



GAUTENG PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

**PREPARATORY EXAMINATION
*VOORBEREIDENDE EKSAMEN***

2024

OFFICIAL/ *AMPTELIKE*

MARKING

GUIDELINES/*NASIENRIGLYNE*

MATHEMATICS/*WISKUNDE* (PAPER/*VRAESTEL 2*) (10612)

20 pages/*bladsye*

NOTE:

- If a candidate answers a question **TWICE**, only mark the **FIRST** attempt.
- If a candidate has crossed out an attempted question 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 to solve a problem is **NOT** acceptable.
- Question 7.3 will be the only question in this marking guideline to have a rounding off penalty.

LET WEL:

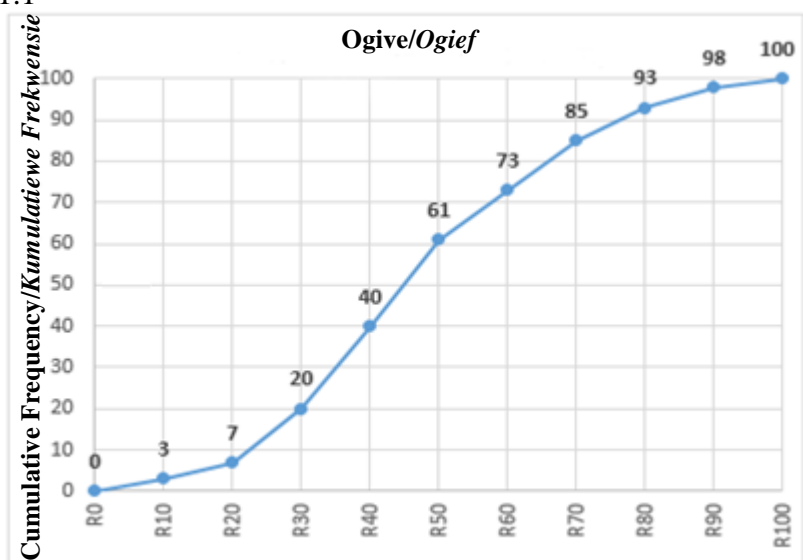
- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.*
- *As 'n kandidaat 'n antwoord tot 'n vraag doodtrek en nie oordoen nie, sien die doodgetrekte poging na.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aannames van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.*
- *Vraag 7.3 is die enigste vraag in die nasienriglyne waar afronding gepenaliseer sal word.*

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

QUESTION/VRAAG 1

Monthly salary (in thousand Rand) <i>Maandelikse salaris (in duisend Rand)</i>	Number of employees <i>Aantal werknemers</i>
$R0 < x \leq R10$	3
$R10 < x \leq R20$	4
$R20 < x \leq R30$	13
$R30 < x \leq R40$	20
$R40 < x \leq R50$	21
$R50 < x \leq R60$	12
$R60 < x \leq R70$	12
$R70 < x \leq R80$	8
$R80 < x \leq R90$	5
$R90 < x \leq R100$	2

1.1



Monthly salaries in thousand Rand/Maandelikse salaris in duisend Rand

- ✓ (0 ; 0)
- ✓ Upper limit/*Boonste limiet*
- ✓ Cumulative frequency/
Kumulatiewe frekwensie
- ✓ Shape/*Vorm*

(4)

1.2

30 employees/*werknemers*

- ✓ answer/*antwoord*
Accept/*aanvaar* 29-31

(1)

1.3

Median/*Mediaan* = R45 000

- ✓ answer/*antwoord*
Accept/*aanvaar*
R44 000 – R46 000

(1)

1.4.1

Mean/*Gemiddeld* = R85 857,14

- ✓ answer/*antwoord*

(1)

1.4.2

Standard deviation/*Standaardafwyking* = R2 294,63

- ✓ answer/*antwoord*

(1)

1.4.3

(83 562,51 ; 88 151,77)

$$\frac{4}{7} \times 100$$

$$= 57,14\%$$

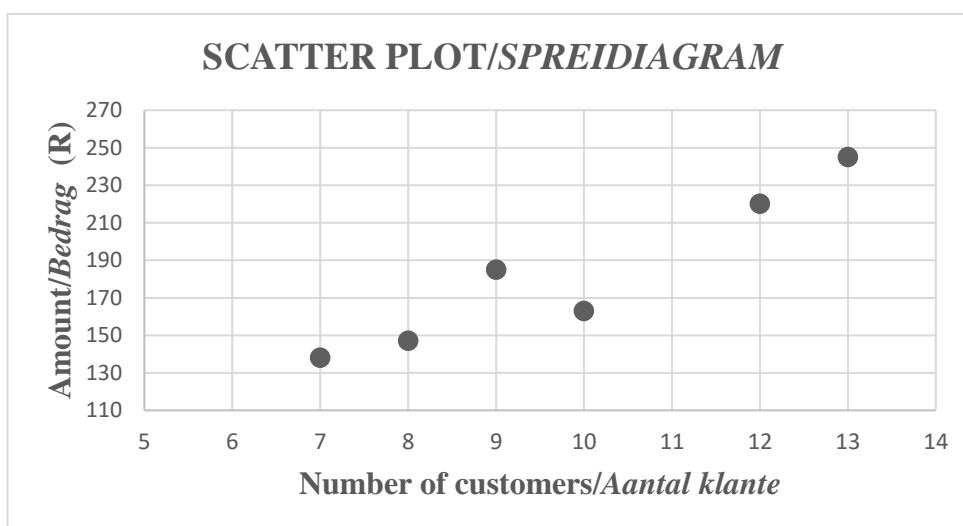
- ✓ interval
- ✓ 4
- ✓ answer/*antwoord*

(3)

[11]

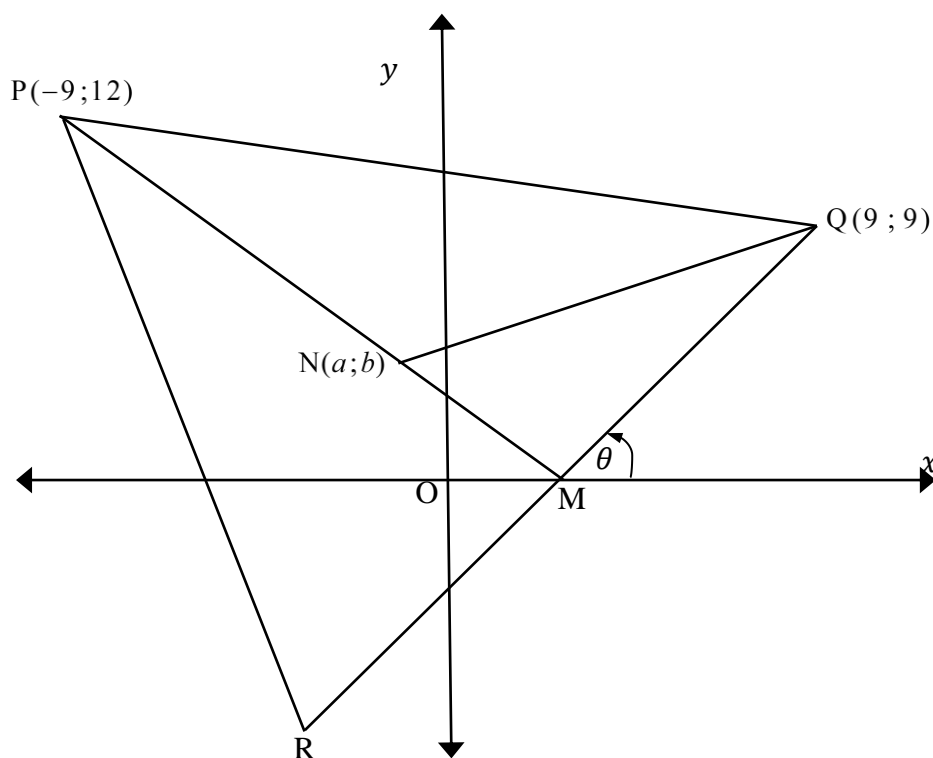
QUESTION/VRAAG 2

Stall <i>Stalletjie</i>	Number of customers/ <i>Aantal klante</i>	Amount of money spent (R)/ <i>Bedrag spandeer</i> (R)
1	10	163
2	7	138
3	9	185
4	12	220
5	8	147
6	13	245



2.1	$a = 12,59627329$ $b = 17,32919255$ $\hat{y} = 12,60 + 17,33x$	ANSWER ONLY: full marks <i>SLEGS ANTWOORD: volpunte</i>	$\checkmark a$ $\checkmark b$ \checkmark equation/vergeliking (3)
2.2	$\hat{y} = 12,60 + 17,33(11)$ $\hat{y} = 203,23$ OR/OF $\hat{y} = 203,22$ (with calculator/ <i>met sakrekenaar</i>)	ANSWER ONLY: full marks <i>SLEGS ANTWOORD: volpunte</i>	\checkmark substitution/substitusie \checkmark R203,23 $\checkmark\checkmark$ answer/antwoord (2)
2.3	$r = 0,949501084$ $r = 0,95$		\checkmark value of r / <i>waarde van r</i> (1)
2.4	No/ <i>Nee</i> The correlation shows a positive strong correlation between the money spent and the number of customers./ <i>Daar is 'n sterk positiewe korrelasie tussen die geld spandeer en die aantal klante.</i>		\checkmark no, strong positive correlation/ <i>nee sterk positiewe korrelasie</i> NO marks for NO only/ <i>Geen punte vir slegs NEE nie</i> (1)

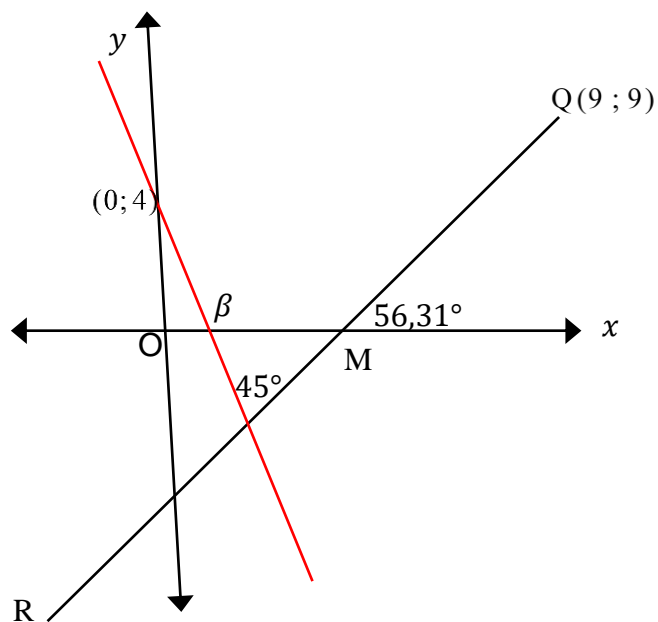
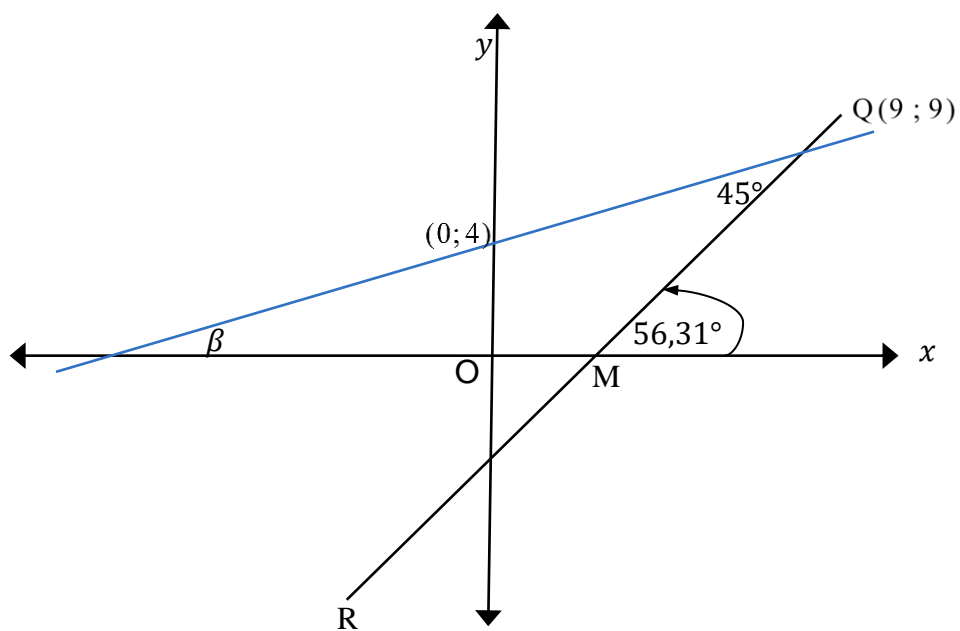
2.5	The gradient will decrease as the line will become less steep. The point is far away from the line. Or the point is above the data./Die gradiënt sal afneem want die lyn word minder steil. Die punt is ver van die lyn af. Of die punt lê bokant die data.	✓ decrease/afneem ✓ point is above the data/far away from the line/punt is bokant die lyn/punt is ver weg van die lyn af (2)
[9]		

QUESTION/VRAAG 3

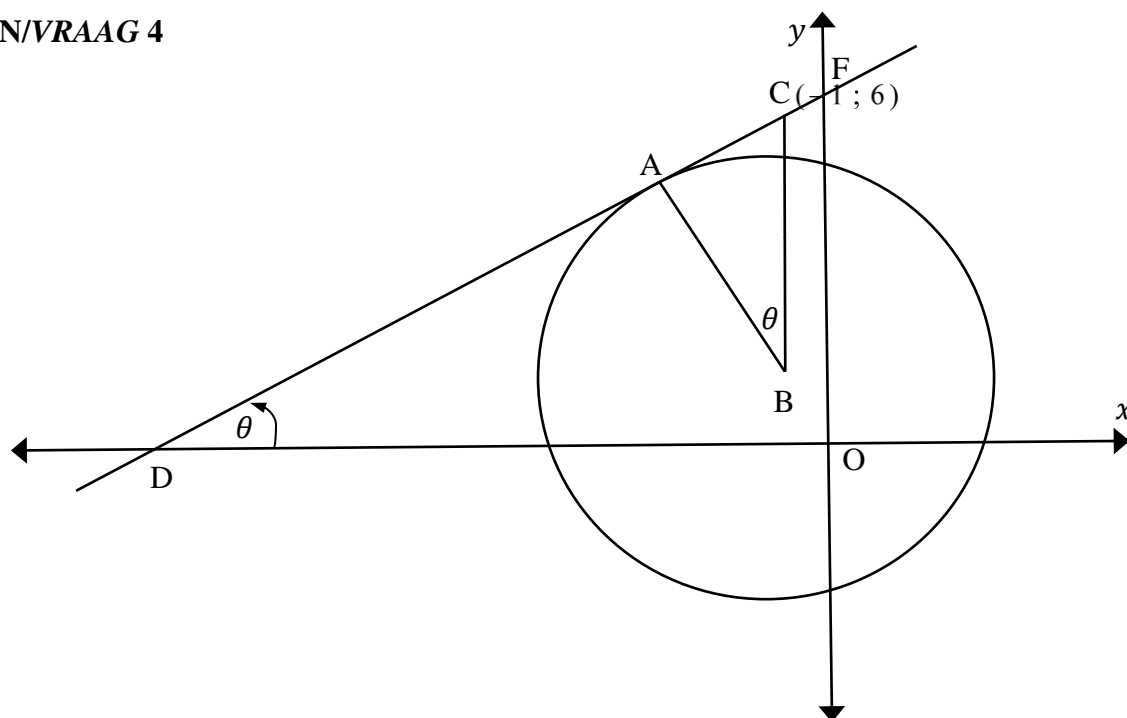
3.1	$2y - 3x + 9 = 0$ $2(0) - 3x = -9$ $x = 3$ $\therefore M(3; 0)$	✓ $y = 0$ ✓ $x = 3$ (2)
3.2	$m_{PM} = \frac{12 - 0}{-9 - 3}$ $= -1$ Substitute/Vervang $P(-9; 12)$ $y - 12 = -(x + 9)$ $y = -x - 9 + 12$ $y = -x + 3$	✓ correct substitution of P and M into gradient formula/korrekte substitusie van P en M in die gradiënt formule ✓ $m_{PM} = -1$ ✓ sub of point P or M/vervang punt P of M ✓ equation/vergelyking (4)

3.3	$\tan \theta = \frac{3}{2}$ $\theta = 56,31^\circ$	$\checkmark \tan \theta = \frac{3}{2}$ \checkmark answer/antwoord (2)
3.4	Substitute/vervang $(a; b)$ into/in $y = -x + 3$: $\therefore b = -a + 3$ $\therefore b = 3 - a$	\checkmark substitution/substitusie (1)
3.5	$(5\sqrt{5})^2 = (a - 9)^2 + (b - 9)^2$ Substitute/vervang $b = 3 - a$: $125 = (a - 9)^2 + (3 - a - 9)^2$ $\therefore 125 = a^2 - 18a + 81 + (-a - 6)^2$ $\therefore 125 = a^2 - 18a + 81 + a^2 + 12a + 36$ $\therefore 125 = 2a^2 - 6a + 117$ $\therefore 0 = 2a^2 - 6a - 8$ $\therefore 0 = a^2 - 3a - 4$ $\therefore 0 = (a - 4)(a + 1)$ $\therefore a = 4$ or $a = -1$ Since N is in the second quadrant, we choose $a = -1$. Omdat N in die tweede kwadrant is, kies $a = -1$. $\therefore b = 3 - (-1)$ $\therefore b = 4$	\checkmark substitution into correct formula/substitusie in die korrekte formule \checkmark subs of a /vervang a \checkmark standard form/standaardvorm \checkmark correct value of a /korrekte waarde van a \checkmark correct value of b /korrekte waarde van b (5)
3.6	$3 = \frac{9 + x}{2}$ $0 = \frac{9 + y}{2}$ $R(-3; -9)$ $(-3)^2 + (-9)^2 = r^2$ $x^2 + y^2 = 90$	$\checkmark x_R = -3$ $\checkmark y_R = -9$ \checkmark substitution of R/vervang R $\checkmark x^2 + y^2 = 90$ (4)
3.7	Let β be the inclination angle of the line/Laat β die inklinasiehoek wees van die lyn $v = mx + 4$ $\beta = 56,31^\circ - 45^\circ$ or/of $\beta = 56,31^\circ + 45^\circ$ $\beta = 11,31^\circ$ or/of $\beta = 101,31^\circ$ $m = \tan 11,31^\circ$ or/of $m = \tan 101,31^\circ$ $m = 0,20$ or/of $m = -5,00$	$\checkmark \beta = 11,31^\circ$ $\checkmark \beta = 101,31^\circ$ $\checkmark m = 0,20$ $\checkmark m = -5,0$ (4)
	See diagram for Q3.7 on the next page./ Sien die diagram vir V3.7 op die volgende bladsy.	
		[22]

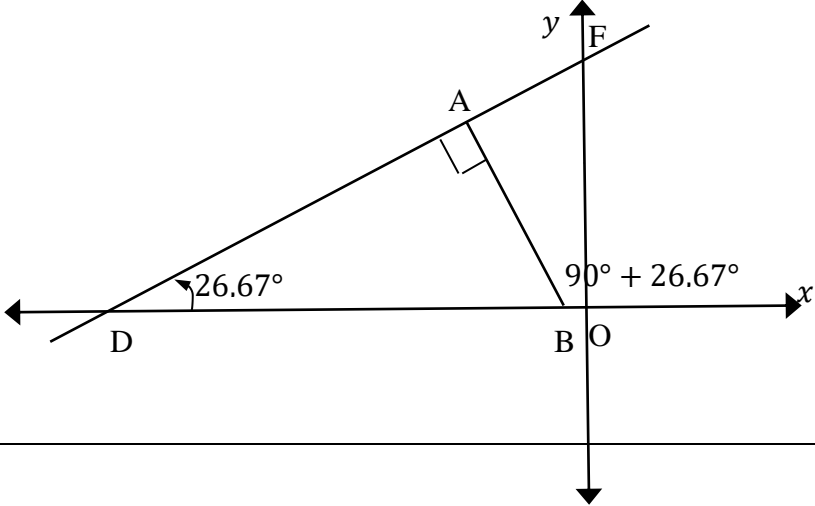
3.7



QUESTION/VRAAG 4



4.1	$B(-1; 1)$	✓ answer/antwoord (1)
4.2	$BC = 6 - 1 = 5$ $AB = \sqrt{20}$ $\hat{C}AB = 90^\circ$ <i>tan \perp rad/rklyn \perp rad</i> $AC^2 = (5)^2 - (\sqrt{20})^2$ $AC = \sqrt{5}$	✓ $BC = 5$ ✓ $\hat{C}AB = 90^\circ$ ✓ subs in Pythagoras/ <i>vervang in Pythagoras</i> (3)
4.3	$\tan \theta = \frac{AC}{AB} = \frac{\sqrt{5}}{\sqrt{20}} = \frac{1}{2}$	✓ $\tan \theta = \frac{1}{2}$ (1)
4.4	$m_{DC} \times m_{AB} = -1$ $m_{DC} = \tan \theta = \frac{1}{2}$ $m_{AB} = -2$ Substitute/Vervang $B(-1; 1)$ $y - 1 = -2(x + 1)$ $y = -2x - 1$ OR/OF	✓ $m_{DC} = \frac{1}{2}$ ✓ $m_{AB} = -2$ ✓ substitution of m and B / <i>substitusie van m en B</i> (3)

	$m_{AB} = \tan(90 + 26,57^\circ)$ $m_{AB} = -2$ <p>Substitute/ Vervang $B(-1; 1)$</p> $y - 1 = -2(x + 1)$ $y = -2x - 1$ 	$\checkmark m_{AB} = \tan(90 + 26,57^\circ)$ $\checkmark m_{AB} = -2$ <p>\checkmark substitution of m and B/ <i>substitusie van m en B</i></p> <p>(3)</p>
4.5	$(x + 1)^2 + (-2x - 1 - 1)^2 = 20$ $x^2 + 2x + 1 + 4x^2 + 8x + 4 = 20$ $5x^2 + 10x - 15 = 0$ $x^2 + 2x - 3 = 0$ $(x + 3)(x - 1) = 0$ $x = -3 \text{ or/of } x = 1$ $y = -2(-3) - 1$ $y = 5$ $A(-3; 5)$ <p>OR/OF</p>	<p>\checkmark substitution into correct formula/<i>substitusie in die korrekte formule</i></p> <p>\checkmark standard form/ <i>standaardvorm</i></p> <p>$\checkmark x = -3$</p> <p>$\checkmark y = 5$</p> <p>(4)</p>

	<p>Eq of DC/Verg van DC:</p> $y - 6 = \frac{1}{2}(x + 1)$ $y = \frac{1}{2}x + 6,5$ $\frac{1}{2}x + 6,5 = -2x - 1$ $x + 13 = -4x - 2$ $5x = -15$ $x = -3$ $y = -2(-3) - 1$ $y = 5$ $\therefore A(-3; 5)$	<p>✓ equation of DC/ vergelyking van DC</p> <p>✓ equate/gelykstel</p> <p>✓ $x = -3$</p> <p>✓ $y = 5$</p> <p>(4)</p>
4.6	<p>Area of/van $\Delta ABC = \frac{1}{2}(\sqrt{20})(\sqrt{5}) \sin 26,57^\circ$ $= 5$</p> <p>Area of/van $\Delta ODF = \frac{1}{2}(13)(14,53) \sin 26,57^\circ$ $= 42,25$</p> <p>Area of/van ΔABC : Area of $\Delta ODF = 20 : 169$</p> <p>OR/OF</p> <p>Area $\Delta ABC = \frac{1}{2} \times \sqrt{5} \times \sqrt{20} = 5$</p> <p>Equation of DC/Vergelyking van DC:</p> $y - 6 = \frac{1}{2}(x + 1)$ $y = \frac{1}{2}x + 6,5$ <p>Equation of/verg van DC is $y = \frac{1}{2}x + \frac{13}{2}$</p> <p>OF = $\frac{13}{2}$ and/en OD = 13</p> <p>Area of $\Delta ODF = \frac{1}{2} \times \left(\frac{13}{2}\right) \times 13 = \frac{169}{4}$</p> <p>Area ΔABC : Area $\Delta ODF = 20 : 169$</p>	<p>✓ $\frac{1}{2}(\sqrt{20})(\sqrt{5}) \sin 26,57^\circ$</p> <p>✓ area of / van $\Delta ABC = 5$</p> <p>✓ 13 and/en 14,53</p> <p>✓ $\sin 26,57^\circ$</p> <p>✓ area of / van $\Delta ODF = 42,25$</p> <p>✓ answer/antwoord</p> <p>(6)</p> <p>✓ $\frac{1}{2} \times \sqrt{5} \times \sqrt{20}$</p> <p>✓ $y = \frac{1}{2}x + \frac{13}{2}$</p> <p>✓ OF = $\frac{13}{2}$</p> <p>✓ OD = 13</p> <p>✓ $\frac{1}{2} \times \frac{13}{2} \times 13$</p> <p>✓ answer/antwoord</p> <p>(6)</p>
		[18]

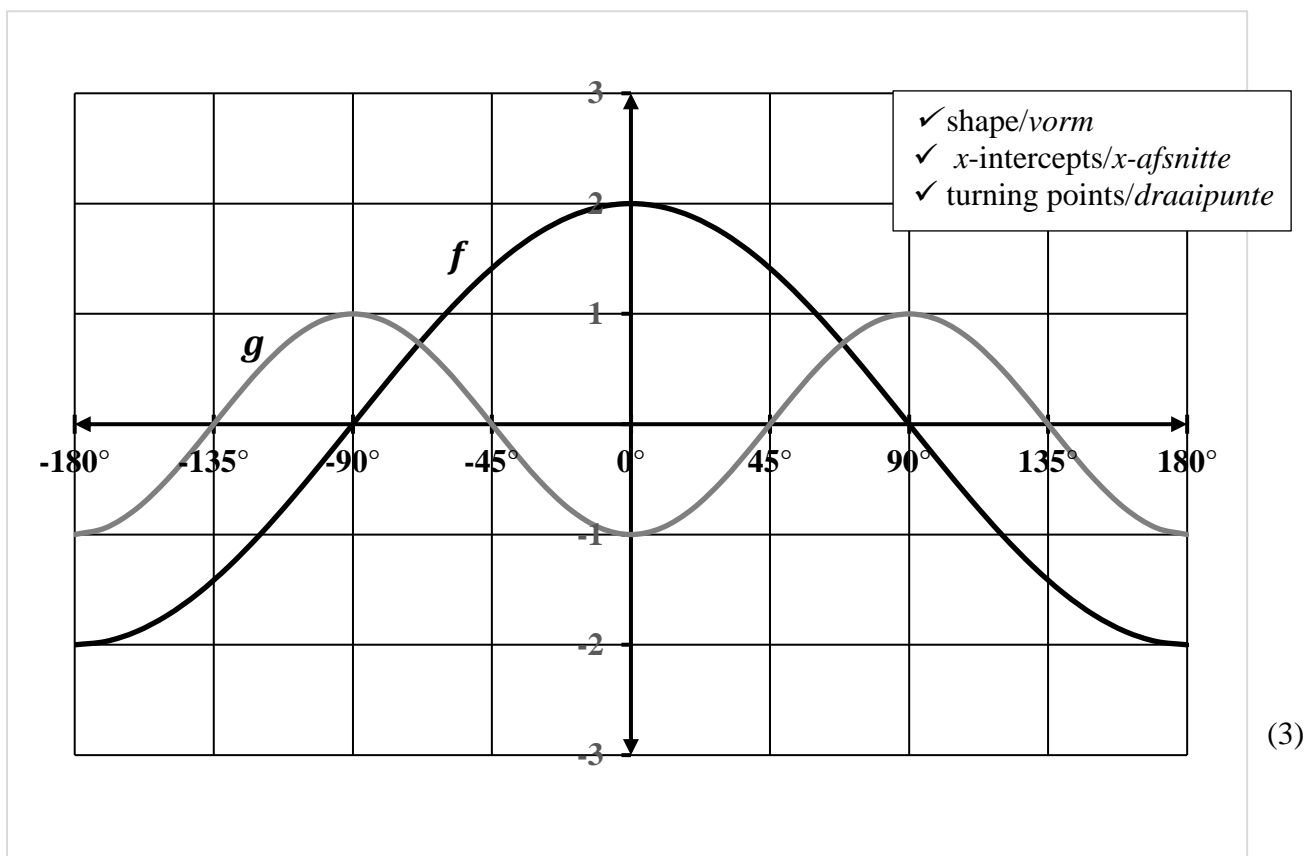
QUESTION/VRAAG 5

5.1	$\frac{\sin^2(180^\circ+x) \cdot \sin(-x)}{-\sin(90^\circ+x) \cdot \tan x} - 1$ $= \frac{(-\sin x)^2 \cdot -\sin x}{-\cos x \cdot \frac{\sin x}{\cos x}} - 1$ $= \sin^2 x - 1$ $= -1(1 - \sin^2 x)$ $= -\cos^2 x$	<ul style="list-style-type: none"> ✓ $(-\sin x)^2$ ✓ $-\sin x$ ✓ $-\cos x$ ✓ $\frac{\sin x}{\cos x}$ ✓ $\sin^2 x - 1$ ✓ $-\cos^2 x$ (6)
5.2.1	$\sin(A + B)$ $= \cos[90^\circ - (A + B)]$ $= \cos[(90^\circ - A) - B]$ $= \cos(90^\circ - A)\cos B + \sin(90^\circ - A)\sin B$ $= \sin A \cos B + \cos A \sin B$	<ul style="list-style-type: none"> ✓ $\cos[90^\circ - (A + B)]$ ✓ $\cos[(90^\circ - A) - B]$ ✓ expansion/uitbreiding (3)
5.2.2	$\cos 420^\circ \cos 15^\circ + \sin 300^\circ \cos 105^\circ$ $= \cos 60^\circ \cos 15^\circ + (-\sin 60^\circ)(-\sin 15^\circ)$ $= \cos(60^\circ - 15^\circ)$ $= \cos 45^\circ$ $= \frac{\sqrt{2}}{2}$	<ul style="list-style-type: none"> ✓ $\cos 60^\circ$ ✓ $-\sin 60^\circ$ ✓ $-\sin 15^\circ$ ✓ $\cos(60^\circ - 15^\circ)$ ✓ $\frac{\sqrt{2}}{2}$ (5)
5.3.1	$\text{LHS/LK} = \tan^2 x \left(\frac{1}{\tan^2 x} - 1 \right)$ $= 1 - \tan^2 x$ $= 1 - \frac{\sin^2 x}{\cos^2 x}$ $= \frac{\cos^2 x - \sin^2}{\cos^2 x}$ $= \frac{\cos 2x}{\cos^2 x}$ $= \text{RHS/RK}$	<ul style="list-style-type: none"> ✓ $1 - \tan^2 x$ ✓ $\frac{\sin^2 x}{\cos^2 x}$ ✓ $\frac{\cos^2 x - \sin^2}{\cos^2 x}$ (3)
5.3.2	$x = 90^\circ$	<ul style="list-style-type: none"> ✓ answer/antwoord (1)

5.4	$\cos 2x = \cos x$ $2\cos^2 x - 1 = \cos x$ $2\cos^2 x - \cos x - 1 = 0$ $(2\cos x + 1)(\cos x - 1) = 0$ $\cos x = -\frac{1}{2} \text{ or / of } \cos x = 1$ $x = 180^\circ - 60^\circ + k360^\circ; k \in \mathbb{Z} \text{ or } x = k360^\circ; k \in \mathbb{Z}$ $x = 120^\circ + k360^\circ; k \in \mathbb{Z}$ <p>or/of</p> $x = 180^\circ + 60^\circ + k360^\circ; k \in \mathbb{Z}$ $x = 240^\circ + k360^\circ; k \in \mathbb{Z}$	<p>✓ $\cos 2x = 2\cos^2 x - 1$ ✓ standard form <i>standaardvorm</i></p> <p>✓ both answers for $\cos x$ <i>albei antwoorde vir</i> $\cos x$</p> <p>✓ $x = k360^\circ; k \in \mathbb{Z}$ ✓ $x = 120^\circ$ and / <i>en</i> $x = 240^\circ$</p> <p>✓ $x = +k360^\circ; k \in \mathbb{Z}$</p> <p style="text-align: right;">(6)</p>										
5.5	$\sin 3\theta = \sin (2\theta + \theta)$ $= \sin 2\theta \cos \theta + \cos 2\theta \sin \theta$ $= (2\sin \theta \cos \theta) \cos \theta + (1 - 2\sin^2 \theta) \sin \theta$ $= 2\sin \theta \cos^2 \theta + \sin \theta - 2\sin^3 \theta$ $= 2\sin \theta (1 - \sin^2 \theta) + \sin \theta - 2\sin^3 \theta$ $= 2\sin \theta - 2\sin^3 \theta + \sin \theta - 2\sin^3 \theta$ $= 3\sin \theta - 4\sin^3 \theta$ $= 3\left(\frac{1}{2}\right) - 4\left(\frac{1}{2}\right)^3$ $= 1$ <p>OR/OF</p> $\sin \theta = \frac{1}{2}$ $\theta = 30^\circ \text{ or } \theta = 150^\circ$ <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">$\sin 3\theta$</td> <td style="width: 50%; border: none;">$\sin 3\theta$</td> </tr> <tr> <td style="border: none;">$= \sin 3(30^\circ)$</td> <td style="border: none;">$= \sin 3(150^\circ)$</td> </tr> <tr> <td style="border: none;">$= \sin 90^\circ$</td> <td style="border: none;">$= \sin 450^\circ$</td> </tr> <tr> <td style="border: none;">$= 1$</td> <td style="border: none;">$= \sin 90^\circ$</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">$= 1$</td> </tr> </table>	$\sin 3\theta$	$\sin 3\theta$	$= \sin 3(30^\circ)$	$= \sin 3(150^\circ)$	$= \sin 90^\circ$	$= \sin 450^\circ$	$= 1$	$= \sin 90^\circ$		$= 1$	<p>✓ $\sin 3\theta = \sin (2\theta + \theta)$ ✓ compound expansion/ <i>saamgestelde</i> <i>uitbreiding</i></p> <p>✓ $\sin 2\theta = 2\sin \theta \cos \theta$ ✓ $\cos 2\theta = 1 - 2\sin^2 \theta$ ✓ $\cos^2 \theta = 1 - \sin^2 \theta$</p> <p>✓ sub/vervang $\sin \theta = \frac{1}{2}$ ✓ answer/antwoord</p> <p style="text-align: right;">(7)</p> <p>✓ $\theta = 30^\circ$ ✓ $\theta = 150^\circ$</p> <p>✓ $\sin 3(30^\circ)$ ✓ $\sin 3(150^\circ)$ ✓ $\sin 450^\circ$ ✓ $\sin 450^\circ = \sin 90^\circ$ ✓ $\sin 90^\circ = 1$</p> <p style="text-align: right;">(7)</p>
$\sin 3\theta$	$\sin 3\theta$											
$= \sin 3(30^\circ)$	$= \sin 3(150^\circ)$											
$= \sin 90^\circ$	$= \sin 450^\circ$											
$= 1$	$= \sin 90^\circ$											
	$= 1$											
[31]												

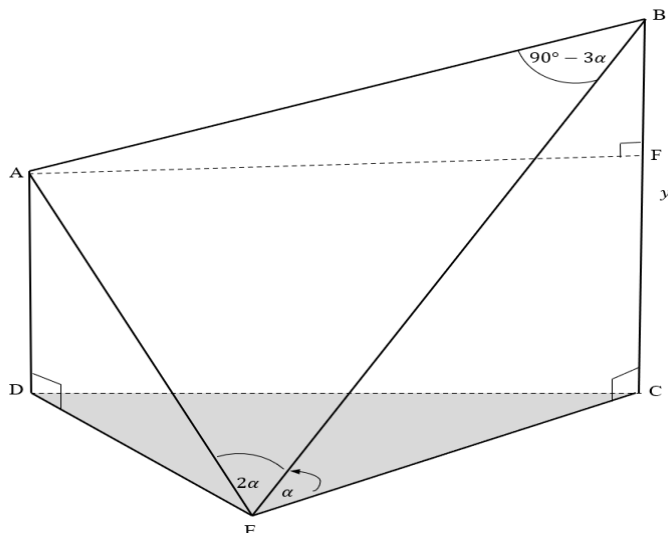
QUESTION/VRAAG 6

6.1



6.2	180°	✓ 180°	(1)
6.3	$x \in [0^\circ; 45^\circ]$ $x \in [90^\circ; 135^\circ]$	✓ $x \in [0^\circ; 45^\circ]$ ✓ $x \in [90^\circ; 135^\circ]$	(2)
6.4	Maximum value of/ <i>Maksimum waarde van</i> $f(x) - g(x) = 2 - (-1) = 3$	✓ 3	(1)
6.5	$y = 2^{2\cos x + 2}$ Range of / <i>Waardevers van</i> $2\cos x$: $-2 \leq y \leq 2$ Range of / <i>Waardevers van</i> $2\cos x + 2$: $0 \leq y \leq 4$ Range of / <i>Waardevers van</i> $2^{2\cos x + 2}$: $2^0 \leq y \leq 2^4$ $\therefore 1 \leq y \leq 16$	✓✓ $1 \leq y \leq 16$	(2)
[9]			

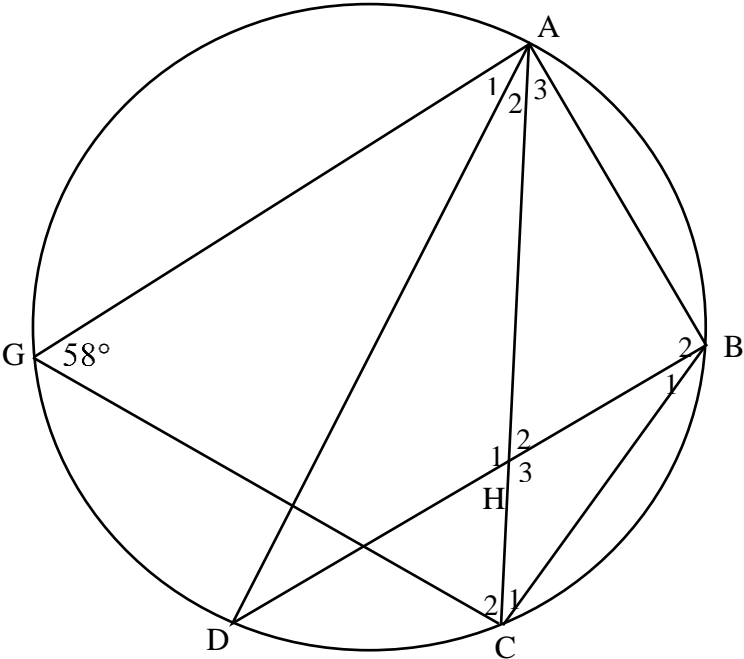
QUESTION/VRAAG 7



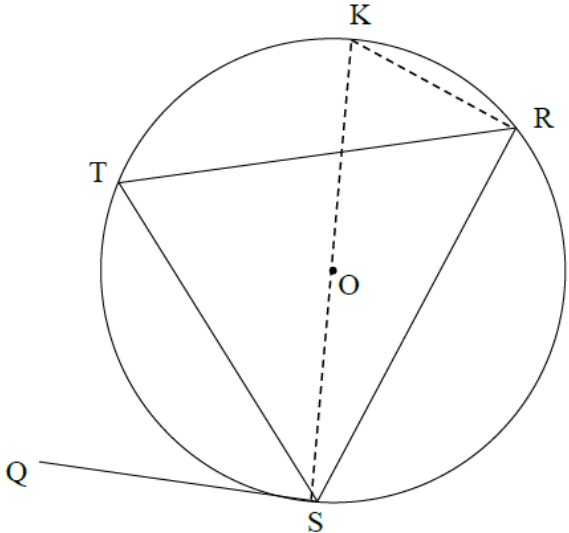
7.1	$\sin \alpha = \frac{y}{BE}$ $BE = \frac{y}{\sin \alpha}$	<ul style="list-style-type: none"> ✓ correct ratio/ korrekte verhouding ✓ $BE = \frac{y}{\sin \alpha}$ <p style="text-align: right;">(2)</p>
7.2	<p>In $\triangle ABE$:</p> $\hat{BAE} = 90^\circ + \alpha.$ $\frac{AB}{\sin 2\alpha} = \frac{BE}{\sin(90^\circ + \alpha)}$ $AB = \frac{BE \times \sin 2\alpha}{\cos \alpha}$ $= \frac{\frac{y}{\sin \alpha} \times 2 \sin \alpha \cos \alpha}{\cos \alpha}$ $= 2y$	<ul style="list-style-type: none"> ✓ $\hat{BAE} = 90^\circ + \alpha$ ✓ correct use of sine rule/ korrekte gebruik van sin reël ✓ double angle/dubbelhoek ✓ co-function/ko-funksie ✓ substitution of BE/ vervang BE <p style="text-align: right;">(5)</p>
7.3	<p>In $\triangle BAF$ is:</p> $\cos \hat{BAF} = \frac{AF}{AB} = \frac{7y}{2y}$ $= \frac{7}{8}$ $\hat{BAF} = 28,955..^\circ$ $= 29^\circ$	<ul style="list-style-type: none"> ✓ correct ratio in terms of y/korrekte verhouding in terme van y ✓ $\cos \hat{BAF} = \frac{7}{8}$ ✓ 29° / PENALTY for incorrect rounding off/ Penaliseer vir foutiewe afroning <p style="text-align: right;">(3)</p>

[10]

QUESTION/VRAAG 8

8.			
8.1.1	$\hat{B}_2 = 90^\circ$	\angle in semi-circle/ \angle in 'n halwe sirkel	\checkmark S \checkmark R (2)
8.1.2	$\hat{B}_1 + \hat{B}_2 + \hat{G} = 180^\circ$ $\hat{B}_1 = 32^\circ$	opposite \angle s of cyclic quad/ <i>teenoorst \anglee van kvh</i>	\checkmark R \checkmark S (2)
8.1.3	$\hat{A}_2 = \hat{B}_1 = 32^\circ$	\angle s in the same segment/ <i>\anglee in dieselfde segment</i>	\checkmark S \checkmark R (2)
8.2	$\hat{C}_1 = \hat{A}_3 = 29^\circ$ $\hat{D} = \hat{C}_1 = 29^\circ$ $\therefore \hat{A}_3 = \hat{D} = 29^\circ$ \therefore AB is a tangent to the circle/ <i>AB is 'n raaklyn aan die sirkel</i>	\angle s opposite equal sides/ <i>\anglee teenoor gelyke sye</i> \angle s in the same segment/ <i>\anglee in dieselfde segment</i> converse tan chord theorem/ <i>omgekeerde raaklyn koordstelling</i>	\checkmark S/R \checkmark S/R \checkmark R (3)
			[9]

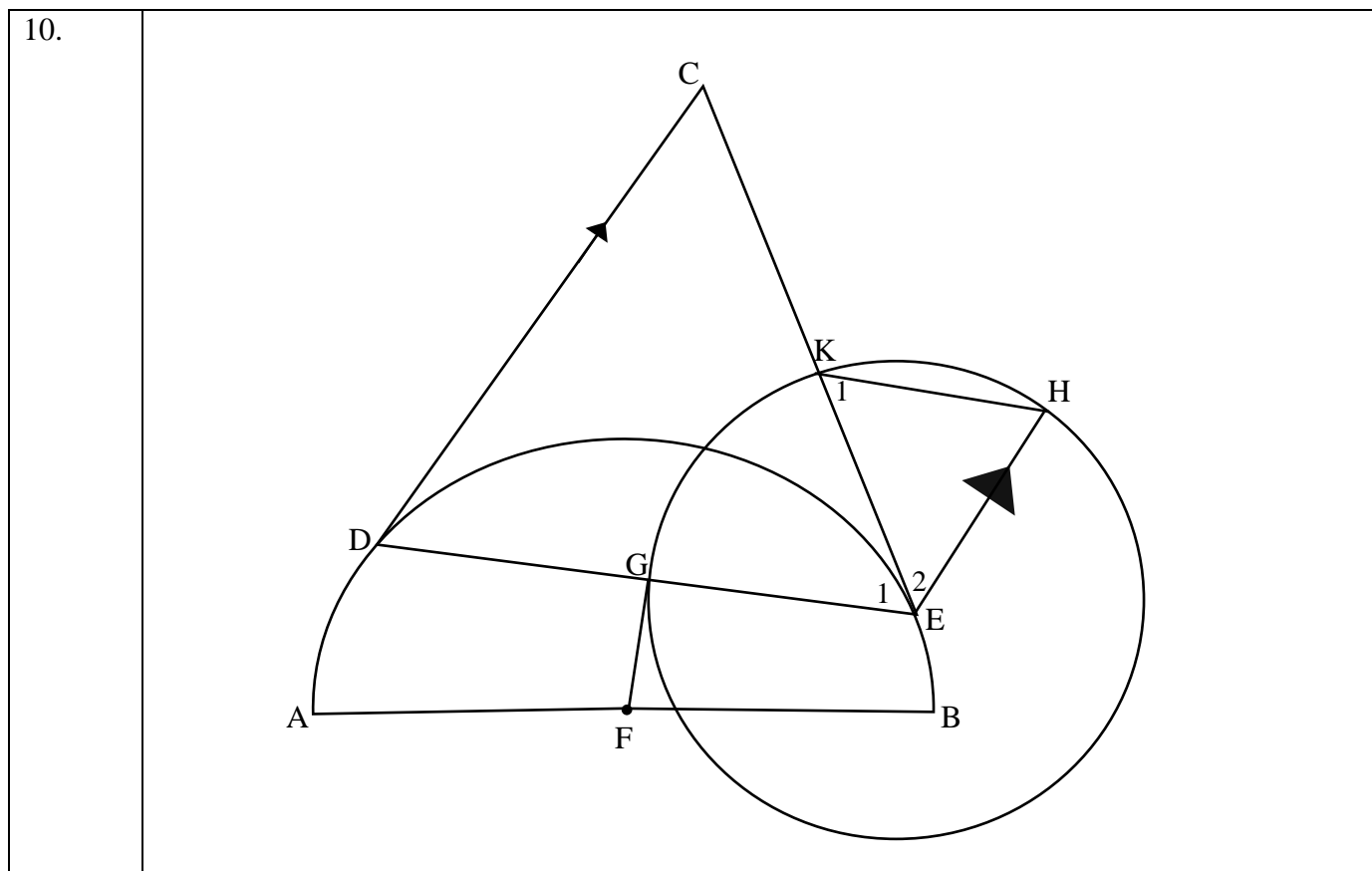
QUESTION/VRAAG 9

9.1		
	<p>Construction/<i>Konstruksie</i>: Draw diameter KS and join KR/<i>Trek middellyn KS en trek KR</i> $\hat{Q}SK = 90^\circ$ radius \perp tangent/<i>raaklyn</i> $\hat{S}RK = 90^\circ$ \angle in semicircle/<i>halwe sirkel</i> but/<i>maar</i> $\hat{T}SK = \hat{T}RK$ \angle's in the same segment/ $\therefore \hat{Q}ST = \hat{R}$ \angle e in <i>dieselfde segment</i></p>	<p>✓ construction/ <i>konstruksie</i> ✓S ✓R ✓S/R ✓S ✓R (6)</p>

<p>9.2</p>			
<p>9.2.1</p>	$\hat{E} = x$	$\angle \text{centre} = 2 \times \angle \text{at circumference/}$ <i>midpts</i> $\angle = 2 \times \text{omtreks}$ \angle	$\checkmark R$ <p>(1)</p>
<p>9.2.2</p>	$\hat{F}_1 = \hat{E} = x$ $\hat{C}_1 = \hat{F}_1 = x$ $\therefore \hat{C}_1 = \hat{E}$ $\therefore GC \parallel FE$	<i>tan chord theorem/</i> <i>rklyn koordstelling</i> <i>ext. \angle of cyclic quad/</i> <i>buite \angle van kvh</i> <i>corresponding \angles are equal/</i> <i>ooreenk \anglee is gelyk</i>	$\checkmark S/R$ $\checkmark S/R$ $\checkmark R$ <p>(3)</p>
<p>9.2.3</p>	$\frac{AB}{BD} = \frac{AG}{GF}$ $\frac{AG}{GF} = \frac{AC}{CE}$ $\therefore \frac{AB}{BD} = \frac{AC}{CE}$	<i>prop. theorem/eweredigheid-</i> <i>stelling; GB \parallel FD</i> <i>prop. theorem/eweredigheid-</i> <i>stelling; GC \parallel FE</i>	$\checkmark S \quad \checkmark R$ $\checkmark S$ <p>(3)</p>

9.2.4	$\frac{AB}{BD} = \frac{4}{5} \quad \text{and/en} \quad \frac{AC}{CE} = \frac{4}{5}$ $\frac{12}{BD} = \frac{4}{5} \quad \text{and/en} \quad \frac{AC}{22,5} = \frac{4}{5}$ $BD = 15 \quad \text{and/en} \quad AC = 18$ $BC = AC - AB$ $= 18 - 12$ $= 6$ $CD = BD - BC$ $= 15 - 6$ $= 9$	<p>✓ substitution/ <i>substitusie</i></p> <p>✓ BD = 15</p> <p>✓ AC = 18</p> <p>✓ BC = 6</p> <p>✓ CD = 9</p> <p>(5)</p>
		[18]

QUESTION/VRAAG 10



10.1	Tangents from the same point	✓R (1)
10.2	<p>In $\triangle DCE$ and $\triangle HEK$ is :</p> <p>1. $\hat{C} = \hat{E}_2$ alt. \angles./verw. \anglee ,DC \parallel EH</p> <p>2. $\hat{D} = \hat{E}_1$ \angles opp equal sides/\anglee teenoor gelyke sye</p> <p>$2\hat{D} = 180^\circ - \hat{C}$ sum of \angles in triangle/ binne \anglee van Δ</p> <p>$\hat{K}_1 = \hat{H}$ \angles opp radii/ \anglee teenoor gelyke radii</p> <p>$2\hat{H} = 180^\circ - \hat{E}_2$ sum of \angles in triangle / binne \anglee van Δ</p> <p>but $\hat{C} = \hat{E}_2$ proved</p> <p>$\therefore \hat{D} = \hat{H}$</p> <p>$\therefore \triangle CDE \parallel \triangle EHK$ $\angle\angle\angle$</p>	<p>✓S/R</p> <p>✓S</p> <p>✓S</p> <p>✓S/R</p> <p>✓S</p> <p>✓R</p> <p>(6)</p>

10.3	$\hat{F}GE = 90^\circ$ $\therefore DG = GE$	$\tan \perp \text{radius} / r \text{ kln } \perp \text{radius}$ line from centre \perp to chord/ <i>lyn vanuit midpt loodreg op koord</i>	$\checkmark S \quad \checkmark R$ $\checkmark R$ (3)
10.4	$\frac{DC}{HE} = \frac{DE}{HK}$ $DC \times HK = DE \times HE$ $DC \times HK = 2GE \times HE$ but $GE = HE$ $\therefore DC \times HK = 2HE^2$	$\triangle CDE \parallel \triangle EHK$ <i>radii/radiusse</i>	$\checkmark S/R$ \checkmark substitute $DE = 2GE$ $\checkmark S$ (3)
			[13]

TOTAL/TOTAAL: 150