

SA's Leading Past Year

Exam Paper Portal



You have Downloaded, yet Another Great
Resource to assist you with your Studies 😊

Thank You for Supporting SA Exam Papers

Your Leading Past Year Exam Paper Resource Portal

Visit us @ www.saexampapers.co.za

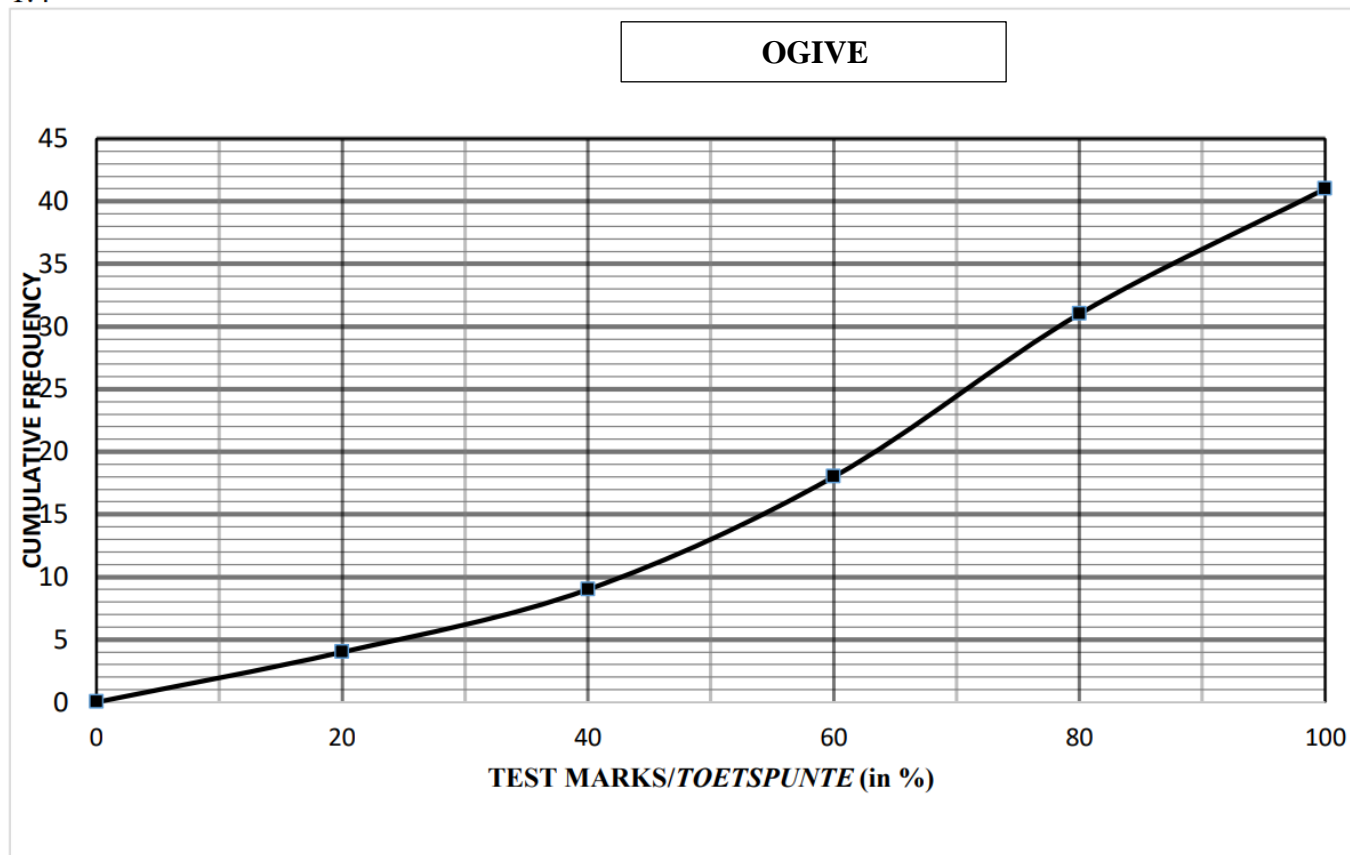


**SA EXAM
PAPERS**

QUESTION/VRAAG 1

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

1.4



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

(3)

1.5

$$\begin{aligned} \text{IQR} &= Q_3 - Q_1 \\ &= 68 - 33 \\ &= 35 \end{aligned}$$

ACCEPT/*AANVAAR*:

- 32 **OR/OF** 34 lower quartile/*laer kwartiel*
- 67 **OR/OF** 69 upper quartile/*boonste kwartiel*

- ✓ L Q
- ✓ U Q
- ✓ IQR

(3)

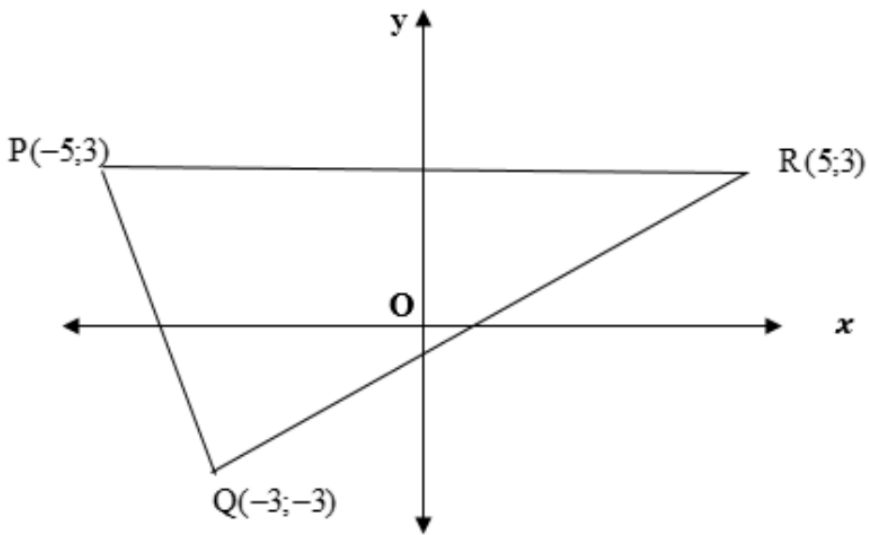
[12]

QUESTION 2

2.1	$y = 12,01 + 0,88x$	✓ value of a/waarde van a ✓ value of b/waarde van b ✓ equation / vergelyking (3)
2.2	$y = 12,01 + 0,88(46)$ $= 52\%$	✓ sub. 46 into the equation / vervang 46 in die vergelyking ✓ answer / antwoord (2)
2.3	No, the preparatory exam mark is the independent variable. Hence we cannot determine the prep. exam marks using the final exam./ <i>Nee, die voorbereidende eksamenpunt is die onafhanklike veranderlike. Dus kan ons nie die voorbereidende eksamenpunt met behulp van die finale eksamenpunt bepaal nie.</i>	✓ answer / antwoord ✓ reason / rede (2)
2.4	$\bar{x} = 60,58$ $\bar{y} = 65,33$ LHS/ILK = $y = 65,33$ RHS/RK = $12,01 + 0,88(60,58) = 65,32$ LHS/ILK = RHS / RK $(\bar{x} ; \bar{y})$ lies on the regression line	✓ $\bar{x} = 60,58$ ✓ $\bar{y} = 65,33$ ✓ sub. into RHS / vervang in RK ✓ LHS = RHS and conclusion / LK = RK en gevolgtrekking (4)
2.5	$r = 0,98$	✓ value of r / waarde van r (1)
2.6	There is a very strong positive correlation between prep. marks and final marks./ <i>Daar is 'n sterk positiewe korrelasie tussen die voorbereidende punte en die finale punte.</i>	✓ very strong / baie sterk ✓ positive / positief (2)

[14]

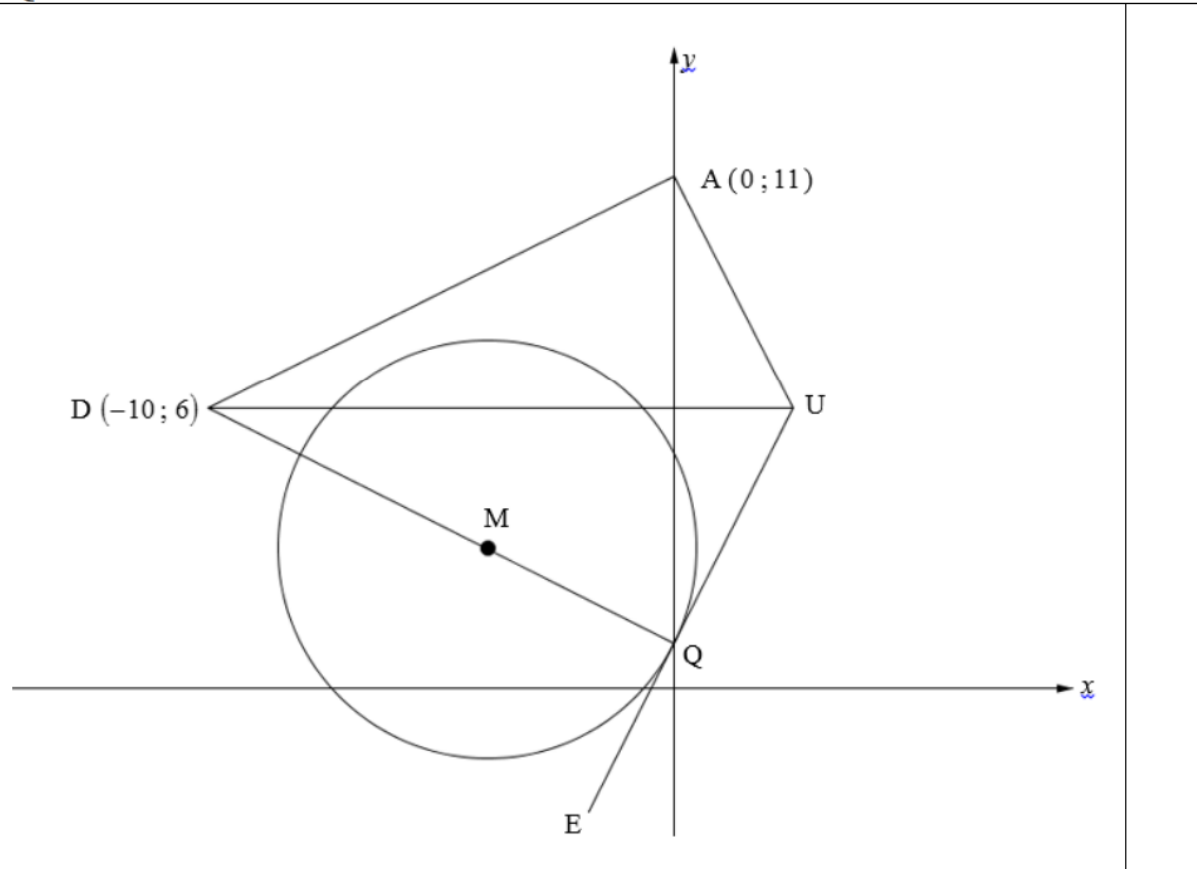
QUESTION 3



3.1	$QR = \sqrt{(5+3)^2 + (3+3)^2}$ $= \sqrt{64 + 36}$ $= \sqrt{100}$ $= 10$	<p>✓ substitution/ <i>vervang</i></p> <p>✓10</p> <p>(2)</p>
-----	--	---

3.2	$M\left(\frac{5-3}{2}; \frac{3-3}{2}\right)$ $= M(1;0)$	✓ x-value/waarde ✓ y-value /waarde (2)
3.3	$P(-5;3) \text{ and } M(1;0) : m = \frac{0-3}{1+5}$ $= \frac{-1}{2}$ $y - 0 = -\frac{1}{2}(x - 1)$ $y = -\frac{1}{2}x + \frac{1}{2}$	✓ m ✓ subst of m and point/ <i>vervang m en punt</i> ✓ equation/ <i>vergelyking</i> (3)
3.4	$r = 5; \text{centre } (1;0) :$ $(x-1)^2 + y^2 = 25$	✓ r = 5 and/en (1;0) ✓ LHS/LK ✓ RHS/RK (3)
3.5	$PM = \sqrt{(1+5)^2 + (-3)^2}$ $= \sqrt{45}$ $> \sqrt{25}$ $\therefore P \text{ lies OUTSIDE the circle.}$	✓ PM = $\sqrt{45}$ ✓ $> \sqrt{25}$ ✓ conclusion/ <i>gevolgtrekking</i> (3)
3.6	S(3;9)	✓ x-value/waarde ✓ y-value/waarde (2)
3.7	$m_{PQ} = \frac{3+3}{-5+3} = -3$ $\tan \theta = -3$ $\theta = 180^\circ - 71,57^\circ$ $= 108,43^\circ$ $\beta = 71,57^\circ \text{ co-interior angles, } PR \parallel x\text{-axis.}$	✓ $m_{PQ} = -3$ ✓ $\tan \theta = -3$ ✓ $\theta = 108,43^\circ$ ✓ $\beta = 71,57^\circ$ (4)
[19]		

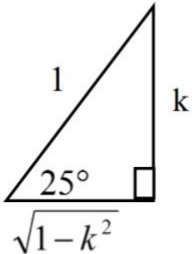
QUESTION 4 / VRAAG 4



4.1	$x^2 + 8x + 16 + y^2 - 6y + 9 = 20$ $(x + 4)^2 + (y - 3)^2 = 20$ $\therefore M(-4; 3)$	<ul style="list-style-type: none"> ✓ completing square <i>kwadraatsvoltooiing</i> ✓ $(x + 4)^2 + (y - 3)^2 = 20$ ✓ x-coordinate / x-koördinaat ✓ y-coordinate / y-koördinaat 	(4)
4.2	$(0 + 4)^2 + (y - 3)^2 = 20$ $(y - 3)^2 = 4$ $y = 3 \pm 2$ $\therefore y = 1$ $Q(0; 1)$	<ul style="list-style-type: none"> ✓ subst. $x = 0$ into circle equation <i>verv. $x = 0$ in sirkel vergelyking</i> ✓ $(y - 3)^2 = 4$ ✓ $y = 1$ 	(3)
4.3	$m_{radius} = \frac{3 - 1}{-4 - 0} = -\frac{1}{2}$ $m_{tan/rkl} = 2$ $y - 1 = 2(x - 0) \quad \begin{array}{l} \text{[tangent } \perp \text{ radius]} \\ \text{[raaklyn } \perp \end{array}$ $\therefore y = 2x + 1$	<ul style="list-style-type: none"> ✓ $m_{rad} = -\frac{1}{2}$ ✓ $m_{tan} = 2$ / $m_{raaklyn} = 2$ ✓ subst. $m_{tan/rkl} = 2$ and Q into correct form. / <i>verv. $m_{tan/rkl} = 2$ en Q in korrekte formule.</i> ✓ equation / <i>vergelyking</i> 	(4)
4.4	$y = 6$	✓ answer / <i>antwoord</i>	(1)

4.5	$6 = 2x + 1$ $x = \frac{5}{2}$ $U\left(\frac{5}{2}; 6\right)$	$\checkmark \quad 6 = 2x + 1$ $\checkmark \quad x = \frac{5}{2}$	(2)
4.6	$m_{AU} = \frac{11-6}{0-\frac{5}{2}}$ $= -2$ $m_{AD} = \frac{6-11}{-10-0}$ $= \frac{1}{2}$ $m_{AU} \times m_{DA} = -2 \times \frac{1}{2}$ $= -1$ $\therefore AU \perp DA$ $\therefore \hat{A} = 90^\circ$ $D\hat{Q}U = 90^\circ$ [tangent \perp radius] / [raaklyn \perp radius] \therefore QUAD is a cyclic quad. [opp. \angle^s add up to 180°] <u>QUAD is 'n koordevierhoek [teenoorst. \angle^e se som is 180°]</u>	$\checkmark \quad m_{AU} = -2$ $\checkmark \quad m_{AD} = \frac{1}{2}$ $\checkmark \quad m_{AU} \times m_{DA} = -1$ $\checkmark \quad \hat{A} = 90^\circ$ $\checkmark \quad D\hat{Q}U = 90^\circ$ $\checkmark \quad R$	(6)
			[20]

QUESTION 5

5.1.1	$y^2 = 1^2 - (\sqrt{1 - k^2})^2$ $= 1 - 1 + k^2$ $= k^2$ $y = k$ $\sin 25^\circ = k$	 <p>✓ diagram and/en Pythagoras</p> <p>✓ $\sin 25^\circ = k$</p> <p>(2)</p>
5.1.2	$\sin 50^\circ = 2 \sin 25^\circ \cos 25^\circ$ $= 2k\sqrt{1 - k^2}$	<p>✓ double angle expansion/ <i>Brei dubbelhoek uit</i></p> <p>✓ substitution/<i>vervang</i></p> <p>(2)</p>
5.2.1	$\frac{\sin(180^\circ - 70^\circ) \cdot \tan 60^\circ}{\cos 180^\circ \cdot \tan(180^\circ + 70^\circ) \cdot \sin 20^\circ}$ $\frac{\sin 70^\circ \cdot \tan 60^\circ}{(-1) \tan 70^\circ \cdot \sin 20^\circ}$ $\frac{\sin 70^\circ \cdot \sqrt{3}}{(-1) \cdot \frac{\sin 70^\circ}{\cos 70^\circ} \cdot \cos 70^\circ}$ $= -\sqrt{3}$	<p>✓ $\sin 70^\circ$</p> <p>✓ $\cos 180^\circ$</p> <p>✓ $\tan 70^\circ$</p> <p>✓ $\sin 20^\circ$</p> <p>✓ $\frac{\sin 70^\circ}{\cos 70^\circ}$</p> <p>✓ $\sin 20^\circ = \cos 70^\circ$</p> <p>✓ $-\sqrt{3}$</p> <p>(7)</p>
5.2.2	$1 - 2 \sin^2 22,5^\circ$ $\cos 2(22,5^\circ)$ $\cos 45^\circ$ $= \frac{1}{\sqrt{2}}$ $= \frac{\sqrt{2}}{2}$	<p>✓ $1 - 2 \sin^2 22,5^\circ$</p> <p>✓ $\cos 2(22,5^\circ)$</p> <p>✓ $\cos 45^\circ$</p> <p>✓ $\frac{1}{\sqrt{2}}$</p> <p>(4)</p>

5.3	<p> LHS = $\frac{\cos x + \sin x}{\cos x - \sin x} - \frac{\cos x - \sin x}{\cos x + \sin x}$ RHS = $2 \tan 2x$ </p> $= \frac{(\cos x + \sin x)^2 - (\cos x - \sin x)^2}{(\cos x - \sin x)(\cos x + \sin x)}$ $= \frac{\cos^2 x + 2 \sin x \cos x + \sin^2 x - \cos^2 x + 2 \sin x \cos x - \sin^2 x}{\cos^2 x - \sin^2 x}$ $= \frac{2(2 \sin x \cos x)}{\cos^2 x - \sin^2 x}$ $= \frac{2 \sin 2x}{\cos 2x}$ $= 2 \tan 2x$ $= \text{RHS}$ <p>OR/OF</p> <p> LHS = $\frac{\cos x + \sin x}{\cos x - \sin x} - \frac{\cos x - \sin x}{\cos x + \sin x}$ RHS = $2 \tan 2x$ </p> $= \frac{(\cos x + \sin x)^2 - (\cos x - \sin x)^2}{(\cos x - \sin x)(\cos x + \sin x)}$ $= \frac{(\cos x + \sin x + \cos x - \sin x)(\cos x + \sin x - \cos x + \sin x)}{\cos^2 x - \sin^2 x}$ $= \frac{(2 \cos x)(2 \sin x)}{\cos^2 x - \sin^2 x}$ $= \frac{2(2 \sin x \cos x)}{\cos^2 x - \sin^2 x}$ $= \frac{2 \sin 2x}{\cos 2x}$ $= 2 \tan 2x$ $= \text{RHS}$ <p>OR/OF</p> <p>RHS = $2 \tan 2x$</p> $= \frac{2 \sin 2x}{\cos 2x}$ $= \frac{2(2 \sin x \cdot \cos x)}{\cos^2 x - \sin^2 x}$ $= \frac{4 \sin x \cdot \cos x}{\cos^2 x - \sin^2 x}$ $= \frac{1 + 2 \sin x \cdot \cos x - (1 - 2 \sin x \cdot \cos x)}{\cos^2 x - \sin^2 x}$ $= \frac{(\cos x + \sin x)^2 - (\cos x - \sin x)^2}{(\cos x + \sin x)(\cos x - \sin x)}$ $= \frac{(\cos x + \sin x)^2}{(\cos x + \sin x)(\cos x - \sin x)} - \frac{(\cos x - \sin x)^2}{(\cos x + \sin x)(\cos x - \sin x)}$ $= \frac{\cos x + \sin x}{\cos x - \sin x} - \frac{\cos x - \sin x}{\cos x + \sin x} = \text{LHS}$	<p>✓ single fraction</p> <p>✓ expansion</p> <p>✓ simplification (both)</p> <p>✓ double \angle identity</p> <p>✓ double \angle identity</p> <p>(5)</p> <p>✓ single fraction</p> <p>✓ difference of two squares</p> <p>✓ simplification (both)</p> <p>✓ double \angle identity</p> <p>✓ double \angle identity</p> <p>(5)</p> <p>✓ double \angle identity</p> <p>✓ double \angle identity</p> <p>✓ identity & method</p> <p>✓ factorising numerator and denominator</p> <p>✓ writing as 2 terms</p> <p>(5)</p>
-----	---	--

5.4	$\sin \theta \sin \frac{3\theta}{2} + \cos \frac{3\theta}{2} \cos \theta = -\frac{\sqrt{3}}{2}$ $\cos \frac{3\theta}{2} \cos \theta + \sin \frac{3\theta}{2} \sin \theta = -\frac{\sqrt{3}}{2}$ $\cos\left(\frac{3\theta}{2} - \theta\right) = -\frac{\sqrt{3}}{2}$ $\cos\left(\frac{\theta}{2}\right) = -\frac{\sqrt{3}}{2}$ $\frac{\theta}{2} = 150^\circ + k.360^\circ \quad k \in \mathbb{Z} \quad \text{or / of} \quad \frac{\theta}{2} = -150^\circ + k.360^\circ \quad k \in \mathbb{Z}$ $\theta = 300^\circ + k.720^\circ \quad k \in \mathbb{Z} \quad \theta = -300^\circ + k.720^\circ \quad k \in \mathbb{Z}$ <p>OR / OF</p> $\text{ref } \angle = 30^\circ$ $\frac{\theta}{2} = 180^\circ - 30^\circ + k.360^\circ \quad \text{or / of} \quad \frac{\theta}{2} = 180^\circ + 30^\circ + k.360^\circ; k \in \mathbb{Z}$ $\theta = 300^\circ + k.720^\circ \quad \text{or / of} \quad \theta = 420^\circ + k.720^\circ$	$\checkmark \cos\left(\frac{3\theta}{2} - \theta\right)$ $\checkmark \frac{\theta}{2} = \pm 150^\circ + k.360^\circ$ $\checkmark \theta = 300^\circ + k.720^\circ$ $\checkmark \theta = -300^\circ + k.720^\circ$ <p>(4)</p> <p>OR / OF</p> $\checkmark \frac{\theta}{2} = 180^\circ \pm 30^\circ + k.360^\circ$ $\checkmark 300^\circ + k.720^\circ$ $\checkmark 420^\circ + k.720^\circ$ <p>(4)</p>
5.5.	Maximum value is 1 and minimum value is -1 / <i>Maksimum waarde is 1 en minimum waarde -1</i>	$\checkmark \text{answer / antw.}$ <p>(1)</p>

[26]

QUESTION 6

6.1	$a = 1$ $b = 2$ $c = 2$ $d = 1$	$\checkmark a = 1$ $\checkmark b = 2$ $\checkmark c = 2$ $\checkmark d = 1$ <p>(4)</p>
6.2	$P(21,44^\circ; 0,73)$	\checkmark correct substitution <p>(2)</p>
6.3.1	$x = 90^\circ$	$\checkmark 90^\circ$ <p>(1)</p>
6.3.2	$x \in [45^\circ; 135^\circ]$ OR $45^\circ \leq x \leq 135^\circ$	$\checkmark 45^\circ \text{ and } 135^\circ$ \checkmark Notation <p>(2)</p>
		[9]

QUESTION 7

7.1	<p>In ΔPQR:</p> $\widehat{Q}_1 = x \quad (PR = QR)$ $\widehat{R} = 180^\circ - 2x \quad (\text{sum of } \angle \Delta PQR)$ $\text{Area of } \Delta PQR = \frac{1}{2}pq \sin \widehat{R}$ $= \frac{1}{2}m \cdot m \sin(180^\circ - 2x)$ $= \frac{1}{2}m^2 \sin 2x$	<p>$\checkmark \widehat{Q}_1 = x$</p> <p>$\checkmark \widehat{R} = 180^\circ - 2x$</p> <p>$\checkmark$ Subst. into Area rule</p> <p>$\checkmark \sin 2x$</p> <p>\checkmark answer</p> <p>(5)</p>
7.2	$\therefore \frac{PQ}{\sin(180^\circ - 2x)} = \frac{m}{\sin x}$ $\therefore PQ = \frac{m \cdot \sin(180^\circ - 2x)}{\sin x}$ $\therefore PQ = \frac{m \cdot \sin 2x}{\sin x}$ $\therefore PQ = \frac{m \cdot 2 \sin x \cdot \cos x}{\sin x}$ $\therefore PQ = 2m \cos x$	<p>\checkmark Use of sine rule</p> <p>\checkmark subst into sine Rule</p> <p>$\checkmark \sin 2x$</p> <p>$\checkmark 2 \sin x \cos x$</p> <p>(4)</p>
7.3	<p>In ΔSPQ:</p> $\tan y = \frac{SP}{PQ}$ $\therefore SP = PQ \tan y$ $\therefore SP = 2m \cos x \tan y$	<p>$\checkmark \tan y = \frac{SP}{PQ}$</p> <p>$\checkmark SP = PQ \tan y$</p> <p>(2)</p>

[11]

QUESTION 8

8.1.1	90°	(1)
8.1.2	Supplementary	(1)

8.2					
8.2.1	(a)	$\hat{A}_1 = 35^\circ$ [tan- chord thm/ raakl-koordstelling]	✓ S ✓ R	(2)	K
	(b)	$\hat{O}_3 = 70^\circ$ [\angle at centre = 2 \angle at circumf/ middelpnts \angle = 2 omtr. \angle]	✓ S ✓ R	(2)	K
	(c)	$\hat{P}_3 = 55^\circ$ [Σ interior/ binne \angle of/ van (isosceles/gelykbenige) Δ]	✓ S ✓ R	(2)	K
	(d)	$\hat{BOM} = 90^\circ$ [adjacent/ aanligg – suppl.] And/ en $\hat{OBM} = 55^\circ$ [$\Sigma \angle$ s of/ van (isosceles/gelykbenige) Δ] OR/ OF [\angle s opposite = radii/ sides/ \angle e teenoor = radiusse/ sye] OR/OF $\hat{OBS} = 90^\circ$ [tan/ raakl. \perp radius] $\therefore \hat{M}_1 = 35^\circ$ [$\Sigma \angle$ s of/ van Δ] OR/OF $\hat{APB} = 90^\circ$ [\angle in semi circle/ \angle in halwe sirkel] $\therefore \hat{P}_1 = 90^\circ$ [adj./ aanligg./ suppl] $= \hat{O}_1$ AMPO is cycl quad/ is 'n kvh [conv. \angle s Subt by same chord/ omg. \angle e ondersp. deur selfde koord] $\therefore \hat{M}_1 = \hat{A}_1 = 35^\circ$ [\angle s Subt by same chord/ \angle e ondersp. deur selfde koord]	✓ S/ R ✓ S/ R ✓ S	(3)	K
8.2.2	(a)	$\hat{APB} = 90^\circ$ [\angle in semi-circle/ \angle in halwe sirkel] $= \hat{O}_1$ [Given/ Gegee] \therefore OLPB is a cycl. quad/ is 'n kvh [ext \angle = opp. int \angle / buite \angle = teenoorst. binne \angle]	✓ S ✓ R ✓ R	(3)	R
	(b)	$\hat{OBS} = 90^\circ$ [tan/ raakl. \perp radius] $= \hat{O}_1$ [Given/ Gegee] $\therefore BS \parallel OM$ [corresp. \angle s =/ ooreenk. \angle e =] OR/ OF $\hat{OBS} = 90^\circ$ [tan/ raakl.-radius] $= \hat{BOM}$ [Proved/ Bewys] $\therefore BS \parallel OM$ [co-int. \angle s suppl./ ko-binne \angle e suppl.] OR/ OF $\hat{M}_1 = 35^\circ$ [Proved/ Bewys] $= \hat{MBS}$ [Given/ Gegee] $\therefore BS \parallel OM$ [alt. \angle s =/ verw. \angle e =]	✓ S/ R ✓ R ✓ S/ R ✓ R ✓ S ✓ R	(2) (2) (2)	R
	(c)	$\hat{P}_2 = \hat{A}_1 = 35^\circ$ [\angle s opposite = sides/radii/ \angle e teenoor = sye/ radiusse] $= \hat{M}_1$ $\therefore OP$ is a tangent to the circle through P, L and M [converse tan-chord thm/ omgekeerde raakl-koordstelling]	✓ S ✓ R ✓ R	(3)	R

QUESTION/ VRAAG 9

#	Suggested answer(s)/ Voorgestelde antwoord(e)	Descriptors/ Beskrywers	Mark/ Punt	
9.1	$\widehat{EFH} = x$ [alt. \angle s; DE//FH/ verw. \angle e; DE//FH]	✓ S ✓ R	3	K
	$\widehat{G} = x$ [tan- chord thm/ raakl-koordstelling]	✓ S ✓ R		
	$\widehat{FEG} = \widehat{G} = x$ [\angle s opposite = sides/ \angle e teenoor = sye]	✓ S ✓ R		
9.2.1	$\frac{EH}{HG} = \frac{DF}{FG}$ [FH//DE or line // 1 side of Δ / lyn // 1 sy van Δ] $= \frac{DF}{DE}$ [FG = DE; given/ Gegee] $= y$	✓ S ✓ R ✓ S	(3)	R
9.2.2	In $\triangle DEF$: $\widehat{D} = \frac{180^\circ - x}{2}$ [$\sum \angle$ s of/ van (isosceles/gelykbenige) Δ] In $\triangle DEG$: $\widehat{D} = 180^\circ - 3x$ [$\sum \angle$ s of/ van Δ] $\therefore \frac{180^\circ - x}{2} = 180^\circ - 3x$ $\therefore 180^\circ - x = 360^\circ - 6x$ $\therefore 5x = 180^\circ$ $\therefore x = 36^\circ$ $\therefore \widehat{D} = \frac{180^\circ - 36^\circ}{2} = 72^\circ$	✓ S ✓ R ✓ S ✓ (equating/ gelyk stel) ✓ Simplify/ Vereenvoudig ✓ value of/ waarde van x	(5)	C

9.2.3	<u>In ΔDGE and/ en ΔDEF:</u> 1. \widehat{D} is common/ gemeen 2. $\widehat{G} = \widehat{DEF} = x$ [proved/ bewys] 3. $\therefore \widehat{DEG} = \widehat{DFE}$ [3^{rd} / 3^{de} \angle] $\therefore \Delta DGE \parallel \Delta DEF$ [\angle , \angle , \angle]	✓ S ✓ S ✓ S OR/ OF ✓ R (\angle , \angle , \angle) (Can also work with 72° etc)	(3)	R
9.2.4	$\therefore \frac{DG}{DE} = \frac{GE}{EF} = \frac{DE}{DF}$ from/ vanaf 9.2.3 OR/ OF $\Delta DGE \parallel \Delta DEF$ $\Rightarrow DE^2 = DF \cdot DG$	✓ S ✓ R Can only give needed 2 ratios	(2)	K
9.2.5	$\frac{DE}{DF} = \frac{DG}{DE}$ $\frac{1}{y} = \frac{DF+FG}{DE}$ $= \frac{DF}{DE} + \frac{FG}{DE}$ $= y + 1$ $\therefore y^2 + y = 1$	✓ S Correct Proportion/ Korrekte Ewaredigheid ✓ $\frac{DE}{DF} = \frac{1}{y}$ ✓ $\frac{DG}{DE} = \frac{DF+FG}{DE}$ ✓ $\frac{1}{y} = \frac{DF}{DE} + \frac{FG}{DE}$ ✓ $\frac{FG}{DE} = 1$	(5)	P

