8.2		(2)
8.3		(3)
8.4		(1)
		[8]

QUESTION 9/VRAAG 9

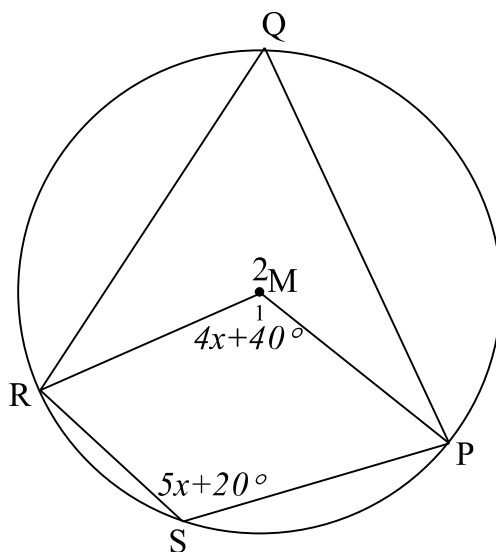
9.1		Statement <i>Stelling</i>	Reason/ <i>Rede</i>	(5)
	9.1.1	$\hat{A}_2 = 50^\circ$		
	9.1.2	$\hat{O}_1 = 80^\circ$		
	9.1.3	$\hat{F}_1 = 80^\circ$		
	9.1.4	$\hat{A}_1 = 30^\circ$		
	9.1.5	$\hat{B}_2 = 30^\circ$		



9.2.1		
		(2)
9.2.2		
		(3)
9.2.3		
		(3)
9.2.4		
		(2)
9.2.5		
		(2)
		[17]

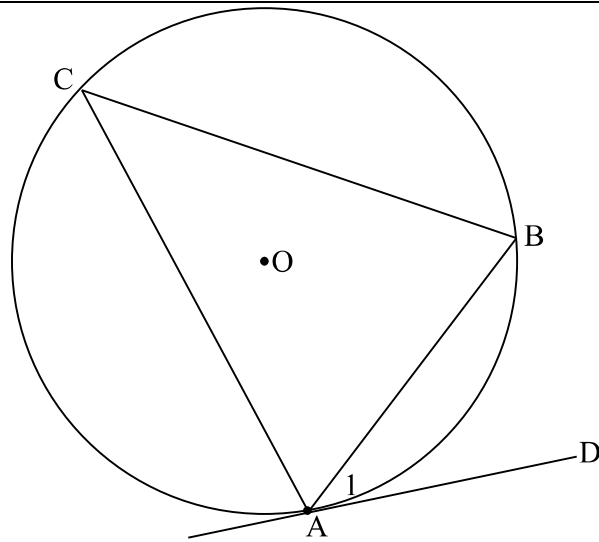
QUESTION 10/VRAAG 10

10.1



(5)

10.2



(6)

10.3.3		
		(3)
		[25]
	TOTAL/TOTAAL:	150



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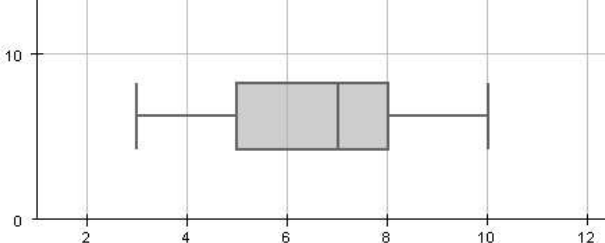
NOVEMBER 2021

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

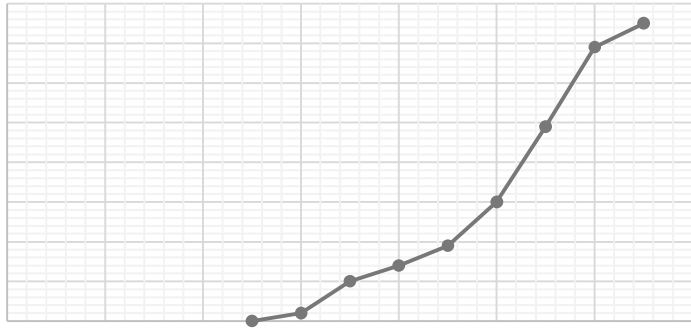
MARKS/PUNTE: 150

This marking guideline consists of 16 pages./
Hierdie nasienriglyn bestaan uit 16 bladsye.

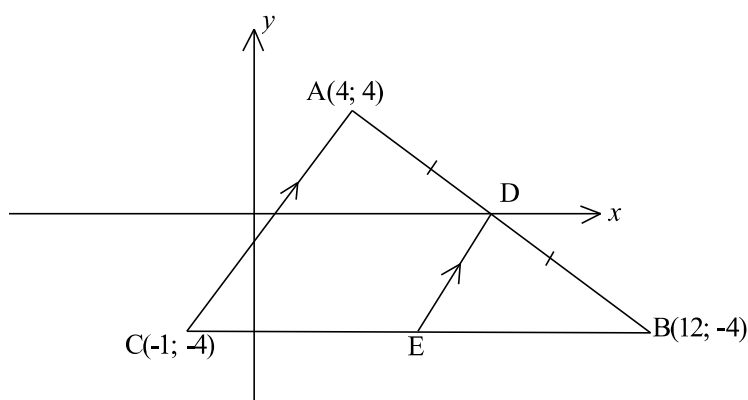
QUESTION 1/VRAAG 1

1.1	$\bar{x} = 6,4$	✓ answer / <i>antwoord</i>	(1)
1.2	Min/ <i>Min</i> = 3; Max./ <i>Maks.</i> = 10; Lower Quartile/ <i>Onderste kwartiel</i> = 5; Median/ <i>Mediaan</i> = 7; Upper Quartile/ <i>Boonste kwartiel</i> = 8	✓ for both min. and max. <i>vir beide min. en maks.</i> ✓ for the rest / <i>vir die res</i>	(2)
1.3		✓ for the box / <i>vir die mond</i> ✓ whiskers / <i>snorre</i>	(2)
1.4	Skewed to the left, mean is smaller than the median OR longer rectangle on the left. <i>Skeef na links, Gemiddelde is kleiner as mediaan OF langer reghoek op linkerkant.</i>	✓ answer / <i>antwoord</i> ✓ reason / <i>rede</i>	(2)
1.5	Standard deviation/ <i>Standaardafwyking</i> = 2, 01	✓✓ answer / <i>antwoord</i>	(2)
1.6	Slept well, if bigger than 8,61. / <i>Het goed geslaap, indien groter as 8,61.</i> Answer 1 learner./ <i>Antwoord 1 leerder</i>	✓ 8,61 ✓ answer / <i>antwoord</i>	(2)
			[11]

QUESTION 2/VRAAG 2

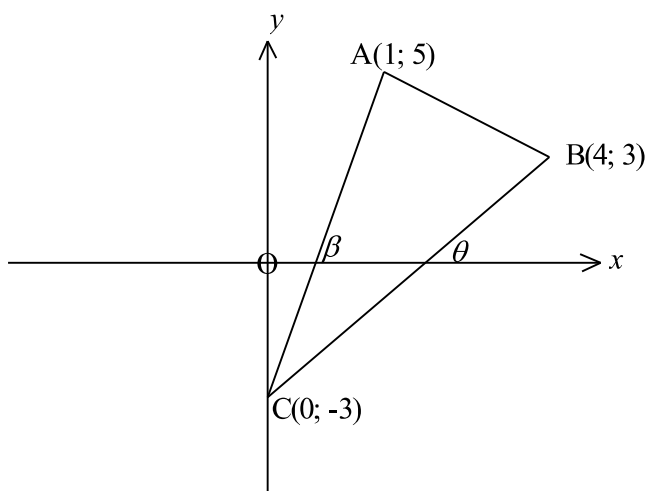
2.1	<table><tr><th>Age <i>Ouderdom</i></th><th>Frequency <i>Frekwensie</i></th><th>Cumulative Frequency <i>Kumulatiewe Frekwensie</i></th></tr><tr><td>$25 < A \leq 30$</td><td>2</td><td>2</td></tr><tr><td>$30 < A \leq 35$</td><td>8</td><td>10</td></tr><tr><td>$35 < A \leq 40$</td><td>4</td><td>14</td></tr><tr><td>$40 < A \leq 45$</td><td>5</td><td>19</td></tr><tr><td>$45 < A \leq 50$</td><td>11</td><td>30</td></tr><tr><td>$50 < A \leq 55$</td><td>19</td><td>49</td></tr><tr><td>$55 < A \leq 60$</td><td>20</td><td>69</td></tr><tr><td>$60 < A \leq 65$</td><td>6</td><td>75</td></tr></table>	Age <i>Ouderdom</i>	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>	$25 < A \leq 30$	2	2	$30 < A \leq 35$	8	10	$35 < A \leq 40$	4	14	$40 < A \leq 45$	5	19	$45 < A \leq 50$	11	30	$50 < A \leq 55$	19	49	$55 < A \leq 60$	20	69	$60 < A \leq 65$	6	75	✓ for first 4 vir eerste 4 ✓ last 4 laaste 4	(2)
Age <i>Ouderdom</i>	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe Frekwensie</i>																												
$25 < A \leq 30$	2	2																												
$30 < A \leq 35$	8	10																												
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$50 < A \leq 55$	19	49																												
$55 < A \leq 60$	20	69																												
$60 < A \leq 65$	6	75																												
2.2	Ages of Teachers <i>Ouderdomme van Onderwysers</i> Cumulative Frequency <i>Kumulatiewe Frekwensie</i>  Ages / Ouderdomme	✓ start point beginpunt ✓ end point eindpunt ✓✓ shape vorm	(4)																											
2.3	Median / <i>Mediaan</i> = 52 (Accept/ <i>Aanvaar</i> 51 – 53)	✓✓ answer / <i>antwoord</i>	(2)																											
2.4	Percentage / <i>Persentasie</i> = $\frac{75 - 57}{75} = \frac{18}{75} = 24\%$	✓ calculation / <i>berekening</i> ✓ answer / <i>antwoord</i>	(2)																											
			[10]																											

QUESTION 3/VRAAG 3



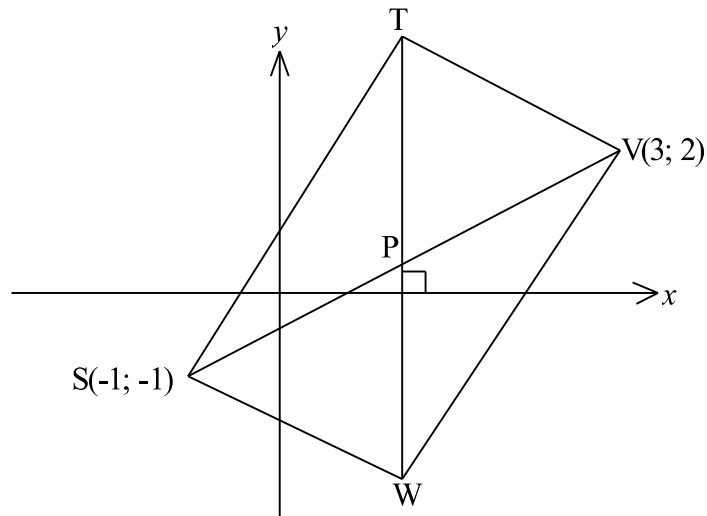
3.1	$AB = \sqrt{(12 - 4)^2 + (-4 - 4)^2}$ $AB = 11,31 \text{ units / eenhede}$		✓ substitution / <i>vervang</i> ✓ answer / <i>antwoord</i>	(2)
3.2	$D\left(\frac{4+12}{2}; \frac{4-4}{2}\right)$ $= D(8; 0)$		✓ substitution / <i>vervang</i> ✓ answer / <i>antwoord</i>	(2)
3.3	$m = \frac{4 - (-4)}{4 - (-1)} = \frac{8}{5}$ $y = mx + c$ $0 = \frac{8}{5} \times 8 + c$ $c = -\frac{64}{5}$ $\therefore y = \frac{8}{5}x - \frac{64}{5}$	$m = \frac{4 - (-4)}{4 - (-1)} = \frac{8}{5}$ $y - y_1 = m(x - x_1)$ $y - 0 = \frac{8}{5}(x - 8)$ $y = \frac{8}{5}x - \frac{64}{5}$	✓ gradient / <i>gradiënt</i> ✓ substitution / <i>vervang</i> ✓ y-intercept / <i>y-afsnit</i> ✓ answer / <i>antwoord</i>	(4)
3.4	$y = \frac{8}{5}x - \frac{64}{5}$ $-4 = \frac{8}{5}x - \frac{64}{5}$ $\therefore x = \frac{11}{5}$ $E\left(\frac{11}{5}; -4\right)$ OR / OF $E\left(\frac{11}{2}; -4\right)$ (Midpoint Theorem) / (<i>Middelpunt-Stelling</i>)		✓ substitution -4 <i>vervang -4</i> ✓ value of x <i>waarde van x</i> ✓ coordinates of E <i>koördinate van E</i> OR / OF ✓ x – value / <i>waarde</i> ✓ y – value / <i>waarde</i> ✓ reason / <i>rede</i>	(3)
				[11]

QUESTION 4/VRAAG 4



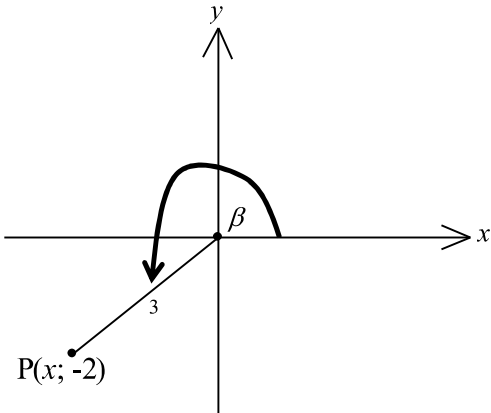
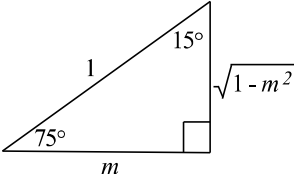
4.1	D(-3; -1)	✓ x-coordinate / <i>koördinaat</i> ✓ y-coordinate / <i>koördinaat</i>	(2)	
4.2	$FC = \sqrt{(8-0)^2 + (p+3)^2} = 12$ $64 + p^2 + 6p + 9 = 144$ $p^2 + 6p - 71 = 0$ Using the quadratic formula: $p = 5,94 \text{ or } p = -11,94$ $p = 6 \text{ or } p = -12$	✓ substitution into the formula and equating to 12 <i>vervanging in die formule en stel gelyk aan 12</i> ✓ squaring both sides <i>kwadreer albei kante</i> ✓ standard form/standaardvorm ✓ $p = 6$ ✓ $p = -12$	(5)	
4.3	$m_{BC} = \frac{3 - (-3)}{4 - 0} = \frac{3}{2}$ $\therefore \tan \theta = \frac{3}{2}$ $\therefore \theta = 56,31^\circ$	$\tan \beta = 8$ $\therefore \beta = 82,87^\circ$ $\therefore \widehat{ACB} = 82,87^\circ - 56,3^\circ$ $\therefore \widehat{ACB} = 26,56^\circ$	✓ gradient of BC ✓ $\tan \theta = \frac{3}{2}$ ✓ for θ ✓ for β ✓ for $\widehat{ACB}$	(5)
			[12]	

QUESTION 5/VRAAG 5



$P\left(\frac{-1+3}{2}; \frac{-1+2}{2}\right)$ $= P\left(1; \frac{1}{2}\right)$ $SV = \sqrt{(3+1)^2 + (2+1)^2}$ $SV = 5 \text{ units / eenhede}$ $TW = 5 \text{ units / eenhede (diagonals of a rectangle)}$ $\text{(hoeklyne van 'n reghoek)}$ $T(1; 3)$ $W(1; -2)$	✓ coordinates of P <i>koördinate van P</i> ✓ substitution / <i>vervanging</i> ✓ for/vir SV ✓ for/vir TW ✓ coordinates of T <i>koördinate van T</i> ✓ coordinates of W <i>koördinate van W</i>	(6)
		[6]

QUESTION 6/VRAAG 6

6.1	$\sin \beta = -\frac{2}{3}$  $x^2 = (3)^2 - (-2)^2$ $x = -\sqrt{5}$ $\therefore 1 + \tan^2 \beta$ $= 1 + \left(\frac{-2}{-\sqrt{5}} \right)^2$ $= \frac{9}{5}$	✓ for solving for sin oplos vir sin ✓ sketch in the correct quad skets in die korrekte kwadrant ✓ value of x/ waarde van x ✓ substitution / vervanging ✓ answer / antwoord	(5)
6.2			
6.2.1	$\cos^2 105^\circ$ $= [\cos(180^\circ - 75^\circ)]^2$ $= (-\cos 75^\circ)^2$ $= m^2$	✓ for/vir $-\cos 75^\circ$ ✓ for/vir m^2	(2)
6.2.2	$\sin 15^\circ$ $= \cos 75^\circ$ $= m$	✓ for/vir $\cos 75^\circ$ ✓ for/vir m	(2)
6.2.3	$\tan 15^\circ = \frac{m}{\sqrt{1-m^2}}$ OR / OF $\tan 15^\circ = \frac{\sin 15^\circ}{\cos 15^\circ} = \frac{\cos 75^\circ}{\sin 75^\circ} = \frac{m}{\sqrt{1-m^2}}$	✓✓ for correct answer only vir korrekte antwoord (accuracy / akkuraatheid)	(2)

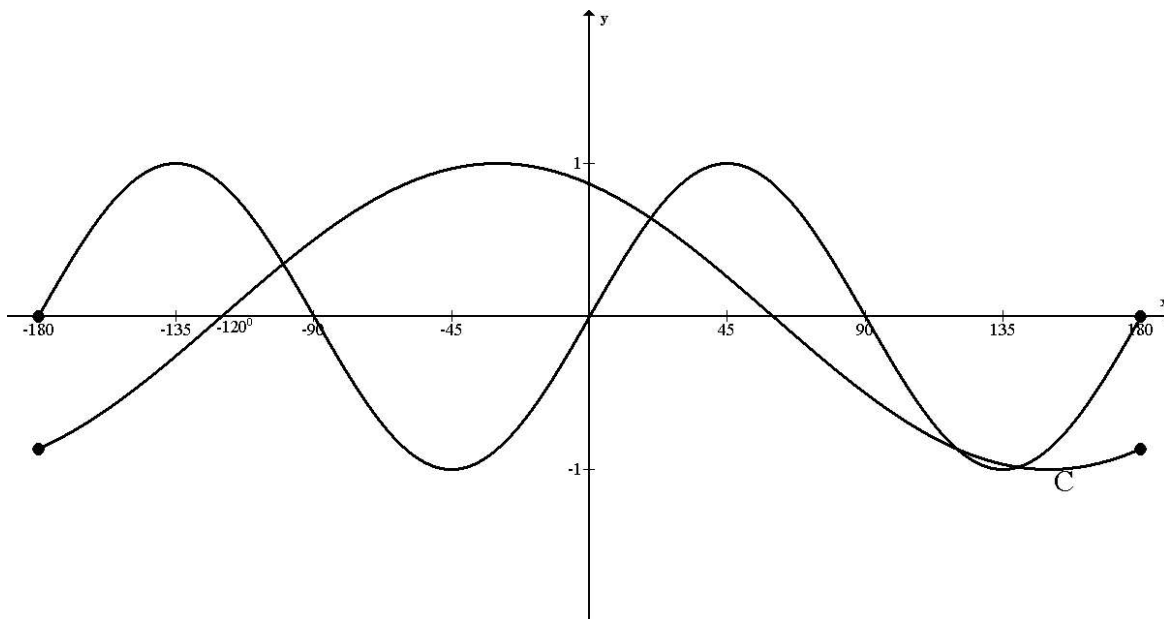
6.3.1	$\frac{\cos(180^\circ - k) \cdot \sin(k - 90^\circ) - 1}{\tan^2(540^\circ + k) \cdot \sin(90^\circ + k) \cdot \cos(-k)}$ $= \frac{-\cos k \cdot -\cos k - 1}{\tan^2 k \cdot \cos k \cdot \cos k}$ $= \frac{\cos^2 k - 1}{\frac{\sin^2 k}{\cos^2 k} \cdot \cos^2 k}$ $= \frac{-\sin^2 k}{\sin^2 k}$ $= -1$	✓ for/vir $-\cos k$ ✓ for/vir $-\cos k$ ✓ for/vir $\tan^2 k$ ✓ for/vir $\cos k$ ✓ for/vir $\cos k$ ✓ for changing $\tan^2 k$ vir verandering van $\tan^2 k$ ✓ for answer / vir antwoord	(7)
6.3.2	$\tan^2 k \cdot \cos^2 k = 0$ $\tan^2 k = 0 \text{ or/of } \cos^2 k = 0$ $\tan k = 0 \text{ or/of } \cos k = 0$ $\therefore k = 0^\circ \text{ or/of } k = 90^\circ \text{ or/of } k = 180^\circ$ $\text{or/of } k = 270^\circ \text{ or/of } k = 360^\circ$	✓ $\tan^2 k \cdot \cos^2 k = 0$ $\tan^2 k = 0$ or/of $\cos^2 k = 0$ ✓✓ $\tan k = 0$ or/of $\cos k = 0$ ✓ $k = 0^\circ$; $k = 90^\circ$ ✓ $k = 180^\circ$; $k = 270^\circ$ ✓ $k = 360^\circ$	(6)
6.4	$\frac{1 + \sin \theta}{1 - \sin \theta} - \frac{1 - \sin \theta}{1 + \sin \theta} = \frac{4 \tan \theta}{\cos \theta}$ $\text{LHS/LK} = \frac{1 + \sin \theta}{1 - \sin \theta} - \frac{1 - \sin \theta}{1 + \sin \theta}$ $= \frac{1 + 2 \sin \theta + \sin^2 \theta - 1 + 2 \sin \theta - \sin^2 \theta}{(1 - \sin \theta)(1 + \sin \theta)}$ $= \frac{4 \sin \theta}{1 - \sin^2 \theta}$ $= \frac{4 \sin \theta}{\cos^2 \theta}$ $= \frac{4 \tan \theta}{\cos \theta} = \text{RHS/RK}$	✓ for/vir LCD/KGD ✓ for/vir $1 + 2 \sin \theta + \sin^2 \theta$ ✓ for/vir $-1 + 2 \sin \theta - \sin^2 \theta$ ✓ for/vir $\frac{4 \sin \theta}{1 - \sin^2 \theta}$ ✓ for/vir $\cos^2 \theta$	(5)

6.5	$6\sin^2 \theta + \cos \theta = 4$ $6(1 - \cos^2 \theta) + \cos \theta = 4$ $6 - 6\cos^2 \theta + \cos \theta - 4 = 0$ $-6\cos^2 \theta + \cos \theta + 2 = 0$ $6\cos^2 \theta - \cos \theta - 2 = 0$ $(3\cos \theta - 2)(2\cos \theta + 1) = 0$ $\cos \theta = \frac{2}{3}$ or/of $\cos \theta = -\frac{1}{2}$ $\theta = 48,19^\circ + 360^\circ.k$ or/of $\theta = 311,81^\circ + 360^\circ.k$ OR/OF $\theta = 120^\circ + 360^\circ.k$ or/of $\theta = 240^\circ + 360^\circ.k$ where/waar $k \in \mathbb{Z}$	✓ for/vir $1 - \cos^2 \theta$ ✓ for the two general solutions/ vir die twee algemene oplossings ✓ for standard form/ vir standaardvorm ✓ for factors / vir faktore ✓ for the other two general solutions/ vir die ander twee algemene oplossings ✓ for answers of $\cos \theta = \frac{2}{3}$ vir antwoorde van $\cos \theta = \frac{2}{3}$ ✓ for answers of $\cos \theta = -\frac{1}{2}$ vir antwoorde van $\cos \theta = -\frac{1}{2}$	(7)
6.6	$p = \tan A + \sin A$ and/en $q = \tan A - \sin A$ $pq = (\tan A + \sin A)(\tan A - \sin A)$ $pq = \tan^2 A - \sin^2 A$ $pq = \frac{\sin^2 A}{\cos^2 A} - \sin^2 A$ $pq = \frac{\sin^2 A - \sin^2 A \cdot \cos^2 A}{\cos^2 A}$ $pq = \frac{\sin^2 A(1 - \cos^2 A)}{\cos^2 A}$ $pq = \tan^2 A \cdot \sin^2 A$	✓ for substitution vir vervanging ✓ for multiplication vir vermenigvuldiging ✓ for changing $\tan^2 A$ vir verandering van $\tan^2 A$ ✓ for the numerator vir die teller ✓ for the common factor vir die gemene faktor	(5)
			[41]

QUESTION 7/VRAAG 7

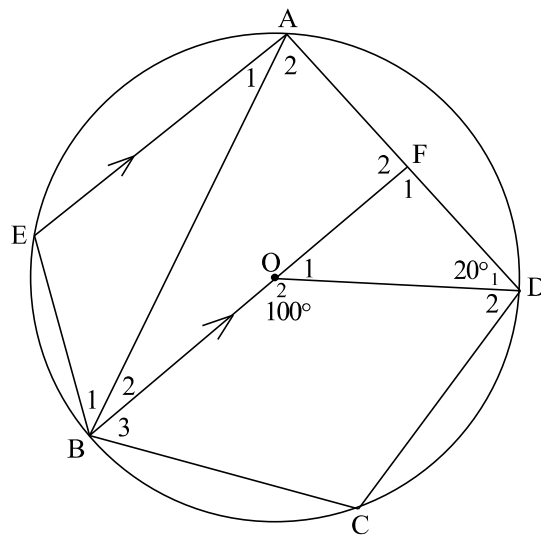
7.1	Exterior angle of a triangle / <i>Buitehoek van 'n driehoek</i>	✓ answer / <i>antwoord</i>	(1)
7.2	$\frac{PS}{\sin 29^\circ} = \frac{10}{\sin 11^\circ}$ $PS = \frac{10 \cdot \sin 29^\circ}{\sin 11^\circ}$ $PS = 25,41 \text{ m}$	✓ for sub. in sine rule <i>vir verv. in sinus-reël</i> ✓✓ for the answer <i>vir die antwoord</i>	(3)
7.3	$PQ^2 = (30)^2 + (25,41)^2 - 2 \times 30 \times 25,41 \times \cos 40^\circ$ $PQ = 19,44 \text{ m}$ $\frac{\sin Q_1}{25,41} = \frac{\sin 40^\circ}{19,44}$ $\sin Q_1 = \frac{25,41 \times \sin 40^\circ}{19,44}$ $\therefore \hat{Q}_1 = 57,16^\circ$ $\therefore \theta = 32,84^\circ$	✓ for sub. in the cosine rule <i>verv. in die cosinus-reël</i> ✓ for the answer PQ <i>vir die antwoord PQ</i> ✓ for using the sine rule <i>vir gebruik van die sinus-reël</i> ✓ for/vir $\hat{Q}_1$ ✓ for/vir θ	(5)
			[9]

QUESTION 8 / VRAAG 8

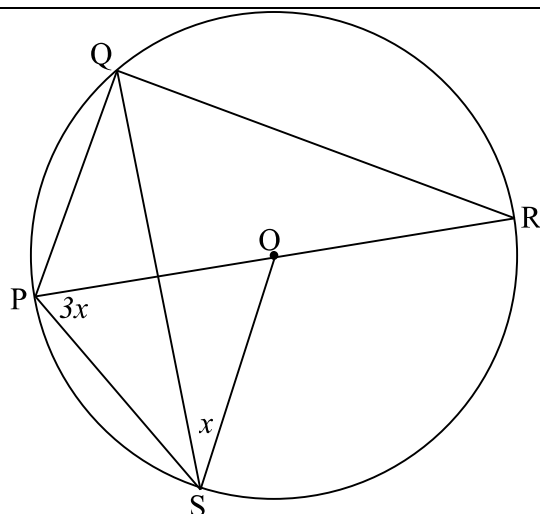


8.1	$a = 2$ $b = -30^\circ$	✓ for/vir a ✓ for/vir b	(2)
8.2	$C(150^\circ; -1)$	✓ for/vir 150° ✓ for/vir -1	(2)
8.3	$-120^\circ \leq x \leq -90^\circ$	✓ for/vir -120° ✓ for/vir -90° ✓ for correct notation vir korrekte notasie	(3)
8.4	$f(x) = \sin 2(x - 30^\circ)$	✓ for correct answer vir korrekte antwoord	(1)
			[8]

QUESTION 9/VRAAG 9

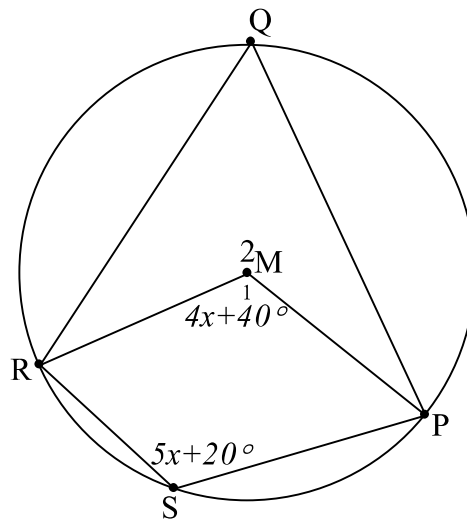


9.1.1	< at centre = 2 x angle at the circumference <i>Middelpunts $\angle = 2 \times \text{Omtreks } \angle$</i>	✓ for the answer <i>vir die antwoord</i>	(1)
9.1.2	<'s on a straight line <i>$\angle$'e op 'n reguitlyn</i>	✓ for the answer <i>vir die antwoord</i>	(1)
9.1.3	Exterior angle of a triangle / <'s of a triangle <i>Buitehoek van 'n driehoek / $\angle$e van 'n driehoek</i>	✓ for the answer <i>vir die antwoord</i>	(1)
9.1.4	$\hat{A} = \hat{F}_1$; corresponding angles = ; EA BOF <i>ooreenkomstige $\angle$e = ; EA BOF</i>	✓ for the answer <i>vir die antwoord</i>	(1)
9.1.5	alternate angles = ; EA BOF <i>verwisselende hoeke = ; EA BOF</i>	✓ for the answer <i>vir die antwoord</i>	(1)

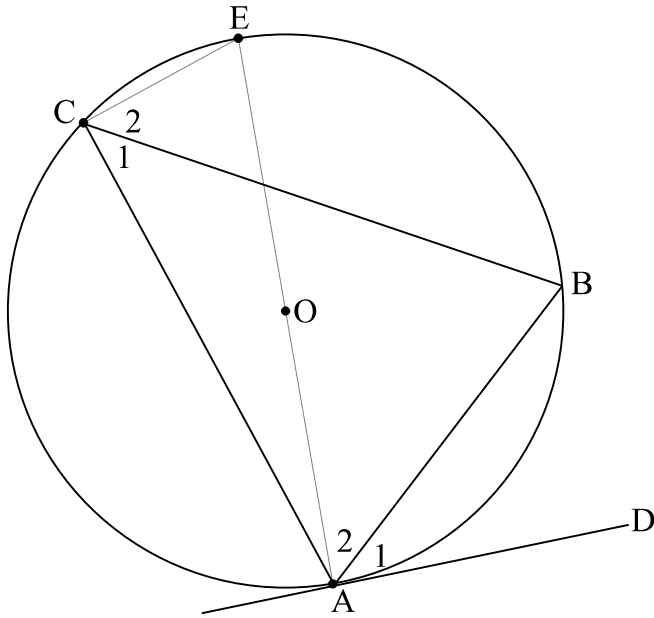


9.2.1	$\widehat{SQR} = 3x$ ($\angle$ s in the same segment) ($\angle$ e in dieselfde segment)	✓ S ✓ R	(2)
9.2.2	$\widehat{Q} = 90^\circ$ ($\angle$ s in a semi-circle) ($\angle$ e in 'n halwe-sirkel) $\therefore \widehat{PQS} = 90^\circ - 3x$	✓ S ✓ R ✓ answer / antwoord	(3)
9.2.3	$\widehat{PSO} = 3x$ ($\angle$ s opposite equal sides) ($\angle$ e teenoor gelyke sye) $\therefore \widehat{PSQ} = 2x$ ($\widehat{QSO} = x$)	✓ S ✓ R ✓ answer / antwoord	(3)
9.2.4	$\widehat{PRQ} = 2x$ ($\angle$ s in the same segment) ($\angle$ e in dieselfde segment)	✓ S ✓ R	(2)
9.2.5	$\widehat{QPR} = 180^\circ - (2x + 90^\circ)$ ($\angle$ s of a triangle) ($\angle$ e van 'n driehoek) $= 90^\circ - 2x$	✓ S and/en R ✓ answer / antwoord	(2)
			[17]

QUESTION 10/VRAAG 10



10.1	$\hat{Q} = 2x + 20^\circ$ ($\angle$ at the centre = $2 \times$ angle at the circumf.) <i>(Middelpunts $\angle$ = $2 \times$ Omtrekshoek)</i> $\therefore 2x + 20^\circ + 5x + 20^\circ = 180^\circ$ (opp. $\angle$s of a c.q.) <i>(teenoorst. $\angle$e van 'n k.v)</i> $7x + 40^\circ = 180^\circ$ $7x = 140^\circ$ $\therefore x = 20^\circ$ $\therefore \hat{Q} = 60^\circ$ OR / OF $\hat{M}_2 = 360^\circ - (4x + 40^\circ)$ ($\angle$s around a point) <i>($\angle$e rondom 'n punt)</i> $= 320^\circ - 4x$ $320^\circ - 4x = 2(5x + 20^\circ)$ ($\angle$ at the centre) / <i>(Middelpunts $\angle$)</i> $320^\circ - 4x = 10x + 40^\circ$ $14x = -280^\circ$ $\therefore x = 20^\circ$ $\therefore \hat{Q} = 60^\circ$	$\checkmark$ for/vir S $\checkmark$ for/vir R $\checkmark$ for S and R <i>vir S en R</i> $\checkmark$ for simplifying <i>vereenvoudiging</i> $\checkmark$ the answer <i>die antwoord</i> $\checkmark$ for S and R <i>vir S en R</i> $\checkmark$ for the answer <i>vir die antwoord</i> $\checkmark$ for S and R <i>vir S en R</i> $\checkmark$ for simplifying <i>vereenvoudiging</i> $\checkmark$ for the answer <i>vir die antwoord</i>	(5)
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10.2		
	Construct diameter AE and join C to E. Label $\hat{C}_1$, $\hat{C}_2$ and $\hat{A}_2$ $\hat{C}_1 + \hat{C}_2 = 90^\circ$ ($\angle$ in a semi - circle) $\hat{A}_1 + \hat{A}_2 = 90^\circ$ (tan $\perp$ rad) But $\hat{C}_2 = \hat{A}_2$ ($\angle$s in the same segment) $\therefore \hat{A}_1 = \hat{C}_1$	✓ for construction ✓ for S ✓ for R ✓ for S ✓ for R ✓ for S and R
	<i>Teken Middellyn AE en verbind C aan E.</i> <i>Merk $\hat{C}_1$, $\hat{C}_2$ en $\hat{A}_2$</i> $\hat{C}_1 + \hat{C}_2 = 90^\circ$ ($\angle$ in 'n halwe - sirkel) $\hat{A}_1 + \hat{A}_2 = 90^\circ$ (raaklyn $\perp$ radius) <i>Maar $\hat{C}_2 = \hat{A}_2$ ($\angle$e in dieselfde segment)</i> $\therefore \hat{A}_1 = \hat{C}_1$	✓ vir konstruksie ✓ vir S ✓ vir R ✓ vir S ✓ vir R ✓ vir S en R

(6)

