



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIORSERTIFIKAAT-EKSAMEN/ NASIONALE SENIORSERTIFIKAAT-EKSAMEN

WISKUNDE V2

MEI/JUNIE 2023

PUNTE: 150

TYD: 3 uur

Hierdie vraestel bestaan uit 13 bladsye en 1 inligtingsblad.

INSTRUKSIES EN INLIGTING

Lees die volgende instruksies noukeurig deur voordat die vraestel beantwoord word.

1. Hierdie vraestel bestaan uit 10 vrae.
2. Beantwoord AL die vrae in die SPESIALE ANTWOORDEBOEK wat verskaf word.
3. Dui ALLE berekeninge, diagramme, grafieke, ens. wat jy in die beantwoording van die vrae gebruik, 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. 'n Inligtingsblad met formules is aan die einde van die vraestel ingesluit.
9. Skryf netjies en leesbaar.

VRAAG 1

- 1.1 Die eienaar van 'n klein maatskappy wil vasstel of advertensies in 'n streekskoerant effektief is. Die tabel hieronder toon die bedrag wat aan advertensies spandeer is en die ooreenstemmende verkoopsyfers vir die laaste 9 jaar.

Bedrag aan advertensies spandeer (in rand) (x)	21 300	23 700	24 800	30 540	24 100	40 680	22 400	35 250	29 110
Verkope (in rand) (y)	311 500	326 700	349 200	470 000	316 100	564 200	314 000	487 300	392 900

- 1.1.1 Bepaal die vergelyking van die kleinstekwadrate-regressielyn vir die data. (3)
- 1.1.2 Voorspel die verkope vir 'n jaar waarin die maatskappy R28 500 aan advertensies sal spandeer. (2)
- 1.1.3 Skryf die korrelasiekoëffisiënt van die data neer. (1)
- 1.1.4 Beskryf die verwantskap tussen die bedrag wat aan advertensies in die streekskoerant spandeer is en die verkope van hierdie maatskappy. (1)
- 1.2 Die wins wat die klein maatskappy gedurende dieselfde 9 jaar gemaak het, word in die tabel hieronder gegee.

Wins (in rand)	110 750	107 376	152 338	244 480	144 021	275 994	121 900	207 636	187 700
-----------------------	---------	---------	---------	---------	---------	---------	---------	---------	---------

- 1.2.1 Bereken die gemiddelde wins wat gedurende die 9 jaar gemaak is. (2)
- 1.2.2 Skryf die standaardafwyking vir die data neer. (1)
- 1.2.3 Bepaal die aantal jaar waarin die maatskappy 'n wins wat meer as een standaardafwyking van die gemiddelde is, gemaak het. (2)
- [12]**

VRAAG 2

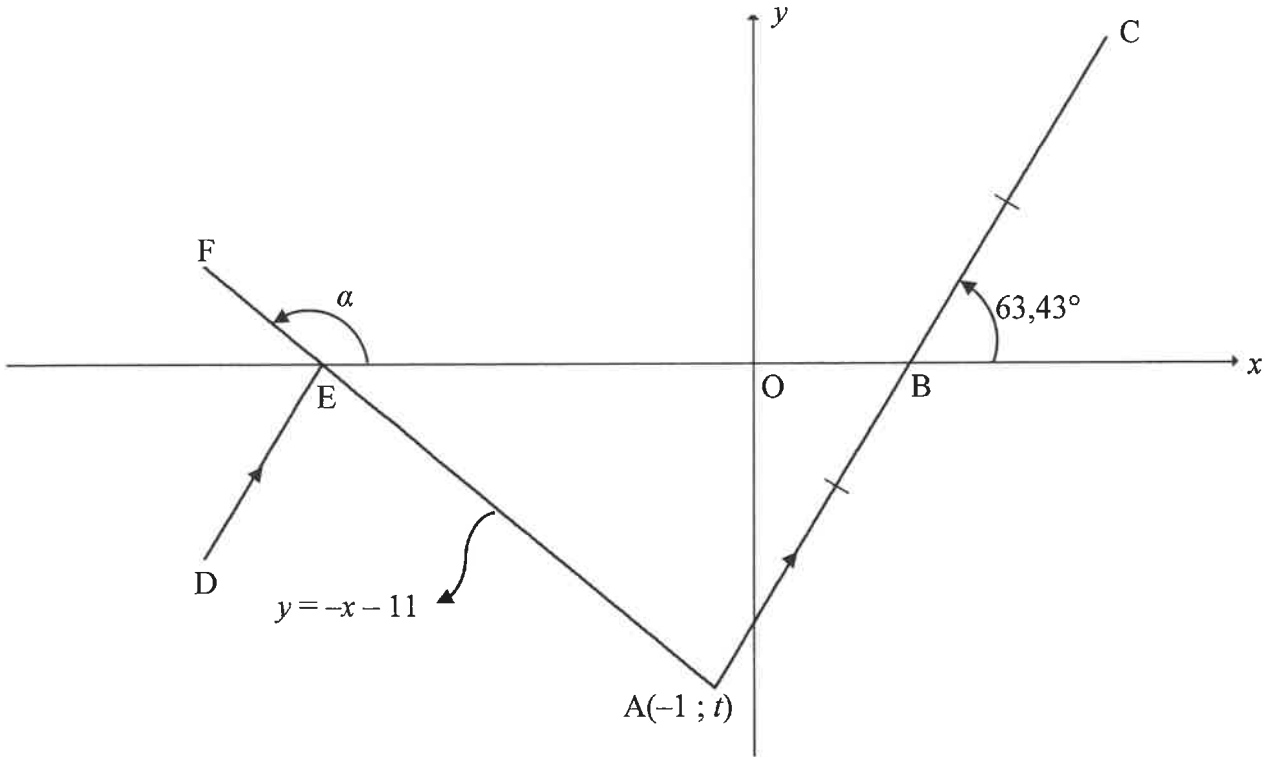
Die ouderdomme van die mense wat 'n musiekkonsert bygewoon het, is in die tabel hieronder opgesom.

OUDERDOM	GETAL MENSE
$5 < x \leq 15$	20
$15 < x \leq 25$	25
$25 < x \leq 35$	60
$35 < x \leq 45$	90
$45 < x \leq 55$	55
$55 < x \leq 65$	40
$65 < x \leq 75$	30

- 2.1 Skryf die modale klas van die data neer. (1)
- 2.2 Hoeveel mense het die musiekkonsert bygewoon? (1)
- 2.3 Skets 'n kumulatiewefrekwensie-grafiek (ogief) op die rooster wat in die ANTWOORDEBOEK voorsien word, om die data hierbo te verteenwoordig. (4)
- 2.4 Gebruik die kumulatiewefrekwensie-grafiek om die mediaanouderdom van die mense wat die musiekkonsert bygewoon het, te bepaal. (2)
- [8]**

VRAAG 3

In die diagram is die vergelyking van lyn AF $y = -x - 11$. B, 'n punt op die x-as, is die middelpunt van die reguitlyn wat A(-1 ; t) en C verbind. Die inklinasiehoeke van AF en AC is α en $63,43^\circ$ onderskeidelik. AF sny die x-as by E. D is 'n punt sodanig dat $DE \parallel AC$.

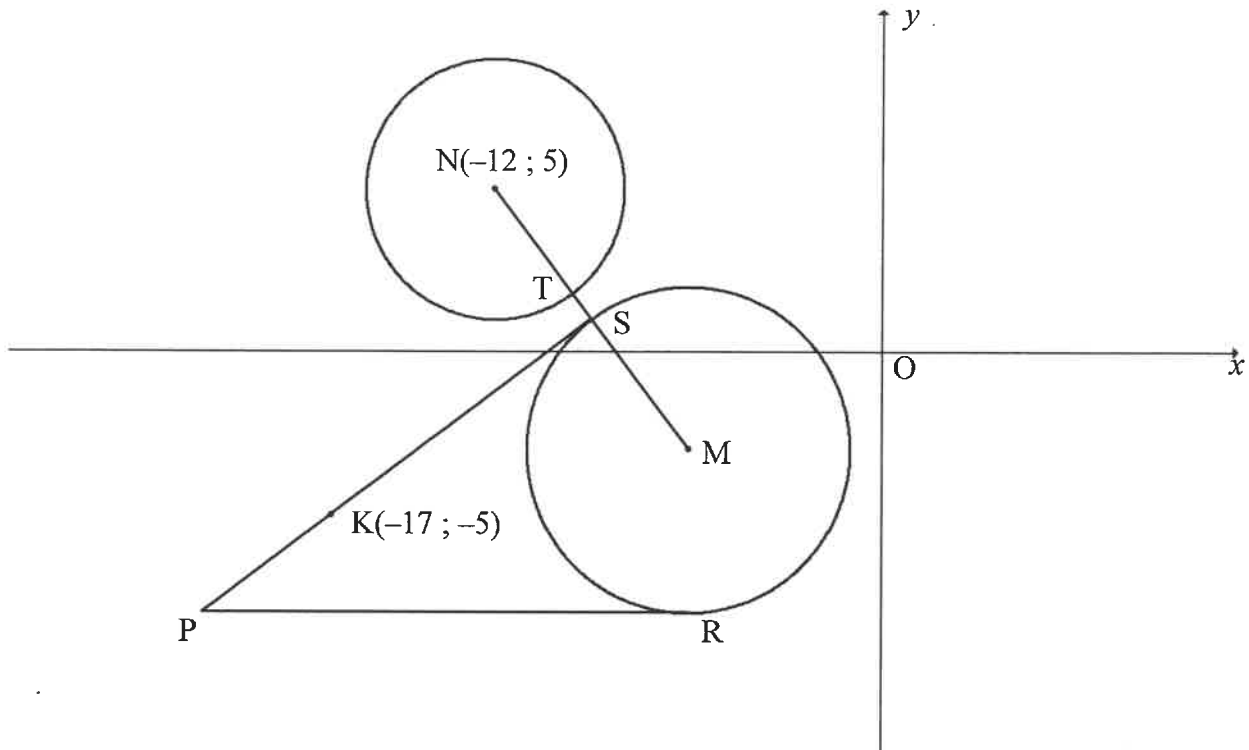


- 3.1 Bereken die:
 - 3.1.1 Waarde van t (2)
 - 3.1.2 Grootte van α (2)
 - 3.1.3 Gradiënt van AC, tot die naaste heelgetal (2)
- 3.2 Bepaal die vergelyking van AC in die vorm $y = mx + k$. (2)
- 3.3 Bereken die:
 - 3.3.1 Koördinate van C (3)
 - 3.3.2 Grootte van $\hat{F}ED$ (3)
- 3.4 G is 'n punt sodanig dat EAGC, in daardie volgorde, 'n parallelogram is.
 Bepaal die vergelyking van 'n sirkel met middelpunt G en wat deur punt B gaan.
 Skryf jou antwoord in die vorm $(x - a)^2 + (y - b)^2 = r^2$. (4)

[18]

VRAAG 4

In die diagram is die vergelyking van die sirkel met middelpunt $N(-12; 5)$, $x^2 + y^2 + 24x - 10y + 153 = 0$. Die vergelyking van die sirkel met middelpunt M word as $(x + 6)^2 + (y + 3)^2 = 25$ gegee. PS en PR is raaklyne aan die sirkel met middelpunt M by S en R onderskeidelik. PR is parallel aan die x -as. $K(-17; -5)$ is 'n punt op PS . Die reguitlyn wat N en M verbind, sny die kleiner sirkel by T en die groter sirkel by S .



- 4.1 Skryf die koördinate van M neer. (2)
- 4.2 Bereken die:
 - 4.2.1 Lengte van die radius van die kleiner sirkel (2)
 - 4.2.2 Lengte van TS (4)
- 4.3 Bepaal die vergelyking van die raaklyn:
 - 4.3.1 PR (2)
 - 4.3.2 PS , in die vorm $y = mx + c$ (5)
- 4.4 Vierhoek $PSMR$ is getrek. Bereken die:
 - 4.4.1 Omtrek van $PSMR$ (5)
 - 4.4.2 Verhouding van $\frac{\text{oppervlakte van } \triangle NPS}{\text{oppervlakte van vierhoek } PSMR}$ (2)

[22]

VRAAG 5

- 5.1 **Sonder die gebruik van 'n sakrekenaar**, vereenvoudig die volgende uitdrukking tot 'n enkele trigonometrieverhouding:

$$\frac{1 - \sin(-\theta)\cos(90^\circ + \theta)}{\cos(\theta - 360^\circ)} \quad (5)$$

- 5.2 Gegee dat $\cos 20^\circ = p$

Sonder die gebruik van 'n sakrekenaar, skryf ELK van die volgende in terme van p :

5.2.1 $\cos 200^\circ$ (2)

5.2.2 $\sin(-70^\circ)$ (2)

5.2.3 $\sin 10^\circ$ (3)

- 5.3 Bepaal, **sonder die gebruik van 'n sakrekenaar**, die waarde van:

$$\cos(A + 55^\circ)\cos(A + 10^\circ) + \sin(A + 55^\circ)\sin(A + 10^\circ) \quad (3)$$

- 5.4 Beskou: $\frac{\cos 2x + \sin 2x - \cos^2 x}{\sin x - 2\cos x} = -\sin x$

5.4.1 Bewys die identiteit hierbo. (3)

5.4.2 Bepaal die waarde van $\frac{\cos 2x + \sin 2x - \cos^2 x}{-3\sin^2 x + 6\sin x \cos x}$ (3)

- 5.5 Gegee: $3\tan 4x = -2\cos 4x$

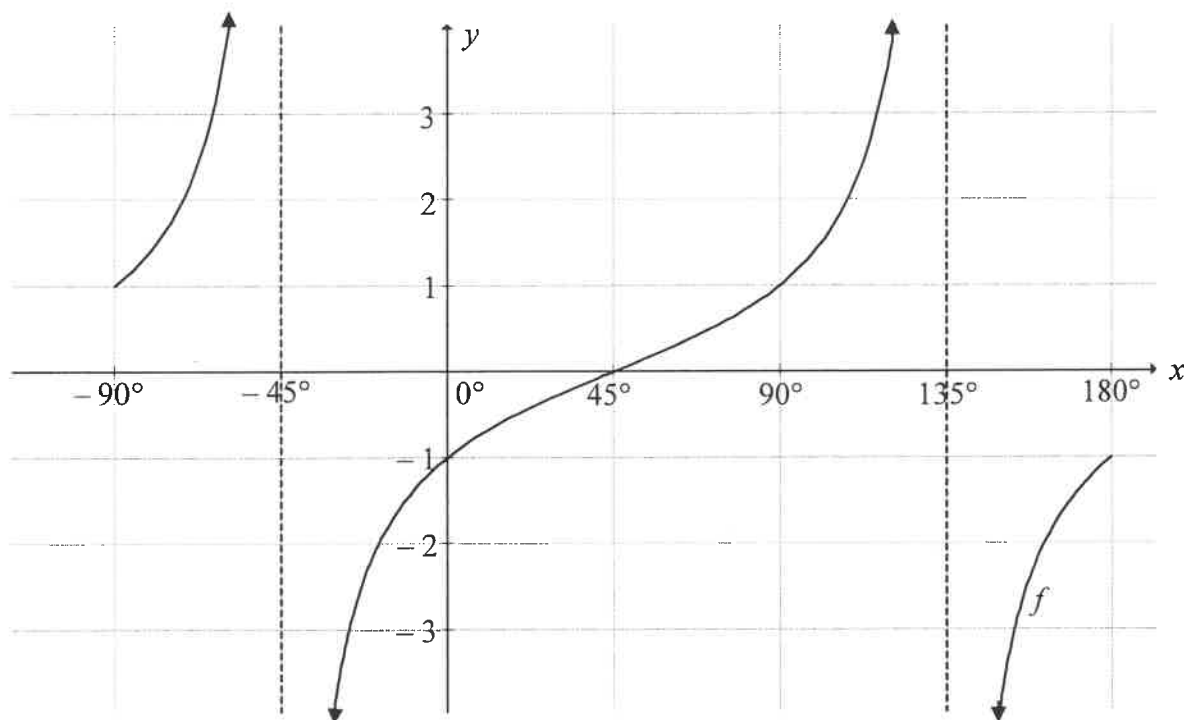
5.5.1 **Sonder die gebruik van 'n sakrekenaar**, toon dat $\sin 4x = -0,5$ die enigste oplossing vir die vergelyking hierbo is. (4)

5.5.2 Bepaal vervolgens die algemene oplossing van x in die vergelyking $3\tan 4x = -2\cos 4x$ (3)

[28]

VRAAG 6

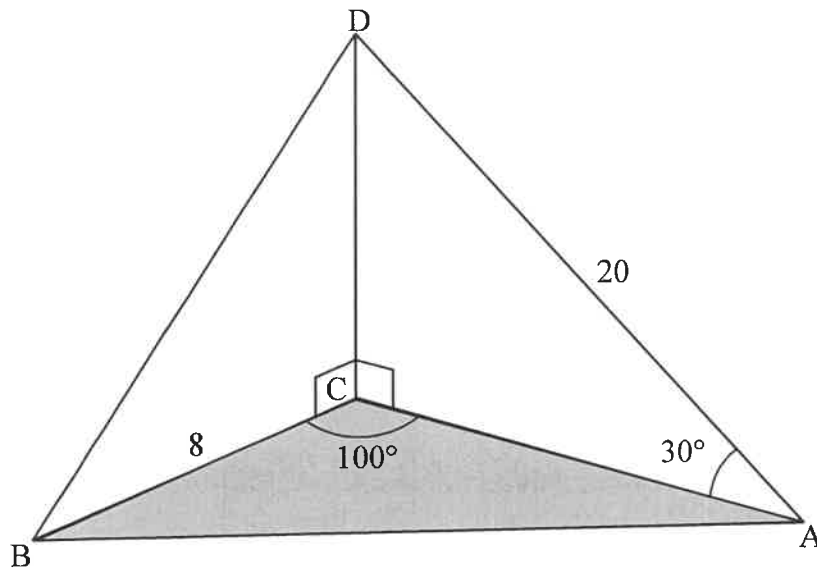
In die diagram hieronder is die grafiek van $f(x) = \tan(x - 45^\circ)$ geskets vir $x \in [-90^\circ; 180^\circ]$.



- 6.1 Skryf die periode van f neer. (1)
- 6.2 Op die rooster wat in die ANTWOORDEBOEK verskaf word, skets die grafiek van $g(x) = -\cos 2x$ vir die interval $x \in [-90^\circ; 180^\circ]$. Toon ALLE afsnitte met die asse asook die minimum en maksimum punte van die grafiek. (3)
- 6.3 Skryf die waardeversameling van g neer. (1)
- 6.4 Die grafiek van g word 45° na links geskuif om die grafiek van h te vorm. Bepaal die vergelyking van h in sy eenvoudigste vorm. (2)
- 6.5 Gebruik die grafiek(e) om die waardes van x in die interval $x \in [-90^\circ; 90^\circ]$, te bepaal waarvoor:
- 6.5.1 $f(x) > 1$ (2)
- 6.5.2 $2 \cos 2x - 1 > 0$ (4)
- [13]

VRAAG 7

In die diagram is A, B en C punte in dieselfde horisontale vlak. D is 'n punt direk bo C, dit is $DC \perp AC$ en $DC \perp BC$. Daar word gegee dat $\hat{ACB} = 100^\circ$, $\hat{CAD} = 30^\circ$, $AD = 20$ eenhede en $BC = 8$ eenhede.



7.1 Bereken die lengte van:

7.1.1 AC (2)

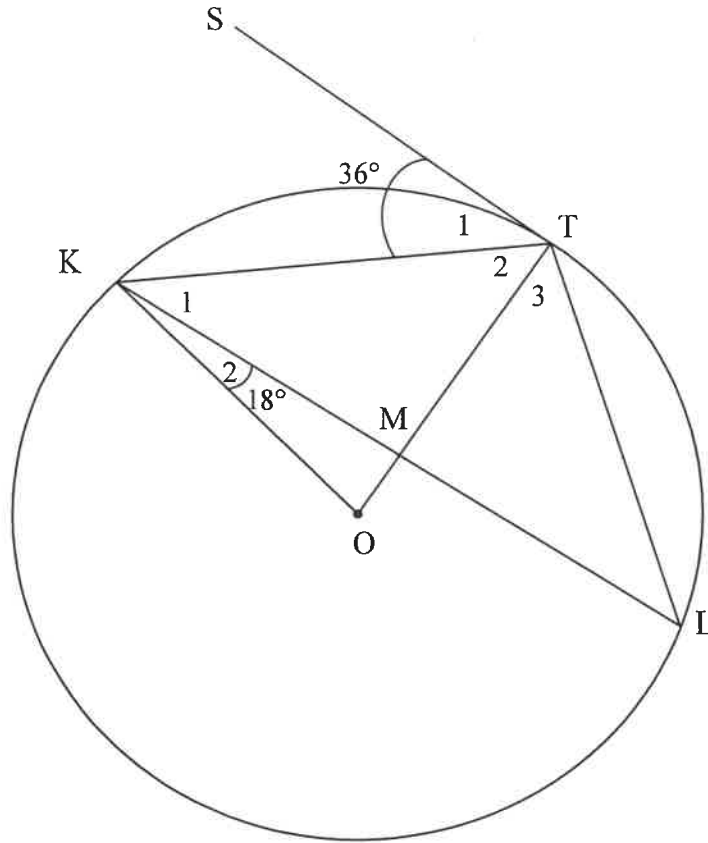
7.1.2 AB (3)

7.2 Indien daar verder gegee word dat $\hat{ABD} = 73,4^\circ$, bereken die grootte van \hat{ADB} . (3)

[8]

VRAAG 8

8.1 In die diagram is O die middelpunt van die sirkel. K , T en L is punte op die sirkel. KT , TL , KL , OK en OT is getrek. OT sny KL by M . ST is 'n raaklyn aan die sirkel by T . $\hat{S}TK = 36^\circ$ en $\hat{OKL} = 18^\circ$.



8.1.1 Bepaal, met redes, die grootte van:

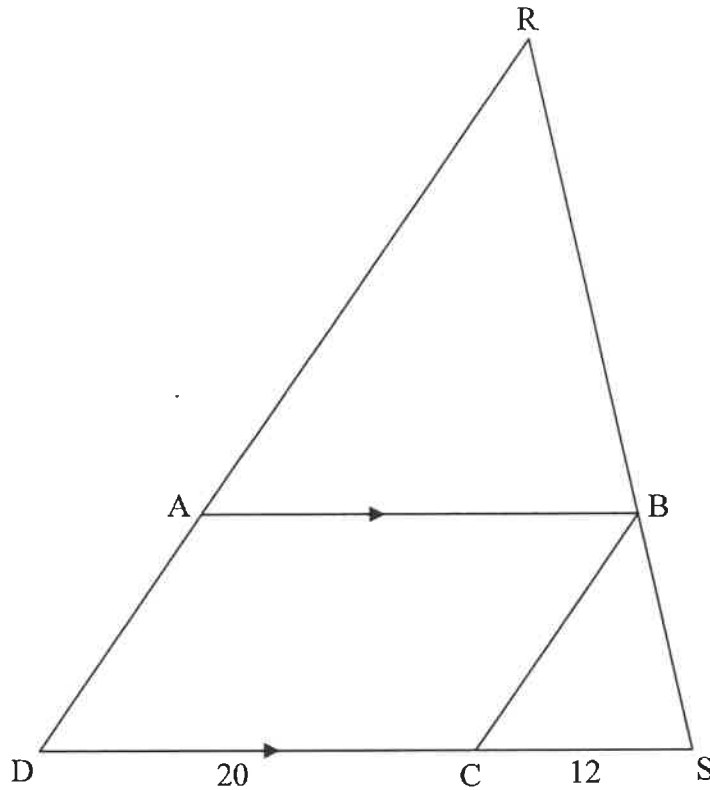
(a) \hat{T}_2 (2)

(b) \hat{L} (2)

(c) \hat{KOT} (2)

8.1.2 Bewys, met redes, dat $KM = ML$. (3)

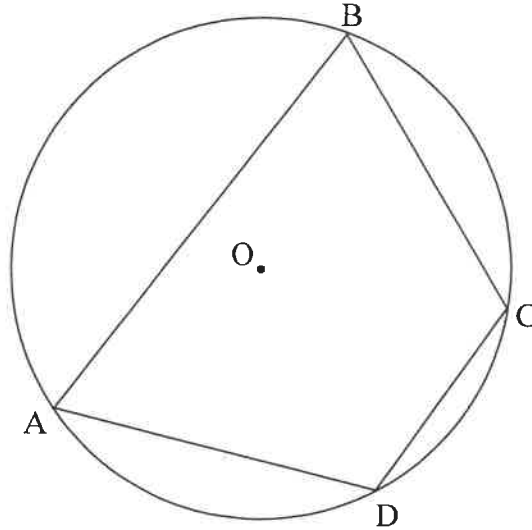
- 8.2 In die diagram is $\triangle RDS$ geskets. A, B en C is punte op RD, RS en DS onderskeidelik sodanig dat $AB \parallel DS$ en $RB : BS = 5 : 3$. $DC = 20$ eenhede en $CS = 12$ eenhede.



- 8.2.1 Bewys, met redes, dat $BC \parallel AD$. (3)
- 8.2.2 Indien daar verder gegee word dat $RD = 48$ eenhede, bereken, met redes, die waarde van die verhouding $AD : AB$. (3)
- [15]

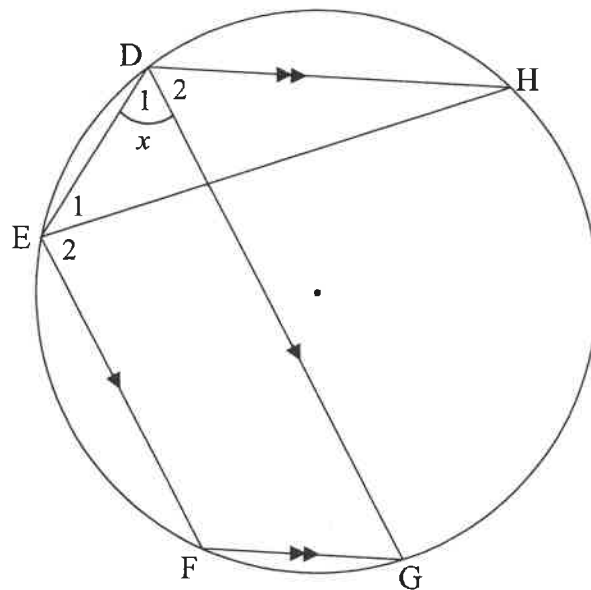
VRAAG 9

9.1 In die diagram is O die middelpunt van die sirkel. $ABCD$ is 'n koordevierhoek.



Gebruik die diagram in die ANTWOORDEBOEK om die stelling te bewys wat beweer dat die teenoorstaande hoeke van 'n koordevierhoek supplementêr is, met ander woorde bewys dat $\hat{B} + \hat{D} = 180^\circ$. (5)

9.2 In die diagram is $DEFG$ 'n koordevierhoek sodanig dat $EF \parallel DG$. H is nog 'n punt op die sirkel sodanig dat $DH \parallel FG$. Koord EH is getrek. Laat $\hat{D}_1 = x$.

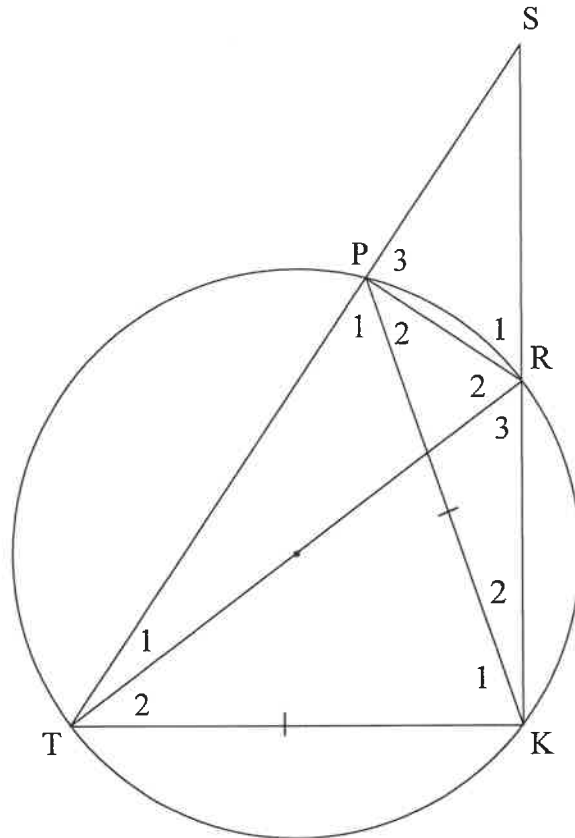


Bewys, met redes, dat $\hat{D}_1 = \hat{D}_2$.

(4)
[9]

VRAAG 10

In die diagram is TR 'n middellyn van die sirkel. PRKT is 'n koordevierhoek. Koorde TP en KR is verleng en sny by S. Koord PK is getrek sodanig dat PK = TK.



10.1 Bewys, met redes, dat:

10.1.1 SR 'n middellyn van 'n sirkel is wat deur punte S, P en R gaan (4)

10.1.2 $\hat{S} = \hat{P}_2$ (5)

10.1.3 $\Delta SPK \parallel \Delta PRK$ (3)

10.2 Indien daar verder gegee word dat $SR = RK$, bewys dat $ST = \sqrt{6}RK$. (5)
[17]

TOTAAL: 150

INLIGTINGSBLAD

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

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

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

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

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

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

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

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

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

$$S_\infty = \frac{a}{1-r}; -1 < r < 1$$

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

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

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

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

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

$$y = mx + c$$

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

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

$$m = \tan \theta$$

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

$$\text{In } \Delta ABC: \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PLEASE FOLLOW THESE INSTRUCTIONS CAREFULLY	VOLG ASSEBLIEF HIERDIE INSTRUKSIES NOUKEURIG
1. Clearly write your examination number and centre number in the space provided and attach your barcode label in the space provided.	1. <i>Skryf jou eksamennommer en sentrumnummer duidelik in die ruimtes verskaf en plak jou stafieskodeplakker in die ruimte verskaf.</i>
2. Remember that your own name (or the name of your school) may not appear anywhere on or in this answer book.	2. <i>Onthou dat jou eie naam (of die naam van jou skool) nie op of in hierdie antwoordeboek mag voorkom nie.</i>
3. Answer ALL questions in the spaces provided.	3. <i>Beantwoord ALLE vrae in die ruimtes wat voorsien is.</i>
4. No pages may be torn from this answer book.	4. <i>Geen bladsye mag uit hierdie antwoordeboek geskeur word nie.</i>
5. Read the instructions printed on your timetable carefully as well as any other instructions which may be given in each examination paper.	5. <i>Lees die instruksies wat op jou eksamenrooster gedruk is, sorgvuldig deur, asook enige ander instruksies wat op elke eksamenvraestel gegee word.</i>
6. Candidates may not retain an answer book or remove it from the examination room.	6. <i>Geen antwoordeboek mag deur die kandidaat behou of uit die eksamenlokaal verwyder word nie.</i>
7. Answers must be written in black/blue ink as distinctly as possible. Do not write in the margins.	7. <i>Skryf die antwoorde so duidelik moontlik met swart/blou ink. Laat die kantlyne oop.</i>
8. Write the numbers of the questions you have answered on the front cover of the answer book where marks are to be recorded.	8. <i>Skryf die nommers van die vrae wat jy beantwoord het op die voorblad van die antwoordeboek waar die punte aangebring word.</i>
9. If you require additional space for your answers: 9.1 Use the additional space provided at the end of the answer book. 9.2 When answering a question in the additional space, indicate clearly the question number in the column on the LHS. 9.3 Rule off after each answer.	9. <i>In geval jy bykomende ruimte benodig vir jou antwoorde:</i> 9.1 <i>Gebruik die bykomende ruimte wat aan die einde van die antwoordeboek voorsien word.</i> 9.2 <i>As 'n vraag in die bykomende ruimte beantwoord word, dui duidelik die vraagnommer in die kolom aan die LK aan.</i> 9.3 <i>Trek 'n lyn na elke antwoord.</i>
10. Draw a neat line through any work/rough work that must not be marked.	10. <i>Trek 'n netjiese lyn deur enige werk/rofwerk wat nie nagesien moet word nie.</i>

QUESTION/VRAAG 1

1.1

Amount spent on advertising (in rands)/ Bedrag aan advertensies spandeer (in rand) (x)	21 300	23 700	24 800	30 540	24 100	40 680	22 400	35 250	29 110
Sales (in rands)/ Verkope (in rand) (y)	311 500	326 700	349 200	470 000	316 100	564 200	314 000	487 300	392 900

	Solution/Oplissing	Marks Punte
1.1.1		(3)
1.1.2		(2)
1.1.3		(1)
1.1.4		(1)

1.2

Profit (in rands)/ Wins (in rand)	110 750	107 376	152 338	244 480	144 021	275 994	121 900	207 636	187 700
--	---------	---------	---------	---------	---------	---------	---------	---------	---------

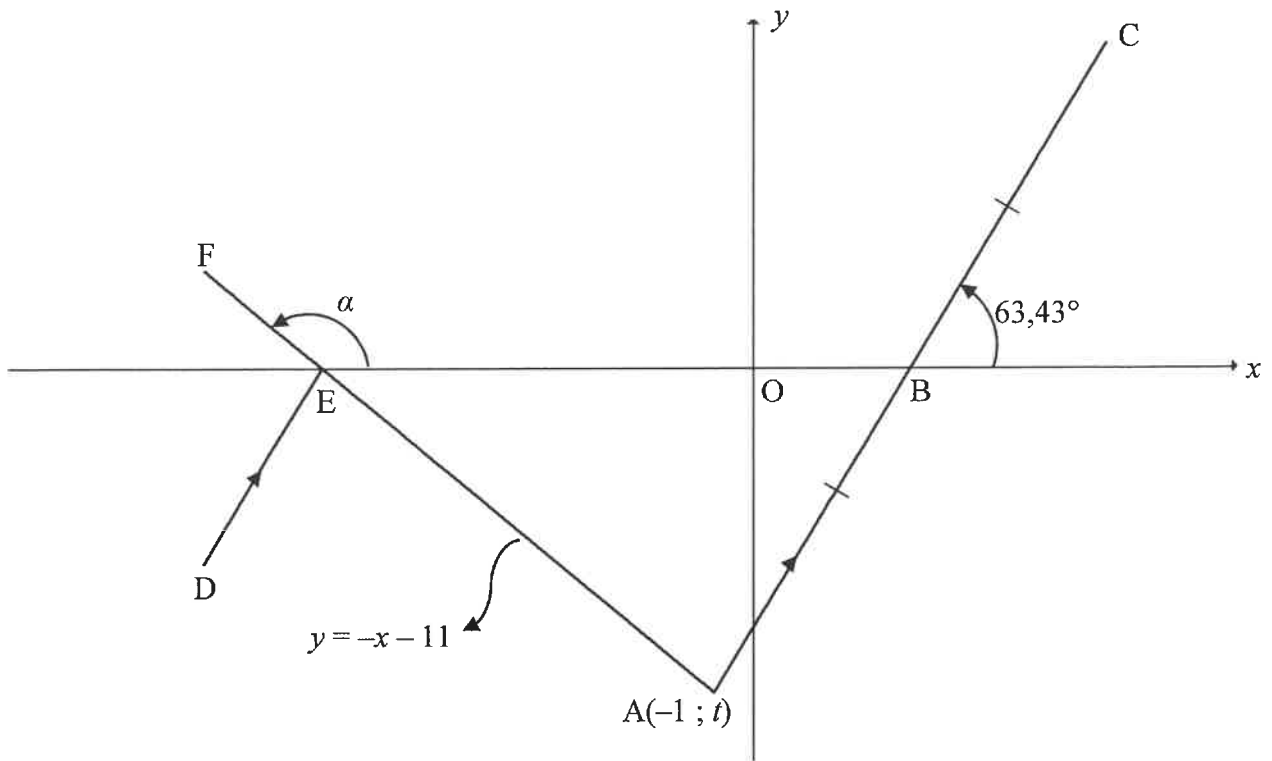
	Solution/Oplossing	Marks Punte
1.2.1		(2)
1.2.2		(1)
1.2.3		(2)
		[12]

QUESTION/VRAAG 2

AGE/OUDERDOM	NUMBER OF PEOPLE/ GETAL MENSE
$5 < x \leq 15$	20
$15 < x \leq 25$	25
$25 < x \leq 35$	60
$35 < x \leq 45$	90
$45 < x \leq 55$	55
$55 < x \leq 65$	40
$65 < x \leq 75$	30

	Solution/Oplissing	Marks Punte
2.1		(1)
2.2		(1)
2.3	<p style="text-align: center;">OGIVE/OGIEF</p>	(4)
2.4		(2)
		[8]

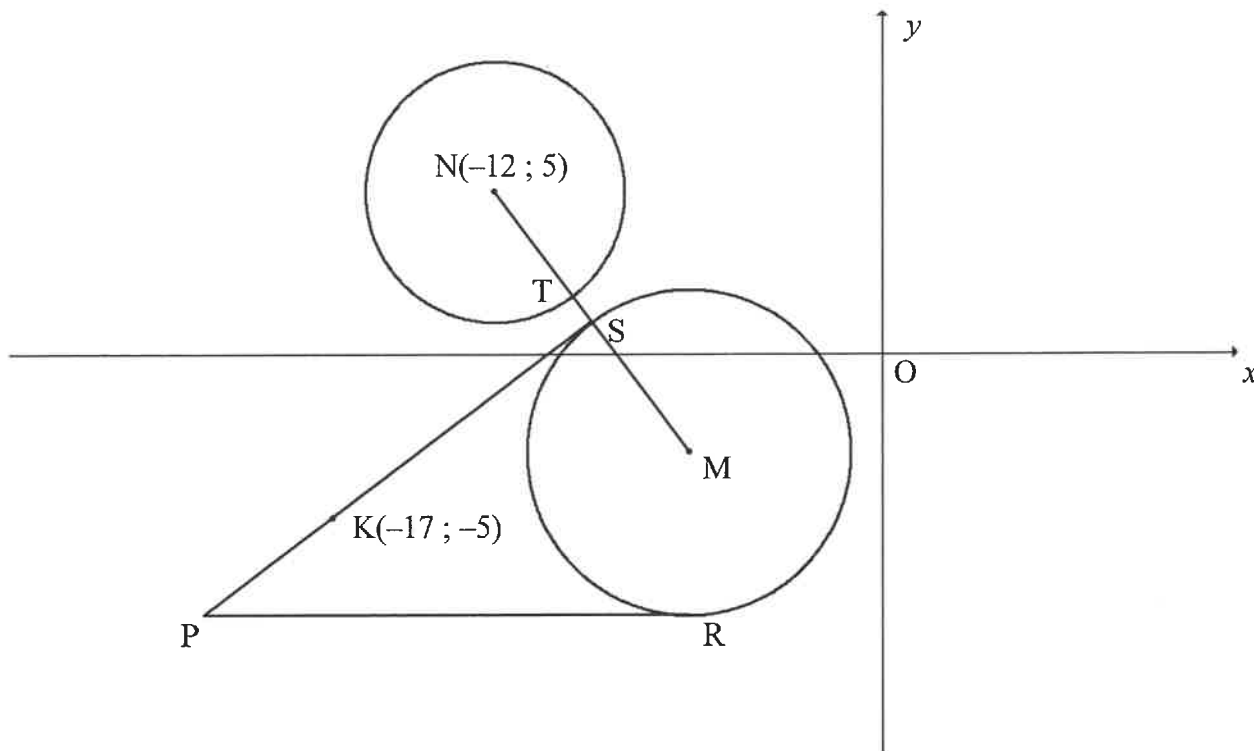
QUESTION/VRAAG 3



	Solution/Oplissing	Marks Punte
3.1.1		(2)
3.1.2		(2)
3.1.3		(2)
3.2		(2)

	Solution/Oplissing	Marks Punte
3.3.1		(3)
3.3.2		(3)
3.4		(4)
		[18]

QUESTION/VRAAG 4



	Solution/Oplissing	Marks Punte
4.1		(2)
4.2.1		(2)
4.2.2		(4)

	Solution/Oplissing	Marks Punte
4.3.1		(2)
4.3.2		(5)
4.4.1		(5)
4.4.2		(2)
		[22]

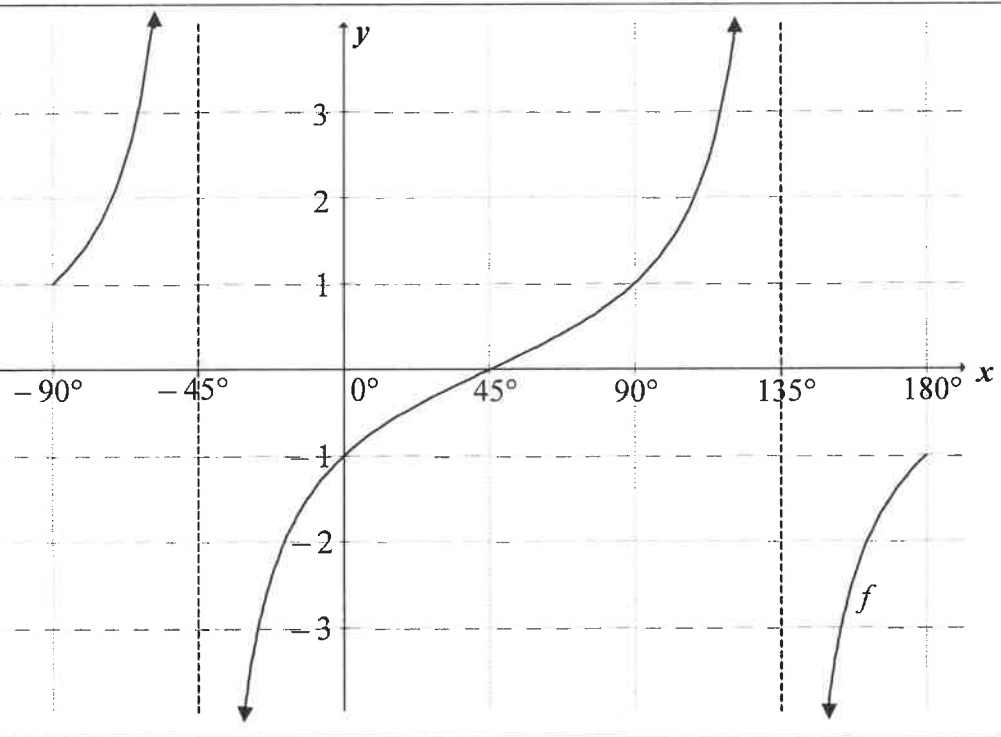
QUESTION/VRAAG 5

	Solution/Oplissing	Marks Punte
5.1		(5)
5.2.1		(2)
5.2.2		(2)
5.2.3		(3)

	Solution/Oplissing	Marks Punte
5.3		(3)
5.4.1		(3)
5.4.2		(3)

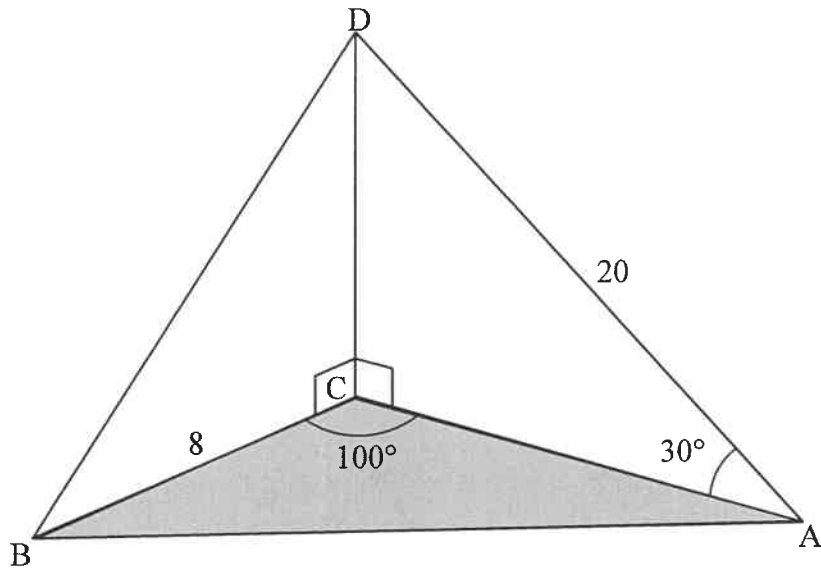
	Solution/Oplissing	Marks Punte
5.5.1		
	(4)	
5.5.2		
	(3)	
	[28]	

QUESTION/VRAAG 6

	Solution/Oplissing	Marks Punte
6.1		(1)
6.2		(3)
6.3		(1)
6.4		(2)
6.5.1		(2)

	Solution/Oplissing	Marks Punte
6.5.2		
	(4)	
	[13]	

QUESTION/VRAAG 7

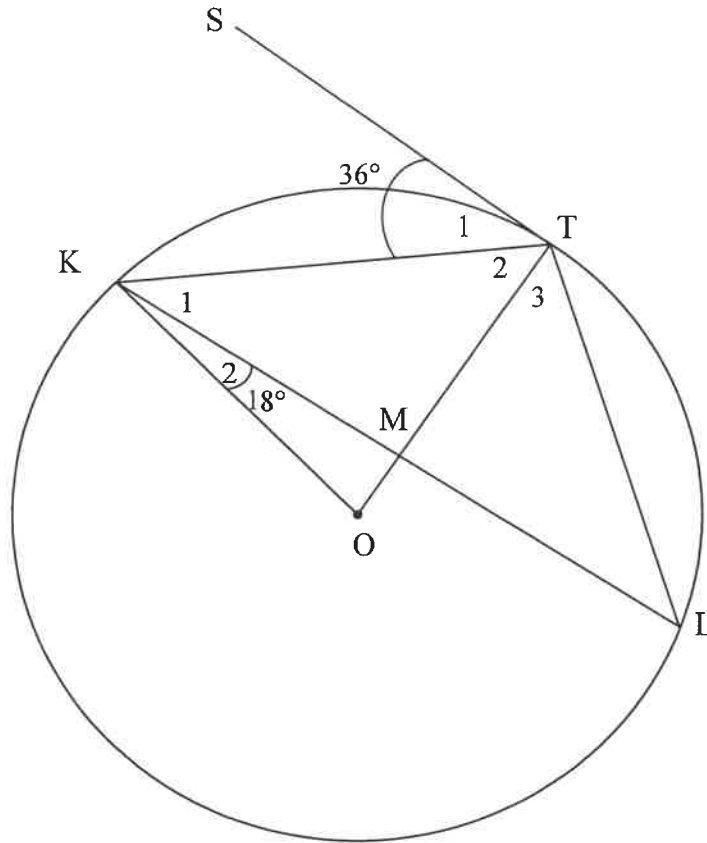


	Solution/Oplissing	Marks Punte
7.1.1		(2)
7.1.2		(3)
7.2		(3)
		(3)
		[8]

Give reasons for your statements in QUESTIONS 8, 9 and 10.
 Gee redes vir jou bewerings in VRAAG 8, 9 en 10.

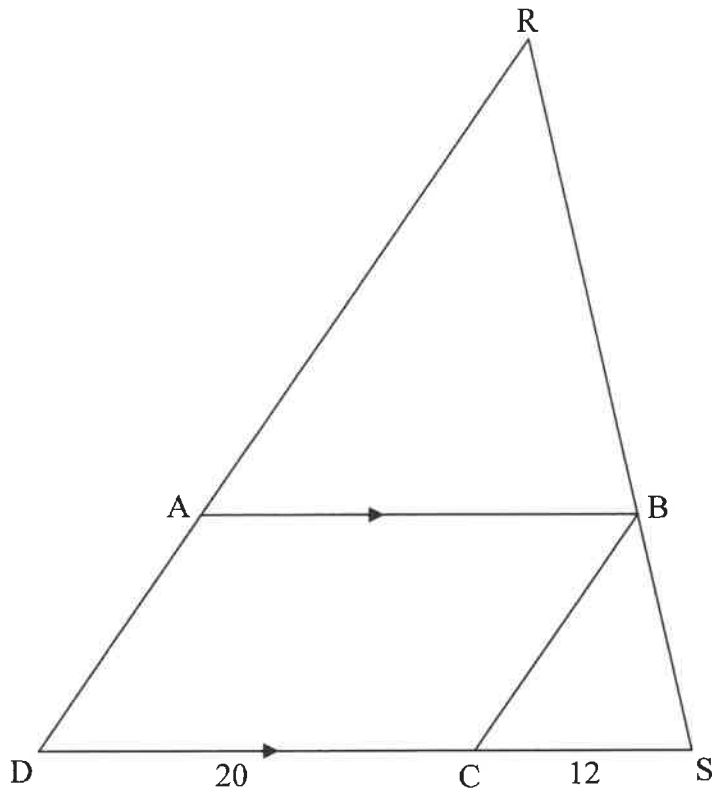
QUESTION/VRAAG 8

8.1



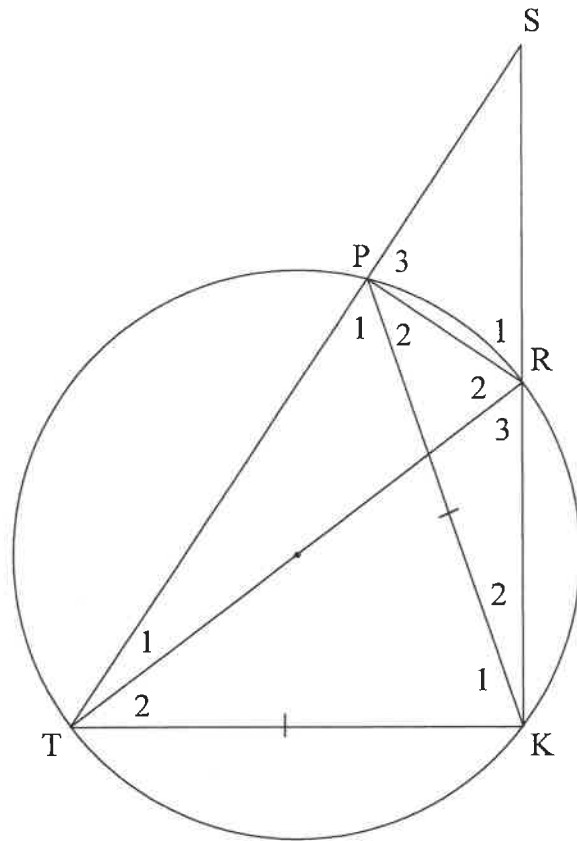
	Solution/Oplissing	Marks Punte
8.1.1(a)		(2)
8.1.1(b)		(2)
8.1.1(c)		(2)
8.1.2		(3)

8.2



	Solution/Oplissing	Marks Punte
8.2.1		
		(3)
8.2.2		
		(3)
		[15]

QUESTION/VRAAG 10



	Solution/Oplissing	Marks Punte
10.1.1		(4)
10.1.2		(5)



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE EXAMINATIONS/
SENIORSERTIFIKAAT-EKSAMEN
NATIONAL SENIOR CERTIFICATE EXAMINATIONS/
NASIONALE SENIORSERTIFIKAAT-EKSAMEN**

MATHEMATICS P2/WISKUNDE V2

MARKING GUIDELINES/NASIENRIGLYNE

MAY/JUNE/MEI/JUNIE 2023

**MARKS: 150
PUNTE: 150**

**These marking guidelines consist of 21 pages./
Hierdie nasienriglyne bestaan uit 21 bladsye.**

NOTE:

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

LET WEL:

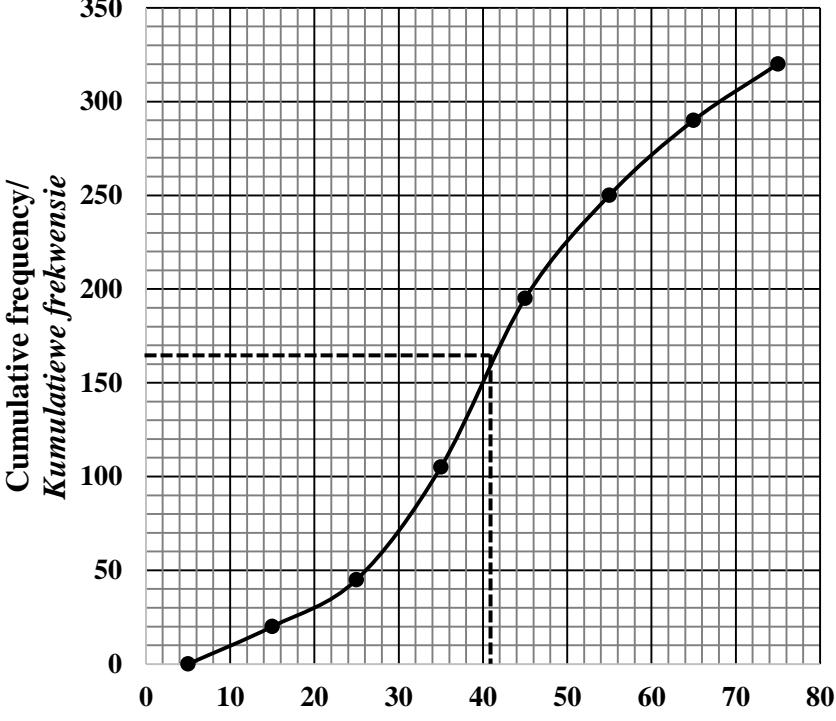
- As 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, merk die doodgetrekte poging.
- Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.
- Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.

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

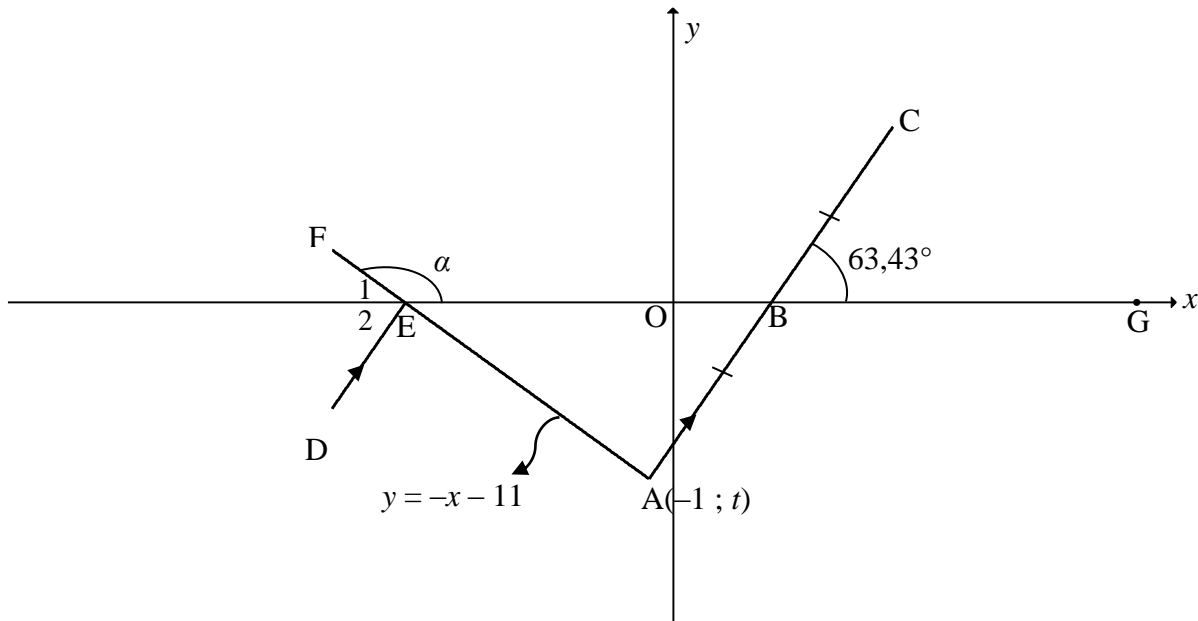
QUESTION/VRAAG 1

1.1.1	$a = 1730,22$ $b = 13,96$ $\hat{y} = 1730,22 + 13,96x$	$\checkmark a = 1730,22$ $\checkmark b = 13,96$ \checkmark equation	(3)
1.1.2	$\hat{y} = 1730,22 + 13,96x$ $\hat{y} = 1730,22 + 13,96(28500)$ $\hat{y} = R399\,590,22$ OR/OF $\hat{y} = R399\,599,64$ (calc)	\checkmark substitution \checkmark answer $\checkmark\checkmark$ answer	(2) (2)
1.1.3	$r = 0,98002 \dots$ $r = 0,98$	\checkmark answer	(1)
1.1.4	There is a very strong positive correlation between the amount spent on advertising and sales. / <i>Daar is 'n baie sterk positiewe korrelasie tussen die bedrag spandeer op advertensie en die verkope.</i>	\checkmark strong positive	(1)
1.2.1	$\bar{x} = \frac{1\,552\,195}{9}$ $\bar{x} = 172\,466,11$	$\checkmark \bar{x} = \frac{1\,552\,195}{9}$ \checkmark answer	(2)
1.2.2	$\sigma = 56\,950,09$	\checkmark answer	(1)
1.2.3	$\bar{x} + \sigma$ $= 172\,466,11 + 56\,950,09$ $= 229\,416,20$ 2 years/jaar	$\checkmark \bar{x} + \sigma$ \checkmark answer	(2)
			[12]

QUESTION/VRAAG 2

2.1	$35 < x \leq 45$	✓ answer (1)																								
2.2	320 people/mense	✓ answer (1)																								
2.3	<table border="1" data-bbox="384 551 1067 913"> <thead> <tr> <th>AGE</th> <th>NUMBER OF PEOPLE</th> <th>CUMULATIVE FREQUENCY</th> </tr> </thead> <tbody> <tr> <td>$5 < x \leq 15$</td> <td>20</td> <td>20</td> </tr> <tr> <td>$15 < x \leq 25$</td> <td>25</td> <td>45</td> </tr> <tr> <td>$25 < x \leq 35$</td> <td>60</td> <td>105</td> </tr> <tr> <td>$35 < x \leq 45$</td> <td>90</td> <td>195</td> </tr> <tr> <td>$45 < x \leq 55$</td> <td>55</td> <td>250</td> </tr> <tr> <td>$55 < x \leq 65$</td> <td>40</td> <td>290</td> </tr> <tr> <td>$65 < x \leq 75$</td> <td>30</td> <td>320</td> </tr> </tbody> </table> <div data-bbox="261 913 1166 1794" style="text-align: center;"> <p>OGIVE/OGIEF</p>  </div>	AGE	NUMBER OF PEOPLE	CUMULATIVE FREQUENCY	$5 < x \leq 15$	20	20	$15 < x \leq 25$	25	45	$25 < x \leq 35$	60	105	$35 < x \leq 45$	90	195	$45 < x \leq 55$	55	250	$55 < x \leq 65$	40	290	$65 < x \leq 75$	30	320	<ul style="list-style-type: none"> ✓ cumulative frequency ✓ grounding ✓ plotting at upper limit ✓ shape <p style="text-align: right;">(4)</p>
AGE	NUMBER OF PEOPLE	CUMULATIVE FREQUENCY																								
$5 < x \leq 15$	20	20																								
$15 < x \leq 25$	25	45																								
$25 < x \leq 35$	60	105																								
$35 < x \leq 45$	90	195																								
$45 < x \leq 55$	55	250																								
$55 < x \leq 65$	40	290																								
$65 < x \leq 75$	30	320																								
2.4	Median = 41	✓✓ answer (2)																								
		[8]																								

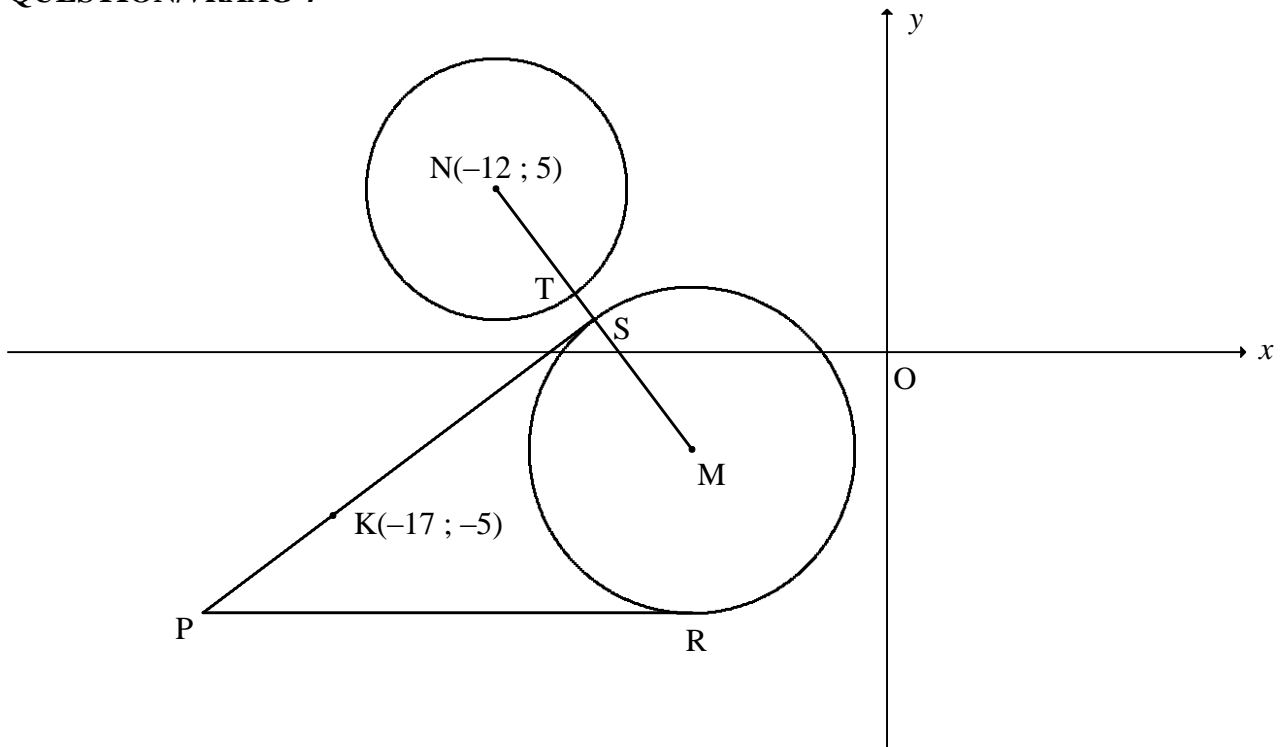
QUESTION/VRAAG 3



3.1.1	$y = -x - 11$ $A(-1 ; t)$ $t = -(-1) - 11$ $t = -10$	✓ substitution ✓ value of t (2)
3.1.2	$\tan \alpha = -1$ <i>ref.</i> $\angle = 45^\circ$ $\therefore \alpha = 135^\circ$	✓ $\tan \alpha = -1$ ✓ 135° (2)
3.1.3	$\tan 63,43^\circ = m_{AC}$ $m_{AC} = 2$	✓ $\tan 63,43^\circ = m_{AC}$ ✓ answer (2)
3.2	$m_{AC} = 2$ $A(-1 ; -10)$ $y = 2x + k$ $-10 = 2(-1) + k$ $k = -8$ $y = 2x - 8$	<p style="text-align: center;">OR/OF</p> $y - y_1 = 2(x - x_1)$ $y - (-10) = 2(x - (-1))$ $y = 2x - 8$ ✓ substitution of m and A ✓ equation (2)

<p>3.3.1</p>	$y = 2x - 8$ $0 = 2x - 8$ $x_B = 4$ $\frac{x_C + (-1)}{2} = 4$ $x_C = 9$ $\frac{y_C + (-10)}{2} = 0$ $y_C = 10$ <p>OR/OF by translation / <i>met translasie</i></p> <p>A → B (x; y) → (x + 5; y + 10)</p> <p>B → C (4; 0) → (4 + 5; 0 + 10) = (9; 10)</p>	<p>✓ $x_B = 4$</p> <p>✓ $x_C = 9$ ✓ $y_C = 10$</p> <p>(3)</p> <p>✓ (x + 5; y + 10)</p> <p>✓ $x_C = 9$ ✓ $y_C = 10$</p> <p>(3)</p>
<p>3.3.2</p>	$\hat{A}BE = 63,43^\circ$ $\hat{E}_2 = 63,43^\circ$ $\hat{E}_1 = 45^\circ$ $\hat{F}ED = 108,43^\circ$ <p>OR/OF</p> $\hat{E}AB = 135^\circ - 63,43^\circ$ $\hat{E}AB = 71,57^\circ$ $\hat{D}EA = \hat{E}AB = 71,57^\circ$ $\hat{F}ED = 108,43^\circ$ <p>OR/OF</p> $\hat{A}BE = 63,43^\circ$ $\hat{D}EO = 116,57^\circ$ $\hat{F}ED = 360^\circ - (116,57^\circ + 135^\circ)$ $= 108,43^\circ$	<p>✓ $\hat{A}BE = 63,43^\circ$</p> <p>✓ $\hat{E}_1 = 45^\circ$</p> <p>✓ $\hat{F}ED = 108,43^\circ$</p> <p>(3)</p> <p>✓ $\hat{E}AB = 71,57^\circ$</p> <p>✓ $\hat{D}EA = \hat{E}AB = 71,57^\circ$</p> <p>✓ $\hat{F}ED = 108,43^\circ$</p> <p>(3)</p> <p>✓ $\hat{A}BE = 63,43^\circ$</p> <p>✓ $\hat{D}EO = 116,57^\circ$</p> <p>✓ $\hat{F}ED = 108,43^\circ$</p> <p>(3)</p>
<p>3.4</p>	$y = 0$ $x_E = -11$ $\frac{x_G + (-11)}{2} = 4$ $x_G = 19$ $(x - 19)^2 + y^2 = 15^2$ $(x - 19)^2 + y^2 = 225$	<p>✓ $x_E = -11$</p> <p>✓ $x_G = 19$</p> <p>✓ $(x - 19)^2 + y^2 = 225$</p> <p>(4)</p>
<p>[18]</p>		

QUESTION/VRAAG 4



4.1	$M(-6; -3)$	✓ -6 ✓ -3 (2)
4.2.1	$x^2 + y^2 + 24x - 10y + 153 = 0$ $(x+12)^2 + (y-5)^2 = -153 + 144 + 25$ $(x+12)^2 + (y-5)^2 = 16$ $r^2 = 16$ $r = 4$ units	✓ $r^2 = -153 + 144 + 25$ ✓ length of radius (2)
4.2.2	$NM = \sqrt{(-12 - (-6))^2 + (5 - (-3))^2}$ $NM = 10$ units $SM = 5$ units $\therefore TS = 10 - 5 - 4 = 1$ unit	✓ substitution into distance formula ✓ $NM = 10$ units ✓ $SM = 5$ units ✓ answer (4)
4.3.1	$R(-6; -8)$ $y = -8$	✓ $y_R = -8$ ✓ answer (2)

<p>4.3.2</p>	$m_{NM} = \frac{5 - (-3)}{-12 - (-6)}$ $m_{NM} = -\frac{4}{3}$ $m_{\text{tangent}} = \frac{3}{4}$ $-5 = \frac{3}{4}(-17) + c \quad \text{OR/OF} \quad y - y_1 = \frac{3}{4}(x - x_1)$ $c = \frac{31}{4} \quad y - (-5) = \frac{3}{4}(x - (-17))$ $y = \frac{3}{4}x + \frac{31}{4} \quad y = \frac{3}{4}x + \frac{31}{4}$ <p>OR/OF</p> <p>NS = SM = 5</p> <p>S $\left(\frac{-12-6}{2}; \frac{5-3}{2}\right)$</p> <p>S (-9 ; 1)</p> $m_{SK} = \frac{1 - (-5)}{-9 + 17}$ $= \frac{6}{8} = \frac{3}{4}$ $y + 5 = \frac{3}{4}(x + 17)$ $y = \frac{3}{4}x + \frac{31}{4} \text{ or } y = \frac{3}{4}x + 7\frac{3}{4}$	<p>✓ substitution</p> <p>✓ $m_{NM} = -\frac{4}{3}$</p> <p>✓ $m_{\text{tangent}} = \frac{3}{4}$</p> <p>✓ substitution of m and N</p> <p>✓ equation (5)</p> <p>✓ S midpoint</p> <p>✓ coordinates of S</p> <p>✓ $m_{\text{tangent}} = \frac{3}{4}$</p> <p>✓ substitution of m and K(-17 ; -5) or S</p> <p>✓ equation (5)</p>
<p>4.4.1</p>	$-8 = \frac{3}{4}x + \frac{31}{4}$ $-32 = 3x + 31$ $3x = -63$ $x = -21$ <p>P(-21 ; -8)</p> <p>R(-6 ; -8)</p> <p>PR = PS = 15 units [tangents from same point]</p> <p>MS = MR = 5 units</p> <p>Perimeter PSMR = 15 + 15 + 5 + 5 = 40 units</p>	<p>✓ $-8 = \frac{3}{4}x + \frac{31}{4}$</p> <p>✓ $x = -21$</p> <p>✓ PR = PS = 15 units</p> <p>✓ MS = MR = 5 units</p> <p>✓ answer (5)</p>

<p>4.4.2</p>	$\frac{\text{area of } \triangle NPS}{\text{area of quadrilateral PSMR}}$ $\frac{\frac{1}{2} NS.SP}{\frac{1}{2} SP.MS + \frac{1}{2} MR.PR}$ $= \frac{\frac{1}{2}(5)(15)}{2\left(\frac{1}{2}\right)(5)(15)}$ $= \frac{1}{2}$ <p>OR</p> $\triangle NPS \equiv \triangle SPM \equiv \triangle MPR$ $\frac{\text{area of } \triangle NPS}{\text{area of quadrilateral PSMR}}$ $= \frac{1}{2}$	<p>✓ substitution</p> <p>✓ answer (2)</p> <p>✓ congruent</p> <p>✓ answer (2)</p>
<p>[22]</p>		

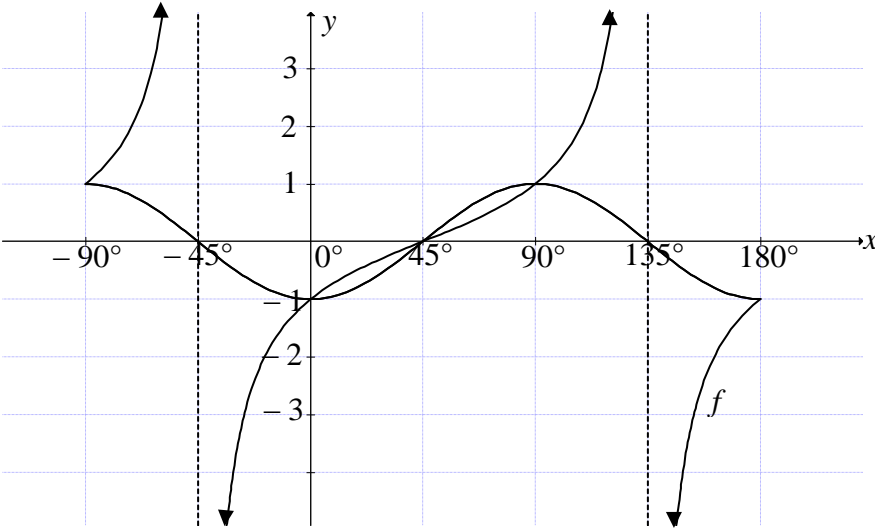
QUESTION/VRAAG 5

<p>5.1</p>	$\frac{1 - \sin(-\theta)\cos(90^\circ + \theta)}{\cos(\theta - 360^\circ)}$ $= \frac{1 - (-\sin\theta)(-\sin\theta)}{\cos\theta}$ $= \frac{1 - \sin^2\theta}{\cos\theta}$ $= \frac{\cos^2\theta}{\cos\theta}$ $= \cos\theta$	<p>✓ $-\sin\theta$ ✓ $-\sin\theta$ ✓ $\cos\theta$</p> <p>✓ $\cos^2\theta$ ✓ answer</p> <p>(5)</p>
<p>5.2.1</p>	<p>$\cos 200^\circ$ $= -\cos 20^\circ$ $= -p$</p>	<p>✓ reduction ✓ answer</p> <p>(2)</p>
<p>5.2.2</p>	<p>$\sin(-70^\circ)$ $= -\sin 70^\circ$ $= -\cos 20^\circ$ $= -p$</p> <p>OR/OF</p> <p>$\sin(-70^\circ)$ $= -\sin 70^\circ$ $= -p$</p>	<p>✓ reduction ✓ answer</p> <div data-bbox="603 987 1104 1272" data-label="Diagram"> </div> <p>(2)</p> <p>✓ reduction ✓ answer</p> <p>(2)</p>
<p>5.2.3</p>	<p>$\sin 10^\circ$ $\cos(2(10^\circ)) = 1 - 2\sin^2 10^\circ$ $2\sin^2 10^\circ = 1 - \cos 20^\circ$ $\sin 10^\circ = \sqrt{\frac{1 - \cos 20^\circ}{2}}$ $\sin 10^\circ = \sqrt{\frac{1 - p}{2}}$</p> <p>OR/OF</p> <p>$\sin 10^\circ$ $\sin(30^\circ - 20^\circ)$ $= \sin 30^\circ \cos 20^\circ - \cos 30^\circ \sin 20^\circ$ $= \frac{1}{2}p - \frac{\sqrt{3}}{2}\sqrt{1-p^2} = \frac{p - \sqrt{3}\sqrt{1-p^2}}{2}$</p> <p>OR/OF</p>	<p>✓ double angle</p> <p>✓ $\sin 10^\circ$ as subject</p> <p>✓ answer</p> <p>(3)</p> <p>✓ using special angle ✓ expanding</p> <p>✓ answer</p> <p>(3)</p>

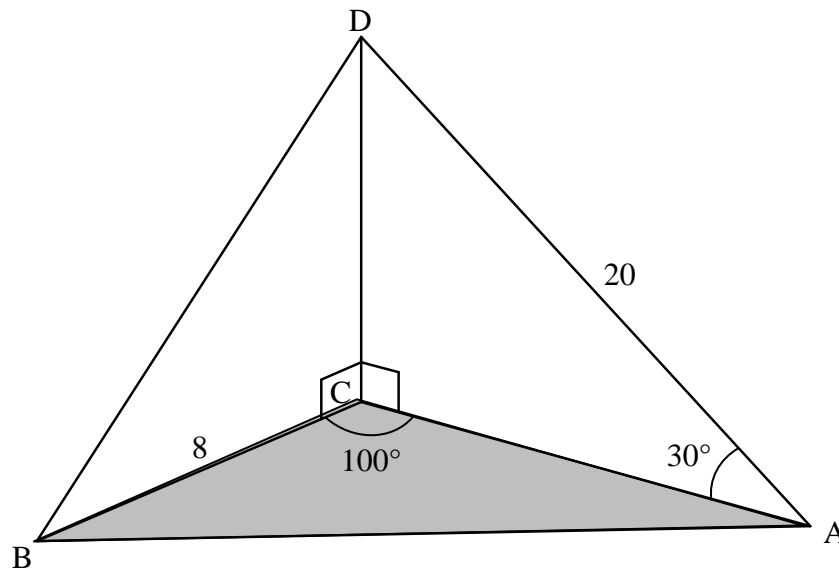
	$\sin 10^\circ$ $\sin(70^\circ - 60^\circ)$ $= \sin 70^\circ \cos 60^\circ - \cos 70^\circ \sin 60^\circ$ $= p \cdot \frac{1}{2} - \sqrt{1-p^2} \times \frac{\sqrt{3}}{2} = \frac{p - \sqrt{3}\sqrt{1-p^2}}{2}$ <p>OR/OF</p> $\sin 10^\circ$ $= \cos 80^\circ$ $\cos(60^\circ + 20^\circ)$ $= \cos 60^\circ \cos 20^\circ - \sin 60^\circ \sin 20^\circ$ $= \frac{1}{2} p - \frac{\sqrt{3}}{2} \cdot \sqrt{1-p^2}$	<p>✓ using special angle ✓ expanding</p> <p>✓ answer (3)</p> <p>✓ using special angle ✓ expanding</p> <p>✓ answer (3)</p>
<p>5.3</p>	$\cos(A + 55^\circ)\cos(A + 10^\circ) + \sin(A + 55^\circ)\sin(A + 10^\circ)$ $= \cos[A + 55^\circ - (A + 10^\circ)]$ $= \cos 45^\circ$ $= \frac{1}{\sqrt{2}} \quad \text{or} \quad \frac{\sqrt{2}}{2}$	<p>✓✓ compound identity</p> <p>✓ answer (3)</p>
<p>5.4.1</p>	$\text{LHS} = \frac{\cos 2x + \sin 2x - \cos^2 x}{\sin x - 2 \cos x}$ $= \frac{\cos^2 x - \sin^2 x + 2 \sin x \cos x - \cos^2 x}{\sin x - 2 \cos x}$ $= \frac{-\sin^2 x + 2 \sin x \cos x}{\sin x - 2 \cos x}$ $= \frac{-\sin x(\sin x - 2 \cos x)}{\sin x - 2 \cos x}$ $= -\sin x$ <p>∴ LHS = RHS</p> <p style="text-align: right;">$\text{RHS} = -\sin x$</p>	<p>✓ $\cos^2 x - \sin^2 x$ ✓ $2 \sin x \cos x$</p> <p>✓ common factor of $-\sin x$</p> <p>(3)</p>
<p>5.4.2</p>	$\frac{\cos 2x + \sin 2x - \cos^2 x}{-3 \sin^2 x + 6 \sin x \cos x}$ $= \frac{\cos 2x + \sin 2x - \cos^2 x}{-3 \sin x(\sin x - 2 \cos x)}$ $= \frac{\cos 2x + \sin 2x - \cos^2 x}{(\sin x - 2 \cos x)} \times \frac{1}{-3 \sin x}$ $= (-\sin x) \times \frac{1}{-3 \sin x}$ $= \frac{1}{3}$	<p>✓ common factor of $-3 \sin x$</p> <p>✓ substitution</p> <p>✓ answer (3)</p>

5.5.1	$3 \tan 4x = -2 \cos 4x$ $3 \left(\frac{\sin 4x}{\cos 4x} \right) = -2 \cos 4x$ $3 \sin 4x + 2 \cos^2 4x = 0$ $3 \sin 4x + 2(1 - \sin^2 4x) = 0$ $-2 \sin^2 4x + 3 \sin 4x + 2 = 0$ $2 \sin^2 4x - 3 \sin 4x - 2 = 0$ $(2 \sin 4x + 1)(\sin 4x - 2) = 0$ $\sin 4x = -\frac{1}{2} \quad \text{or} \quad \sin 4x \neq 2$	<p>✓ identity</p> <p>✓ $1 - \sin^2 4x$</p> <p>✓ standard form</p> <p>✓ factors</p> <p>(4)</p>
5.5.2	$\sin 4x = -\frac{1}{2}$ <p>ref. $\angle = 30^\circ$</p> $4x = 210^\circ + k.360^\circ \quad \text{or} \quad 4x = 330^\circ + k.360^\circ$ $x = 52,5^\circ + k.90^\circ ; k \in Z \quad \quad \quad x = 82,5^\circ + k.90^\circ ; k \in Z$	<p>✓ $210^\circ ; 330^\circ$</p> <p>✓ $52,5^\circ ; 82,5^\circ$</p> <p>✓ $k.90^\circ ; k \in Z$</p> <p>(3)</p>
		[28]

QUESTION/VRAAG 6

6.1	Period = 180°	✓ answer (1)
6.2		✓ x-intercepts ✓ turning points ✓ end points (3)
6.3	$y \in [-1; 1]$ OR/OF $-1 \leq y \leq 1$	✓ answer (1)
6.4	$g(x) = -\cos 2x$ $g(x + 45^\circ) = -\cos 2(x + 45^\circ)$ $= -\cos(2x + 90^\circ)$ $= \sin 2x$	✓ $-\cos 2(x + 45^\circ)$ ✓ answer (2)
6.5.1	$x \in (-90^\circ; -45^\circ)$ OR/OF $-90^\circ < x < -45^\circ$	✓✓ $x \in (-90^\circ; -45^\circ)$ (2)
6.5.2	$2 \cos 2x - 1 > 0$ $\cos 2x > \frac{1}{2}$ $-\cos 2x < -\frac{1}{2}$ $x \in (-30^\circ; 30^\circ)$ OR/OF $-30^\circ < x < 30^\circ$	✓ $\cos 2x > \frac{1}{2}$ ✓ $-\cos 2x < -\frac{1}{2}$ ✓ $x = \pm 30^\circ$ ✓ interval (4)
		[13]

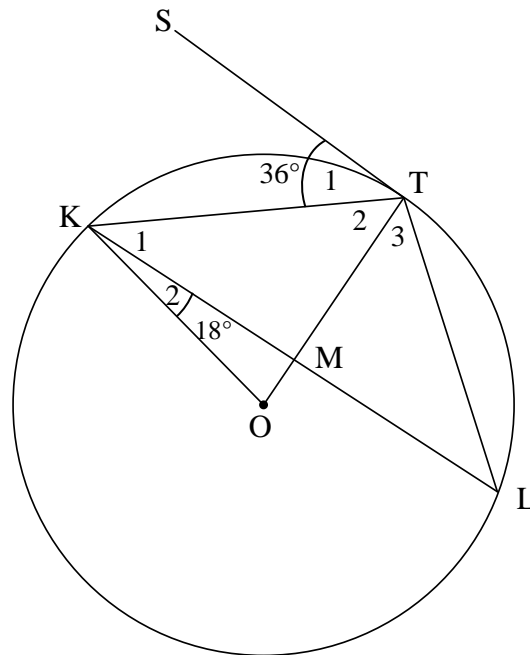
QUESTION/VRAAG 7



<p>7.1.1</p>	$\frac{AC}{20} = \cos 30^\circ$ $AC = 20 \cos 30^\circ$ $AC = 10\sqrt{3} = 17,32 \text{ units}$ <p>OR/OF</p> $\frac{AC}{\sin 60^\circ} = \frac{20}{\sin 90^\circ}$ $\therefore AC = 20 \sin 60 = 17,32$	<p>✓ trig ratio</p> <p>✓ answer (2)</p> <p>✓ trig ratio</p> <p>✓ answer (2)</p>
<p>7.1.2</p>	$AB^2 = AC^2 + BC^2 - 2AC \cdot BC \cos \hat{ACB}$ $AB^2 = (10\sqrt{3})^2 + 8^2 - 2(10\sqrt{3})(8) \cos 100^\circ$ $AB = 20,30 \text{ units}$	<p>✓ cosine formula</p> <p>✓ substitution into cosine formula</p> <p>✓ answer (3)</p>
<p>7.2</p>	$\frac{\sin \hat{ADB}}{AB} = \frac{\sin \hat{ABD}}{AD}$ $\frac{\sin \hat{ADB}}{20,3} = \frac{\sin 73,4^\circ}{20}$ $\sin \hat{ADB} = \frac{20,3 \sin 73,4^\circ}{20}$ $\hat{ADB} = 76,58^\circ$	<p>✓ sine formula in $\triangle ABD$</p> <p>✓ substitution into sine formula</p> <p>✓ answer (3)</p>
<p>[8]</p>		

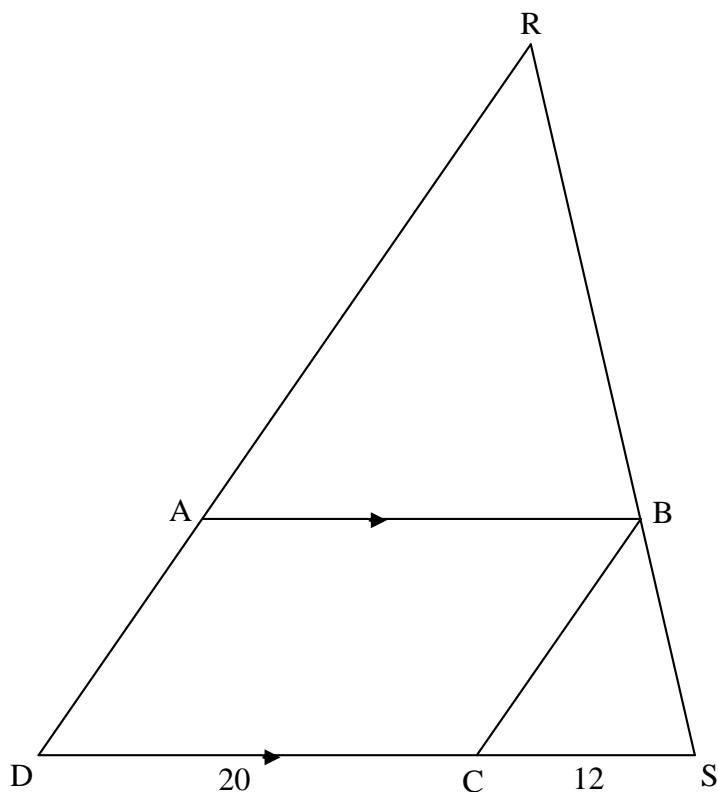
QUESTION/VRAAG 8

8.1



8.1.1(a)	$\hat{T}_2 = 54^\circ$ [tan \perp rad]	\checkmark S \checkmark R (2)
8.1.1(b)	$\hat{L} = 36^\circ$ [tan - chord theorem]	\checkmark S \checkmark R (2)
8.1.1(c)	$\hat{KOT} = 72^\circ$ [\angle at centre = $2 \times \angle$ at circumference] OR/OF $\hat{OKT} = \hat{T}_2 = 54^\circ$ [\angle s opposite = radii] $\hat{KOT} = 180^\circ - (54^\circ + 54^\circ)$ [sum of int \angle 's of Δ] $= 72^\circ$	\checkmark S \checkmark R (2) \checkmark S/R \checkmark S (2)
8.1.2	$\hat{KMO} = 180^\circ - (18^\circ + 72^\circ)$ $= 90^\circ$ [sum of int \angle 's of Δ] $\therefore KM = ML$ [line from centre \perp to chord] OR/OF $\hat{OKT} = 54^\circ$ [\angle s opposite = radii] $\hat{K}_1 = 54^\circ - 18^\circ = 36^\circ$ $\hat{TMK} = 90^\circ$ [sum of int \angle 's of Δ] $\therefore KM = ML$ [line from centre \perp to chord]	\checkmark S \checkmark S \checkmark R (3) \checkmark S \checkmark S \checkmark R (3)

8.2

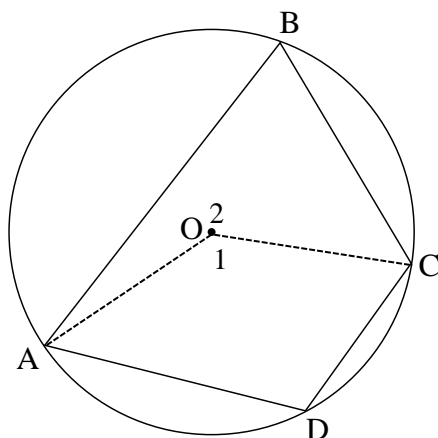


<p>8.2.1</p>	$\frac{DC}{CS} = \frac{20}{12} = \frac{5}{3}$ $\therefore \frac{DC}{CS} = \frac{RB}{BS}$ $\therefore BC \parallel DR \quad \text{[converse line } \parallel \text{ one side of } \Delta \text{ OR sides in the same proportion]}$ $\therefore BC \parallel AD$	<p>✓ S</p> <p>✓ S</p> <p>✓ R</p> <p>(3)</p>
<p>8.2.2</p>	$\frac{AR}{AD} = \frac{RB}{BS} \quad \text{[line } \parallel \text{ one side of } \Delta \text{] OR [Prop Theorem } AB \parallel DS \text{]}$ $\frac{AR}{AD} = \frac{5}{3}$ $\frac{48 - AD}{AD} = \frac{5}{3}$ $\therefore 5AD = 144 - 3AD$ $AD = 18$ $AB = 20 \quad \text{[opp sides of parm]}$ $\therefore AD : AB = 18 : 20 = 9 : 10$	<p>✓ $\frac{AR}{AD} = \frac{5}{3}$</p> <p>✓ AD = 18</p> <p>✓ ratio</p> <p>(3)</p>

	<p>OR/OF</p> $\frac{AR}{RD} = \frac{5}{8} \dots\dots\dots \text{prop thm } AB \parallel DS$ $\frac{AR}{48} = \frac{5}{8}$ <p>$\therefore AR = 30$ and $AD = 18$</p> $\therefore \frac{AR}{RD} = \frac{AB}{DS} \dots\dots\dots \parallel \Delta's$ <p>$\therefore AB = 20$</p> <p>$\therefore AB : AD = 18 : 20 = 9 : 10$</p>	<p>✓ $\frac{AR}{RD} = \frac{5}{8}$</p> <p>✓ $AD = 18$</p> <p>✓ ratio</p> <p>(3)</p>
		<p>[15]</p>

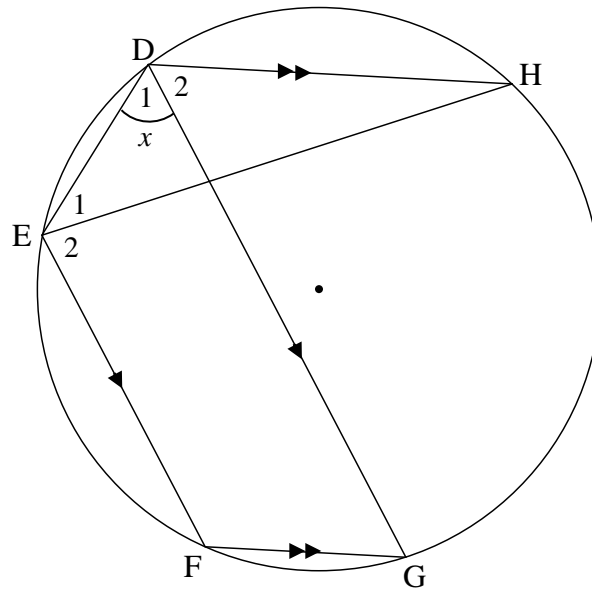
QUESTION/VRAAG 9

9.1



<p>9.1</p>	<p>Constr: Draw radii OA and OC.</p> <p>Proof:</p> <p>$\hat{O}_1 = 2\hat{B}$ [∠ at centre = 2×∠ at circumference]</p> <p>$\hat{O}_2 = 2\hat{D}$ [∠ at centre = 2×∠ at circumference]</p> <p>$\hat{O}_1 + \hat{O}_2 = 360^\circ$ [revolution]</p> <p>$2\hat{B} + 2\hat{D} = 360^\circ$ [revolution]</p> <p>$\therefore \hat{B} + \hat{D} = 180^\circ$</p>	<p>✓ Construction</p> <p>✓ S ✓ R</p> <p>✓ S/R</p> <p>✓ S</p> <p>(5)</p>
------------	---	---

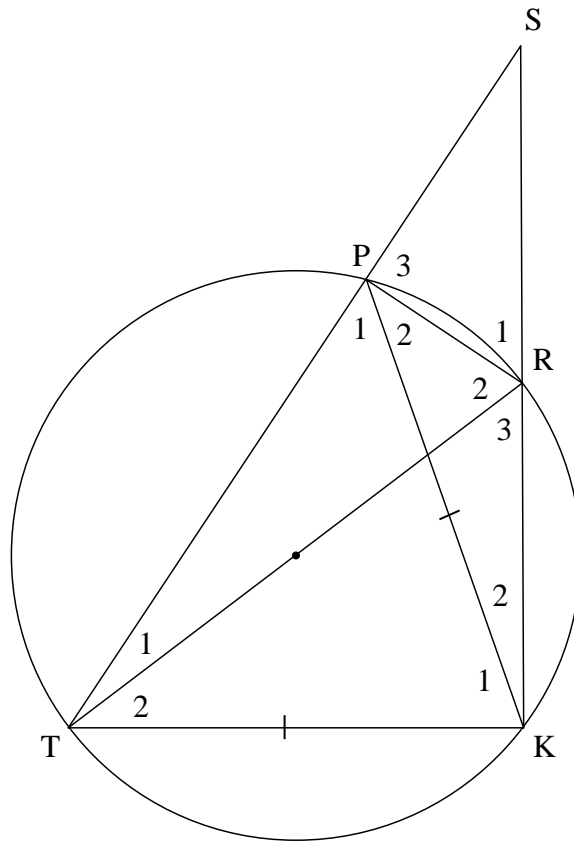
9.2



9.2	$\hat{EFG} = 180^\circ - \hat{D}_1$ $\therefore \hat{EFG} = 180^\circ - x$ $\hat{EFG} = 180^\circ - \hat{G}$ $\hat{G} = x$ But $\hat{G} = \hat{D}_2$ $\therefore \hat{D}_1 = \hat{D}_2 = x$	[opp \angle 's of cyclic quad] [co-int \angle 's; EF \parallel DG] [alt \angle 's; DH \parallel FG]	\checkmark S \checkmark R \checkmark S / R \checkmark S / R (4)
			[9]

QUESTION/VRAAG 10

10.1



10.1.1	$\hat{T}PR = 90^\circ$ $\hat{S}PR = 90^\circ$ $\therefore SR$ is a diameter OR $\hat{T}KR = 90^\circ$ $\hat{S}PR = 90^\circ$ $\therefore SR$ is a diameter	[\angle in semi-circle] [\angle 's on a straight line] [converse \angle in semi-circle] [\angle in semi-circle] [ext \angle of cyclic quad] [converse \angle in semi-circle] OR [chord subtends a right angle]	$\checkmark S \checkmark R$ $\checkmark S$ $\checkmark R$ (4) $\checkmark S \checkmark R$ $\checkmark S$ $\checkmark R$ (4)
--------	---	---	--

<p>10.1.2</p>	<p>$\hat{R}_1 = \hat{P}\hat{T}\hat{K}$ [ext \angle of cyclic quad] $\hat{P}_1 = \hat{P}\hat{T}\hat{K} = \hat{R}_1$ [\angles opp equal sides] $\hat{S} + \hat{R}_1 = \hat{P}_1 + \hat{P}_2$ [ext \angle of Δ] $\therefore \hat{S} = \hat{P}_2$ [$\hat{R}_1 = \hat{P}_1$]</p>	<p>✓S ✓R ✓S /R ✓S ✓R (5)</p>
<p>10.1.3</p>	<p>In ΔSPK and ΔPRK $\hat{S} = \hat{P}_2$ [proved] $\hat{K}_2 = \hat{K}_2$ [common] ΔSPK \parallel ΔPRK [\angle, \angle, \angle] OR/OF In ΔSPK and ΔPRK $\hat{S} = \hat{P}_2$ [proved] $\hat{K}_2 = \hat{K}_2$ [common] $\hat{S}\hat{P}\hat{K} = \hat{P}\hat{R}\hat{K}$ [sum of \angles in Δ] ΔSPK \parallel ΔPRK</p>	<p>✓S ✓S ✓S/R (3) ✓S ✓S ✓S/R (3)</p>
<p>10.2</p>	<p>$\frac{PK}{RK} = \frac{SK}{PK}$ [ΔSPK \parallel ΔPRK] $PK^2 = SK.RK$ $ST^2 = SK^2 + TK^2$ [Pythagoras] $TK = PK$ [Given] $ST^2 = SK^2 + PK^2$ $ST^2 = SK^2 + SK.RK$ $ST^2 = (2RK)^2 + 2RK.RK$ $ST^2 = 6RK^2$ $ST = \sqrt{6}RK$</p>	<p>✓S ✓S ✓ $PK^2 = SK.RK$ ✓ $SK = 2RK$ ✓ $ST^2 = 6RK^2$ (5)</p>
		<p>[17]</p>

TOTAL/TOTAAL: 150