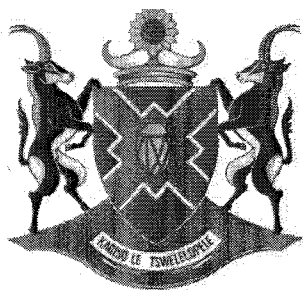




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Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sportontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko

NORTH WEST PROVINCE

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

MATHEMATICS P2/WISKUNDE V2 MEMORANDUM

SEPTEMBER 2016

MARKS: 150

PUNTE: 150

This memorandum consists of 17 pages.
Hierdie memorandum bestaan uit 17 bladsye.

QUESTION 1 / VRAAG 1

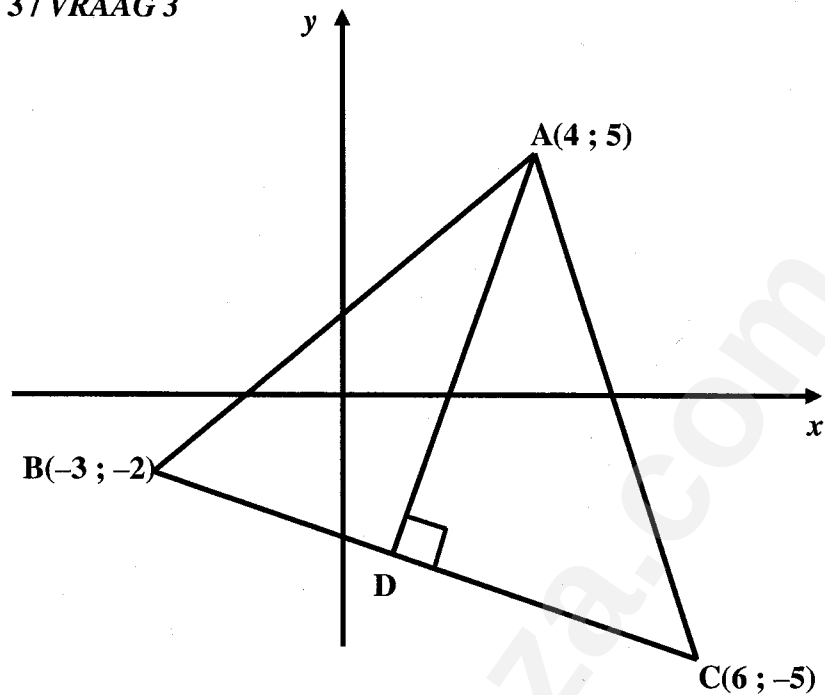
1.1	$y = 12,01 + 0,88x$	✓ value of a/waarde van a ✓ value of b/waarde van b ✓ equation / vergelyking (3)
1.2	$y = 12,01 + 0,88(46)$ $= 52\%$	✓ sub. 46 into the equation / vervang 46 in die vergelyking ✓ answer / antwoord (2)
1.3	No, the preparatory exam mark is the independent variable. Hence we cannot determine the prep. exam marks using the final exam./Nee, die voorbereidende eksamenpunt is die onafhanklike veranderlike. Dus kan ons nie die voorbereidende eksamenpunt met behulp van die finale eksamenpunt bepaal nie.	✓ answer / antwoord ✓ reason / rede (2)
1.4	$\bar{x} = 60,58$ $\bar{y} = 65,33$ $LHS/ILK = y = 65,33$ $RHS/RK = 12,01 + 0,88(60,58) = 65,32$ $LHS/ILK = RHS / RK$ $(\bar{x} ; \bar{y})$ 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)
1.5	$r = 0,98$	✓ value of r / waarde van r (1)
1.6	There is a very strong positive correlation between prep. marks and final marks./ Daar is 'n sterk positiewe korrelasie tussen die voorbereidende punte en die finale punte.	✓ very strong / baie sterk ✓ positive / positief (2)

[14]

QUESTION 2 / VRAAG 2

2.1	$a = 6$	✓ answer / antwoord (1)																		
2.2	<table border="1"> <thead> <tr> <th>Expenditure (in rand)</th><th>Frequency</th><th>Cumulative frequency</th></tr> </thead> <tbody> <tr> <td>$50 \leq x < 100$</td><td>24</td><td>24</td></tr> <tr> <td>$100 \leq x < 150$</td><td>52</td><td>76</td></tr> <tr> <td>$150 \leq x < 200$</td><td>14</td><td>90</td></tr> <tr> <td>$200 \leq x < 250$</td><td>6</td><td>96</td></tr> <tr> <td>$250 \leq x < 300$</td><td>4</td><td>100</td></tr> </tbody> </table>	Expenditure (in rand)	Frequency	Cumulative frequency	$50 \leq x < 100$	24	24	$100 \leq x < 150$	52	76	$150 \leq x < 200$	14	90	$200 \leq x < 250$	6	96	$250 \leq x < 300$	4	100	✓ 76; 90 ✓ 96; 100 (2)
Expenditure (in rand)	Frequency	Cumulative frequency																		
$50 \leq x < 100$	24	24																		
$100 \leq x < 150$	52	76																		
$150 \leq x < 200$	14	90																		
$200 \leq x < 250$	6	96																		
$250 \leq x < 300$	4	100																		
2.3	✓ Correct points ✓ Shape ✓ Grounding / ✓ Korrekte punte ✓ Vorm ✓ grondvlak	(3)																		
2.4	$100 \leq x < 150$	✓ answer / antwoord (1) [7]																		

QUESTION 3 / VRAAG 3

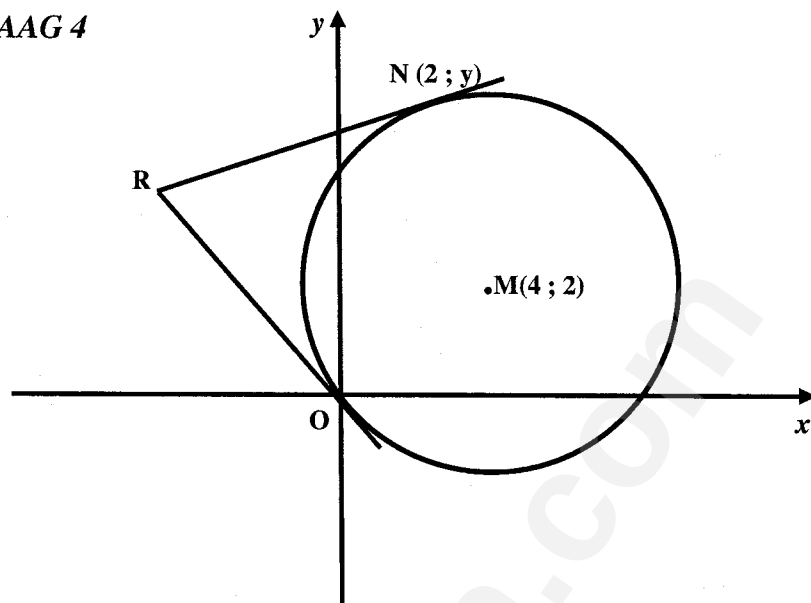


3.1	$BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(6+3)^2 + (-5+2)^2}$ $= \sqrt{90} \text{ or/of } 3\sqrt{10} \text{ or/of } 9,49$	✓ sub. into the distance formula / Vervang in die afstandformule ✓ answer / antwoord (2)
3.2	$m_{BC} = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{-5+2}{6+3}$ $= -\frac{1}{3}$ $y + 5 = -\frac{1}{3}(x - 6) \quad \text{or/of} \quad y + 2 = -\frac{1}{3}(x + 3)$ $y = -\frac{1}{3}x - 3 \quad \text{or} \quad 3y = -x - 9$	✓ sub. into gradient formula / vervang in die gradiënt formule ✓ $-\frac{1}{3}$ ✓ equation / vergelyking (3)
3.3	$m_{AD} = 3$ $y - 5 = 3(x - 4)$ $y = 3x - 7$	✓ $m_{AD} = 3$ ✓ sub. of the point / vervanging van die punt ✓ equation / vergelyking (3)

3.4	$-\frac{1}{3}x - 3 = 3x - 7$ $-x - 9 = 9x - 21$ $-10x = -12$ $x = \frac{6}{5}$ $y = 3\left(\frac{6}{5}\right) - 7$ $= -\frac{17}{5}$ $\therefore D\left(\frac{6}{5}; -\frac{17}{5}\right)$	✓ equating the two equations / stel die twee vergelykings gelyk aan mekaar ✓ x- value / x-waarde ✓ y-value / y-waarde (3)
3.5	$m_{AB} = \frac{5+2}{4+3}$ $= 1$ $\tan \alpha = 1$ $\alpha = 45^\circ$ $\tan \beta = 3$ $\beta = 71,57^\circ$ $\hat{B}AD = 71,57^\circ - 45^\circ$ $= 26,57^\circ$	✓ $m_{AB} = 1$ ✓ $\tan \alpha = 1$ ✓ $\alpha = 45^\circ$ ✓ $\beta = 71,57^\circ$ ✓ answer / antwoord (5)
3.6	Equation of a line AE $\parallel$ BC / vergelyking van AE $\parallel$ BC $y - 5 = -\frac{1}{3}(x - 4)$ $3y - 15 = -x + 4$ AE: $3y + x = 19$ x-intercept/x-afsnit is $3(0) + x = 19$ $x = 19$ E (19: 0)	✓ sub. of $-\frac{1}{3}$ and point into the equation / vervanging van $-\frac{1}{3}$ en die punt in die vergelyking ✓ equation of AE / vergelyking van AE ✓ x-intercepts / x-afsnit ✓ answer / antwoord (4)

[20]

QUESTION 4 / VRAAG 4



4.1	$(x - 4)^2 + (y - 2)^2 = r^2$ $(0 - 4)^2 + (0 - 2)^2 = r^2$ $20 = r^2$ $(x - 4)^2 + (y - 2)^2 = 20$	✓ sub. of M into equation of a circle / <i>vervang M in die vergelyking van die sirkel</i> ✓ sub. of O(0; 0) / <i>vervang (0;0)</i> ✓ value of r^2 / <i>waarde van r^2</i> (3)
4.2	$(x - 4)^2 + (y - 2)^2 = 20$ Subst/Verv(2 ; y) $(2 - 4)^2 + (y - 2)^2 = 20$ $4 + y^2 - 4y + 4 = 20$ $y^2 - 4y - 12 = 0$ $(y - 6)(y + 2) = 0$ $y = 6 \text{ or/of } y = -2 \text{ N/A}$ OR/OF $(x - 4)^2 + (y - 2)^2 = 20$ Subst/Verv(2 ; y) $(2 - 4)^2 + (y - 2)^2 = 20$ $(y - 2)^2 = 16$ $y - 2 = \pm 4$ $y = 6 \text{ or/of } y = -2 \text{ N/A/NVT}$	✓ sub of N(2 ; y) / <i>vervang N(2 ; y)</i> $y^2 - 4y - 12 = 0$ $(y - 6)(y + 2) = 0$ $y = 6$ (4) OR / OF ✓ sub of N(2 ; y) / <i>vervang N(2 ; y)</i> $(y - 2)^2 = 16$ $y - 2 = \pm 4$ $y = 6$ (4)

4.3	$m_{OM} = \frac{2}{4} = \frac{1}{2}$ $m_{OR} = -2$ Equation of OR is /Vergelyking van OR: $y = -2x$	$\checkmark m_{OM} = \frac{1}{2}$ $\checkmark m_{OR} = -2$ $\checkmark y = -2x \quad (3)$
4.4	$m_{MN} = \frac{6-2}{2-4} = -2$ $m_{NR} = \frac{1}{2}$ $y-6 = \frac{1}{2}(x-2)$ $2y-12 = x-2$ NR: $2y-x-10 = 0$ $y = -2x$ $2(-2x) - x - 10 = 0$ $-5x = 10$ $x = -2$ $y = -2(-2) = 4$ R(-2 ; 4) OR $RO^2 = NR^2$ $x^2 + y^2 = (x-2)^2 + (y-6)^2$ $x^2 + y^2 = x^2 - 4x + 4 + y^2 - 12y + 36$ $4x + 12y = 40$ $x + 3y = 10 \quad \text{and} \quad y = -2x$ $x + 3(-2x) = 10$ $x - 6x = 10$ $-5x = 10$ $x = -2$ $y = -2(-2) = 4 \quad R(-2 ; 4)$	$\checkmark m_{MN} = -2$ $\checkmark m_{NR} = \frac{1}{2}$ $\checkmark y-6 = \frac{1}{2}(x-2)$ $\checkmark 2(-2x) - x - 10 = 0$ $\checkmark x = -2$ $\checkmark y = 4$ (6) $\checkmark x^2 + y^2 = (x-2)^2 + (y-6)^2$ $\checkmark 4x + 12y = 40$ $\checkmark x + 3y = 10$ $\checkmark x + 3(-2x) = 10$ $\checkmark x = -2$ $\checkmark y = 4 \quad (6)$

4.5	MNRO is a kite because/vlieër omdat OR = RN and /en MN = OM	✓ Kite/Vlieër ✓ adjacent sides equal /aangr.sye gelyk (2) [18]
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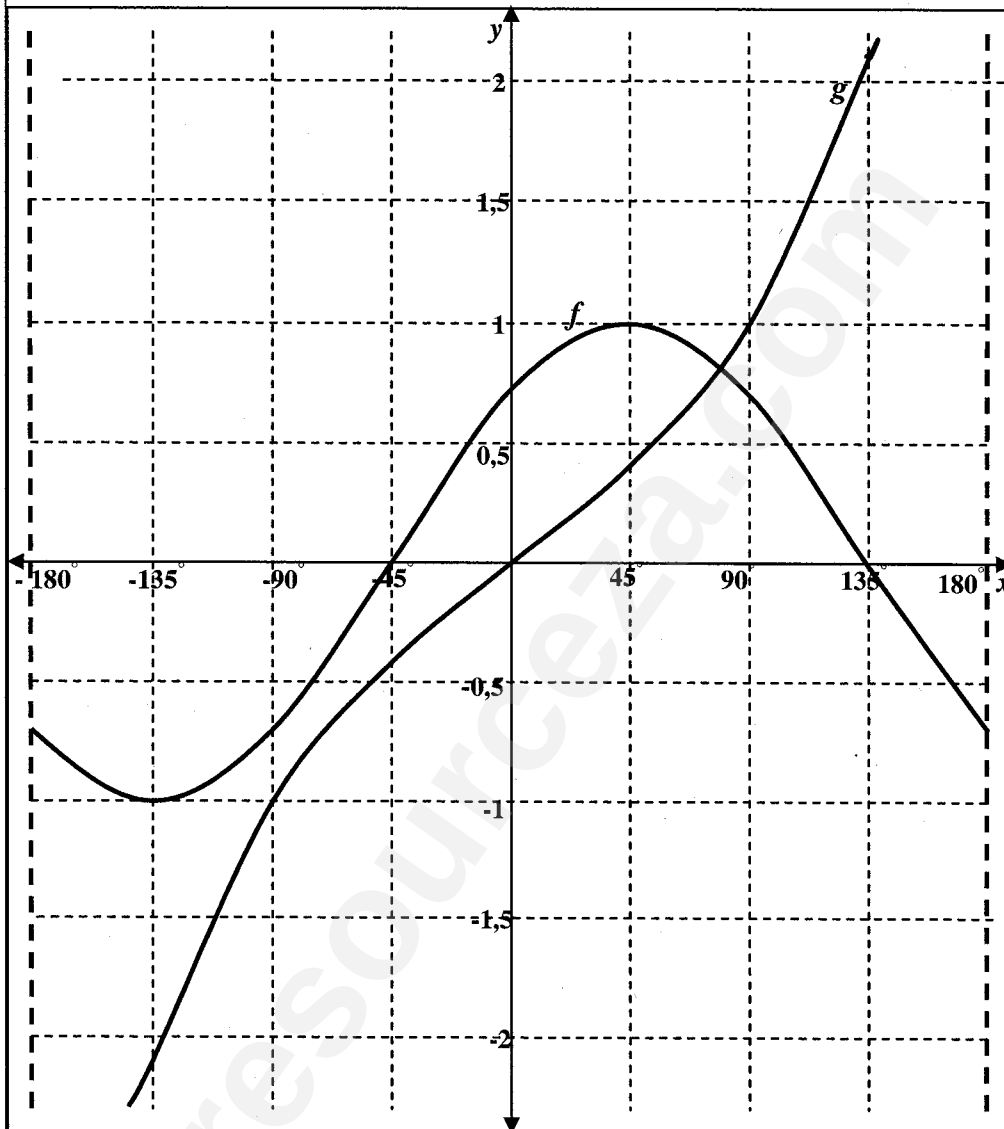
QUESTION 5 / VRAAG 5

5.1	$\frac{\cos(180^\circ + x) \cdot \tan(360^\circ - x) \cdot \sin^2(90^\circ - x)}{\sin(180^\circ - x)} + \sin^2 x$ $= \frac{(-\cos x) \cdot (-\tan x) \cdot \cos^2 x}{\sin x} + \sin^2 x$ $= \frac{\cos x \cdot \frac{\sin x}{\cos x} \cdot \cos^2 x}{\sin x} + \sin^2 x$ $= \cos^2 x + \sin^2 x$ $= 1$	✓ $-\cos x$ ✓ $-\tan x$ ✓ $\cos^2 x$ ✓ $\sin x$ ✓ $\cos^2 x + \sin^2 x$ ✓ answer/antwoord (6)
5.2.1	$\cos(A - B) - \cos(A + B)$ $= \cos A \cos B + \sin A \sin B - [\cos A \cos B - \sin A \sin B]$ $= \cos A \cos B + \sin A \sin B - \cos A \cos B + \sin A \sin B$ $= 2\sin A \sin B$	✓ expansion of $\cos(A-B)$ / uitbreiding van $\cos(A-B)$ ✓ expansion of $\cos(A+B)$ / uitbreiding van $\cos(A+B)$ ✓ simplification / vereenvoudig (3)
5.2.2	$\cos 15^\circ - \cos 75^\circ = \cos(45^\circ - 30^\circ) - \cos(45^\circ + 30^\circ)$ $= 2\sin 45^\circ \cdot \sin 30^\circ$ $= 2 \times \frac{\sqrt{2}}{2} \times \frac{1}{2} \quad \text{or/of} \quad 2 \times \frac{1}{\sqrt{2}} \times \frac{1}{2}$ $= \frac{\sqrt{2}}{2} \quad \text{or/of} \quad \frac{1}{\sqrt{2}}$	✓ $45^\circ - 30^\circ$ and / en $45^\circ + 30^\circ$ ✓ $2\sin 45^\circ \cdot \sin 30^\circ$ ✓ $\frac{\sqrt{2}}{2} \times \frac{1}{2} / \frac{1}{\sqrt{2}} \times \frac{1}{2}$ ✓ answer / antwoord (4)

	OR $\begin{aligned} & \cos 15^\circ - \cos 75^\circ \\ &= \cos(45^\circ - 30^\circ) - \cos(45^\circ + 30^\circ) \\ &= \cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ - [\cos 45^\circ \cos 30^\circ - \sin 45^\circ \sin 30^\circ] \\ &= 2 \sin 45^\circ \sin 30^\circ \\ &= 2 \times \frac{\sqrt{2}}{2} \times \frac{1}{2} \quad \text{or/of} \quad 2 \times \frac{1}{\sqrt{2}} \times \frac{1}{2} \\ &= \frac{\sqrt{2}}{2} \quad \text{or/of} \quad \frac{1}{\sqrt{2}} \end{aligned}$	✓ $45^\circ - 30^\circ$ and / en $45^\circ + 30^\circ$ ✓ $2 \sin 45^\circ \cdot \sin 30^\circ$ ✓ $\frac{\sqrt{2}}{2} \times \frac{1}{2} / \frac{1}{\sqrt{2}} \times \frac{1}{2}$ ✓ answer / antwoord (4)
5.3	$\begin{aligned} AB^2 &= (\cos \theta - 6)^2 + (\sin \theta - 7)^2 \\ 86 &= \cos^2 \theta - 12 \cos \theta + 36 + \sin^2 \theta - 14 \sin \theta + 49 \\ 86 &= 1 + 36 + 49 - 12 \cos \theta - 14 \sin \theta \\ 0 &= -12 \cos \theta - 14 \sin \theta \\ 14 \sin \theta &= -12 \cos \theta \\ \frac{\sin \theta}{\cos \theta} &= \frac{-12}{14} \\ \tan \theta &= -\frac{6}{7} / -0,86 \end{aligned}$	✓ sub. into the distance formula / vervang in die afstandformule ✓ simplification / vereenvoudig ✓ $14 \sin \theta = -12 \cos \theta$ ✓ $\tan \theta = -\frac{6}{7} / -0,86$ (4) [17]

QUESTION 6 / VRAAG 6

6.1



f : ✓ x -int/ x -afsnitte ✓ y -int,/ y -afsnit ✓ turning points / draaipunte

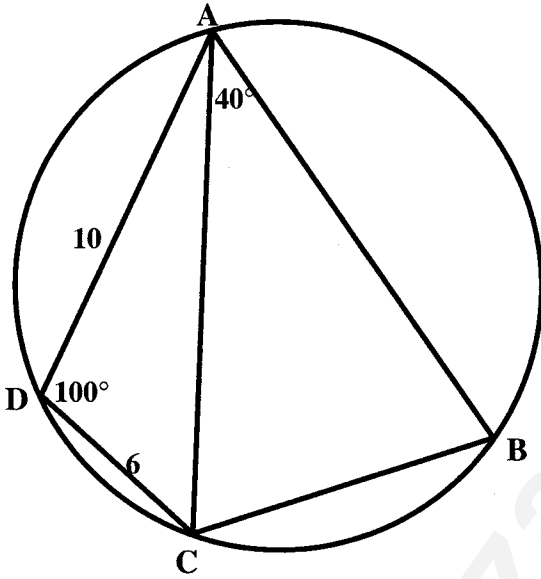
g : ✓ asymptotes, / asimptote ✓ passing (0,0) (-90°;-1) (90°;1),
gaan deur die punt (0;0) (-90°;-1) (90°;1) ✓

(6)

6.2.1	$x = -45^\circ$ or $x = 135^\circ$	✓ $x = -45^\circ$ ✓ $x = 135^\circ$ (2)
6.2.2	$x = 180^\circ$ or / of $x = -180^\circ$	✓ $x = 180^\circ$ ✓ $x = -180^\circ$ (2)
6.2.3	$y \in [-1;1]$ or / of $-1 \leq y \leq 1$	✓ answer / antw (1)
6.2.4	1	✓ answer / antw (1)
6.2.5	$x \in (-180^\circ; -45^\circ)$ or / of $(0^\circ; 135^\circ)$ OR $-180^\circ < x < -45^\circ$ or / of $0^\circ < x < 135^\circ$	✓ $-180^\circ; -45^\circ$ ✓ $0^\circ; 135^\circ$ ✓ notation / notasie (3)

[15]

QUESTION 7 / VRAAG 7

		
7.1	$AC^2 = 10^2 + 6^2 - 2(10)(6) \cos 100^\circ$ $= 156,8377813$ $AC = 12,5 \text{ units/eenhede}$ $\hat{B} = 80^\circ \text{ (opp angles of a cyclic quad/teenoorste van koordev)}$ In $\triangle ABC$, $\frac{BC}{\sin 40^\circ} = \frac{AC}{\sin B}$ $\frac{BC}{\sin 40^\circ} = \frac{12,5}{\sin 80^\circ}$ $BC = \frac{12,5 \times \sin 40^\circ}{\sin 80^\circ}$ $= 8,2 \text{ units}$	✓ sub. into cosine rule / vervang in die kosinus-reël ✓ 156,8377813 ✓ 12,5 units / eenhede ✓ $\hat{B} = 80^\circ$ ✓ sub. into sine rule / vervang in die sinus-reël ✓ answer / antwoord (6)
7.2	$\text{Area of } \triangle ABC = \frac{1}{2} AC \cdot BC \cdot \sin 60^\circ$ $= \frac{1}{2} (12,5)(8,2) \sin 60^\circ$ $= 44,4 \text{ square units}$	✓ 60° ✓ sub. into the area rule / vervang in die oppervlakte-reël ✓ answer / antwoord (3) [9]

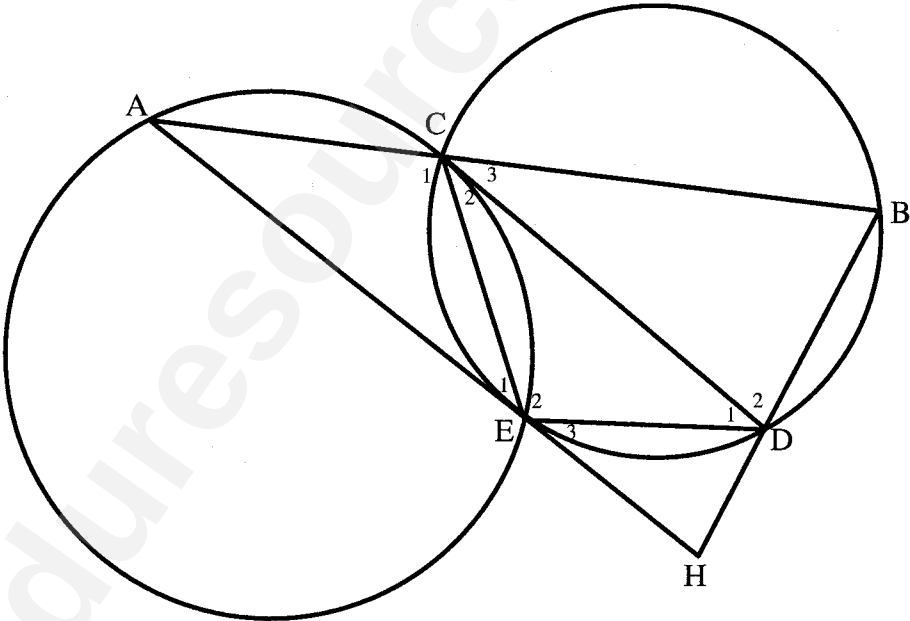
QUESTION 8 / VRAAG 8

8.1.1	90°	✓ ans / antwoord (1)
8.1.2	Angle in the alternate segment Die hoek in die teenoorstaande segment	✓ ans / antwoord (1)
8.2		
8.2.1	$\hat{B}_4 = \hat{E} = x$ (tan chord theorem / hoek tussen raaklyn en koord) $\hat{B}_4 = \hat{A} = x$ (corresponding angles / ooreenkomstige hoeke) $\hat{B}_2 = \hat{E} = x$ (radii / radiusse OE = OB)	✓S ✓R ✓S ✓R ✓S ✓R (6)
8.2.2	$\hat{B}_2 + \hat{B}_3 = 90^\circ$ (subtended by a diameter / onderspan deur middellyn) $\hat{CBE} = 90^\circ + x$	✓S ✓R ✓ ans / antwoord (3)
8.2.3	In $\triangle DBE$, $\frac{EO}{OD} = \frac{EF}{FB}$ (line $\parallel$ to one side of a $\triangle$ / lyn $\parallel$ aan een sy van $\triangle$) But/maar $\frac{EO}{OD} = 1$ (radii / radiusse) $\frac{EF}{FB} = 1$ $EF = FB$ F is the midpoint of EB / F is die middelpunt van EB	✓S ✓R ✓S ✓ EF = FB (4)

	OR In $\triangle EOF$ and $\triangle BOF$ $\hat{E} = \hat{B}_2$ (Proven in 8.2.1/Bewys in 8.2.1)) $EO = OB$ (radii/radiusse) $\hat{D}_1 = \hat{B}_3$ ($\angle$ s opp = sides/ $\angle$ e teenoor gelyke sye) $\hat{D}_1 = \hat{O}_3$ (corresp $\angle$ s/ooreenkomstige $\angle$ e $BD \parallel AO$) $\therefore \hat{B}_3 = \hat{O}_3$ $\therefore \hat{B}_3 = \hat{O}_2$ (alt $\angle$ s/verwisselende $\angle$ e $BD \parallel AO$) $\therefore \hat{O}_3 = \hat{O}_2$ $\triangle EOF \equiv \triangle BOF$ (AAS/HHS) $EF = FB$	$\checkmark \hat{E} = \hat{B}_2$ $\checkmark \hat{D}_1 = \hat{B}_3$ $\checkmark \hat{D}_1 = \hat{O}_3$ $\checkmark \triangle EOF \equiv \triangle BOF$ (AAS/HHS) (4)
8.2.4	$OF \perp EB$ (line from centre to a midpoint / lyn uit middelpunt van sirkel na middelpunt van koord) $EF = 4$ (F is the midpoint / F is die middelpunt) $OE^2 = OF^2 + EF^2$ $= 3^2 + 4^2$ $= 25$ $OE = 5$ $ED = 10 \text{ cm}$ OR / OF $\hat{F}_3 = 90^\circ$ (corresponding angles / ooreenkomstige hoeke) $EF = 4$ (F is the mid point / F is die middelpunt) $OE^2 = OF^2 + EF^2$ $= 3^2 + 4^2$ $= 25$ $OE = 5$ $ED = 10 \text{ cm}$	$\checkmark$ S/R $\checkmark EF = 4$ $\checkmark OE = 5$ $\checkmark$ ans / antwoord OR / OF $\checkmark$ S/R $\checkmark EF = 4$ $\checkmark OE = 5$ $\checkmark$ ans / antwoord (4)

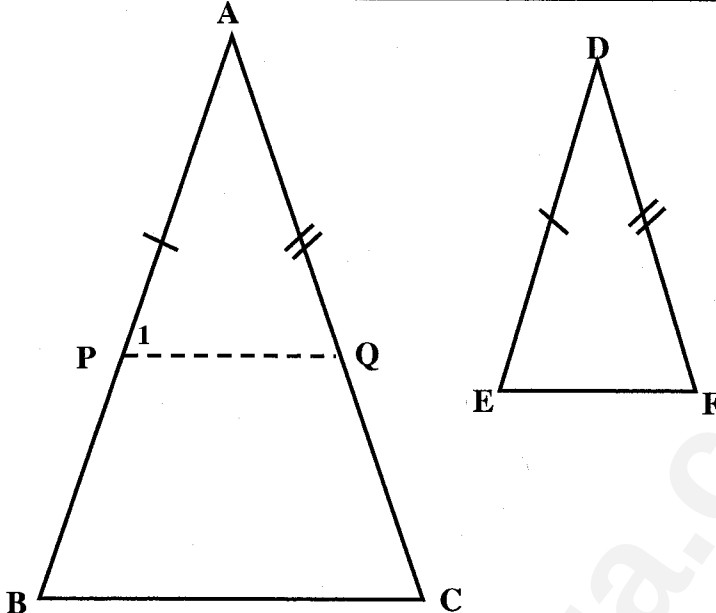
	OR / OF	OR / OF
	$OF = \frac{1}{2}DB$ (midpoint theorem/<i>middelpunt formule</i>) $DB = 6 \text{ cm}$ In $\triangle EDB$, $ED^2 = 6^2 + 8^2 \text{ (Pythagoras thm/ Pythagoras formule)}$ $= 100$ $ED = 10$	$\checkmark OF = \frac{1}{2}DB$ $\checkmark DB = 6$ $\checkmark \text{Application of Pythagoras thm/Toepassing van formule}$ $\checkmark \text{ans/antwoord} \quad (4)$ [19]

QUESTION 9 /VRAAG 9

		
9.1	$\hat{A} = \hat{C}_2 \quad (\text{tan CD and chord CE / raaklyn CD en koord CE})$ $= \hat{E}_3 \quad (\text{tan AEH and chord ED / raaklyn AEH en koord ED})$ But they are corresponding angles / Maar hulle is ooreenkomstige hoeke $AB \parallel ED$	$\checkmark \hat{A} = \hat{C}_2$ $\checkmark \text{reason / rede}$ $\checkmark \hat{C}_2 = \hat{E}_3$ $\checkmark \text{reason / rede}$ $\checkmark \text{corresponding angles / ooreenkomstige hoeke}$ (5)

	OR/OF $\hat{A} + \hat{C}_1 + \hat{E}_1 = 180^\circ$ (sum of angles in a Δ/som van die binne $\angle^e$ van Δ) $\hat{C}_2 + \hat{E}_2 + \hat{D}_1 = 180^\circ$ (Sum of angles in a Δ / som van die binne $\angle^e$ van Δ) But $\hat{A} = \hat{C}_2$ (tan CD and chord CE/ raaklyn CD en koord CE) $\hat{E}_1 = \hat{D}_1$ (tan AEH and chord CE/ raaklyn AEH en koord CE) $\therefore \hat{C}_1 = \hat{E}_2$ but they are alt.angles/ Maar hulle is verwisselende hoeke $AB \parallel ED$	OR/OF $\checkmark \hat{A} + \hat{C}_1 + \hat{E}_1 = 180^\circ$ and $\hat{C}_2 + \hat{E}_2 + \hat{D}_1 = 180^\circ$ $\checkmark \hat{A} = \hat{C}_2$ $\checkmark$ reason / rede $\checkmark \hat{E}_1 = \hat{D}_1$ $\checkmark$ alt.angles / verwisselende hoeke (5)
9.2	ACDE is a parallelogram because one pair of opposite sides (AC and ED) are equal and parallel / ACDE is 'n parallelogram omdat een paar teenoorstaande sye (AC en ED) gelyk en ewewydig is	$\checkmark$ answer / antwoord $\checkmark$ reason / rede (2)
9.3	In ΔABH, $\frac{AC}{CB} = \frac{HD}{DB}$ (proportionality thm or $AH \parallel CD$/ eweredigheidstelling of $AH \parallel CD$) $\frac{HE}{EA} = \frac{HD}{DB}$ (proportionality thm or $AB \parallel ED$ / eweredigheidstelling $AB \parallel ED$) $\frac{AC}{CB} = \frac{HE}{EA}$	$\checkmark \frac{AC}{CB} = \frac{HD}{DB}$ $\checkmark$ reason / rede $\checkmark \frac{HE}{EA} = \frac{HD}{DB}$ $\checkmark$ reason / rede (4) [11]

QUESTION 10

	
10.1	Const: On AB, mark off $AP = DE$ and on AC, mark off $AQ = DF$ / <i>Op AB, merk op $AP = DE$ en op AC, mark of $AQ = DF$.</i> Proof/Bewys: In $\triangle APQ$ and $\triangle DEF$: $AP = DE$ (const/konstr) $AQ = DF$ (const/ konstr) $\hat{A} = \hat{D}$ (given / gegee) $\triangle APQ \equiv \triangle DEF$ (SAS/SHS) $\hat{P}_1 = \hat{E}$ $\hat{P}_1 = \hat{B}$ ($\hat{E} = \hat{B}$) $PQ \parallel BC$ (corresp. angles =/ <i>ooreenkomstige hoeke</i>) $\frac{AB}{AP} = \frac{AC}{AQ}$ (line // one side of a $\triangle$ / lyn // aan een sy van $\triangle$) $\frac{AB}{DE} = \frac{AC}{DF}$ ($AP = DE$ and $AQ = DF$) ✓ Construction/ <i>konstruksie</i> ✓ $\triangle APQ \equiv \triangle DEF$ (SAS) (SHS) ✓ $\hat{P}_1 = \hat{E}$ ✓ $\hat{P}_1 = \hat{B}$ ✓ $PQ \parallel BC$ ✓ $\frac{AB}{AP} = \frac{AC}{AQ}$ ✓ line // to one side of a triangle / lyn // aan een sy van 'n driehoek (7)

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10.2.3	$\frac{RS}{PQ} = \frac{ST}{QT} = \frac{RT}{PT} \quad (\Delta RST \parallel \Delta PQT)$ $\frac{RS}{PQ} = \frac{RT}{PT} \dots\dots\dots(1)$ In ΔQST, $QS \parallel RE$ $\therefore \frac{SE}{ET} = \frac{QR}{RT} \quad (\text{line drawn parallel to one side of a } \Delta / \text{lyn parallel aan een sy van 'n } \Delta)$ $\therefore \frac{SE}{ET} = \frac{RS}{RT} \quad (QR = RS \text{ proved/bewys in 10.2.1})$ $\therefore \frac{SE}{ET} = \frac{RS}{RT} = \frac{PQ}{PT} \quad (\text{from equation/uit vergelyking (1)})$	$\checkmark R(\Delta RST \parallel \Delta PQT)$ $\checkmark \frac{RS}{PQ} = \frac{RT}{PT}$ $\checkmark \therefore \frac{SE}{ET} = \frac{QR}{RT}$ $\checkmark \text{ Reason/rede}$ $\checkmark \therefore \frac{SE}{ET} = \frac{RS}{RT} \quad (5)$ [20]
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TOTAL / TOTAAL: 150

ANALYSIS GRID

Q.no	Concepts	Level 1	Level 2	Level 3	Level 4	Total
1.1	Equation of Regression line		3			
1.2	Prediction	2				
1.3	Estimation and Analysis				2	
1.4	$(\bar{x} ; \bar{y})$		4			
1.5	Correlation coefficient	1				
1.6	Relationship between the two variables	2				
Total		5	7		2	14
2.1	Finding the value of unknown	1				
2.2	Cumulative frequency table	2				
2.3	Ogive		3			
2.4	Modal class	1				
Total		4	3			7
3.1	Distance	2				
3.2	Equation of st. line	3				
3.3	Altitude		3			
3.4	Points of intersection		3			
3.5	Angle between two lines			5		
3.6	Analysis				4	
Total		5	6	5	4	20
4.1	Equation of a circle	3				
4.2	Distance		4			
4.3	Equation of a tangent			3		
4.4	Point of intersection			6		
4.5	Analysis	2				
Total		5	4	9		18
5.1	Reduction and identity		6			
5.2.1	Compound angle		3			
5.2.2	Deduction and special angle			4		
5.3	Trig and distance				4	
Total			9	4	4	17
6.1	Sketching of graphs			6		
6.2.1	Solutions	2				
6.2.2	Asympote		2			
6.2.3	Range	1				
6.2.4	Solutions	1				
6.2.4	Inequality			3		
Total		4	2	9		15
7.1	Application of cosine rule and sine rule		3	3		
7.2	Area rule		3			
Total			6	3		9

8.1.1	Diameter	1				
8.1.2	Tan-chord	1				
8.2.1	Geo. Reasoning			6		
8.2.2	App.tan-chord		3			
8.2.3	Proving mid point			4		
8.2.4	App. of thm		4			
Total		2	7	10		19
9.1	Tan- chord		5			
9.2	Parallelogram			2		
9.3	Proportionality			2	2	
Total			5	4	2	11
10.1	Similarity theorem		7			
10.2.1	Side opp. of equal angles	4				
10.2.2	Cyclic quad.		4			
10.2.3	Application of Similarity				5	
Total		4	11		5	20
Gr.Total		29	60	44	17	150
Expected marks		30	52,5	45	22,5	150
Actual %		19,3%	40%	29,3%	11,3%	100
Expected %		20%	35%	30%	15%	100