



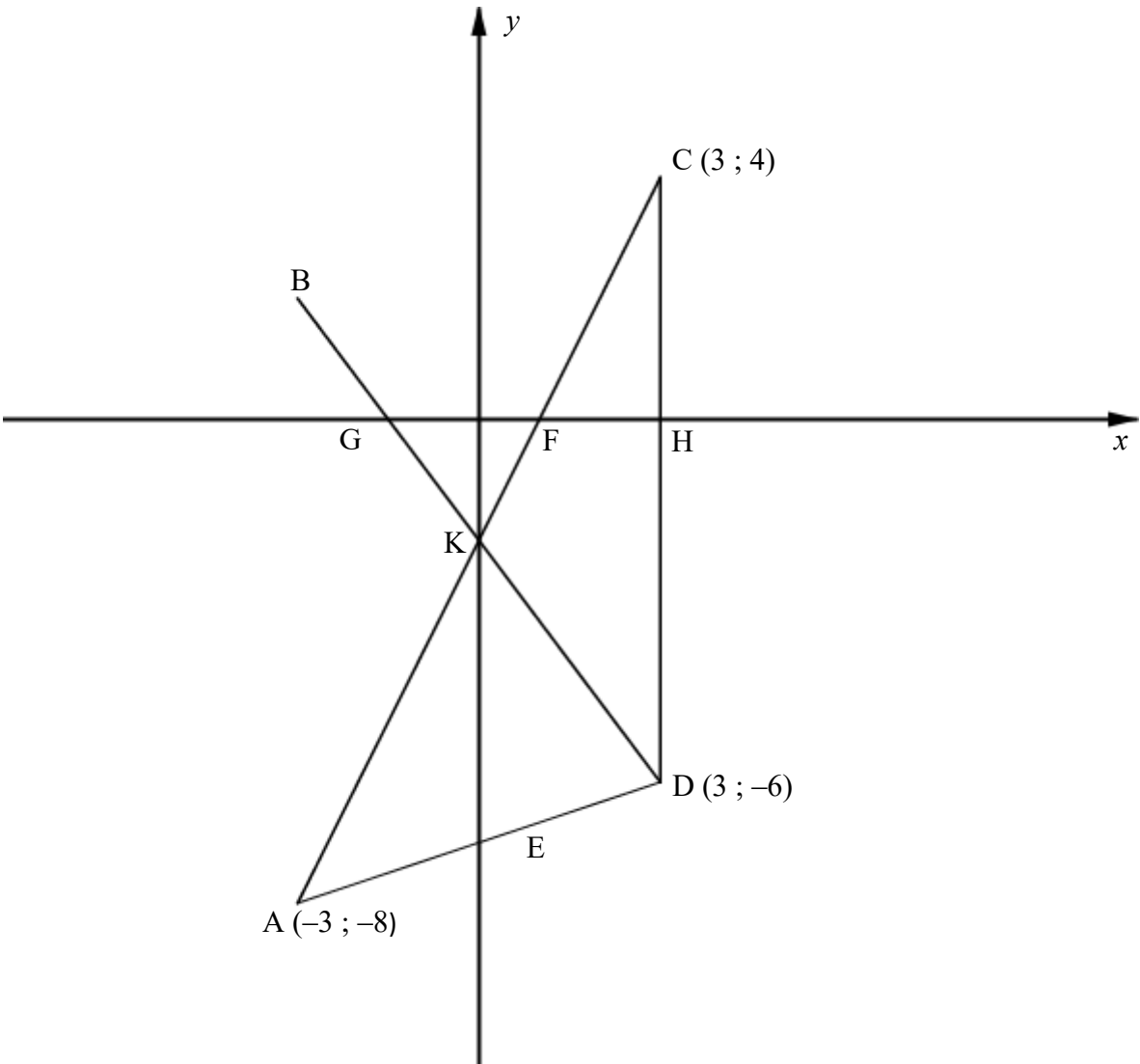
Grade 12 Analytical Geometry

2025 Trial Papers Marking Guidelines

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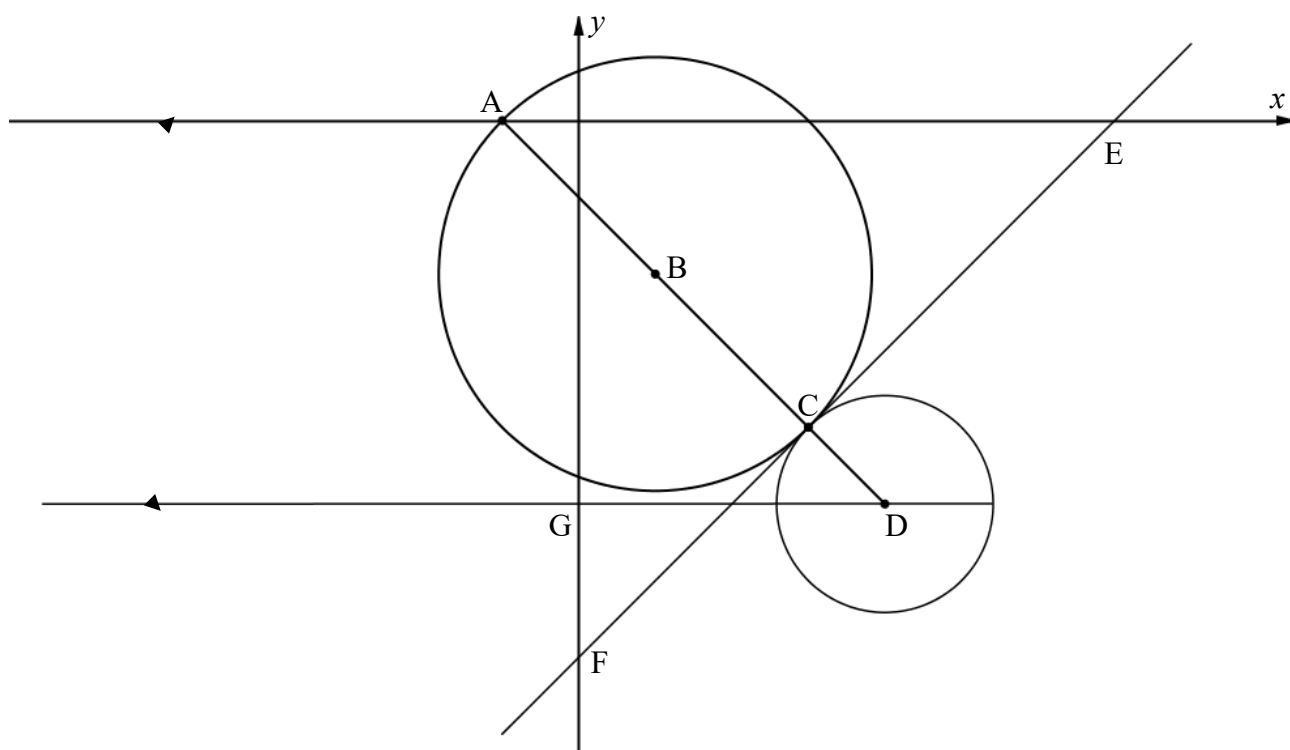
QUESTION/VRAAG 3



3.1	$AC = \sqrt{(-3-3)^2 + (-8-4)^2}$ $= 6\sqrt{5}$	✓ correct substitution/ <i>korrekte vervanging</i> ✓ correct answer/ <i>korrekte antwoord</i>	(2)
3.2	$m_{AC} = \frac{4+8}{3+3}$ $= 2$	✓ correct substitution/ <i>korrekte vervanging</i> ✓ answer/ <i>antwoord</i>	(2)
3.3	$m_{AD} = \frac{-6+8}{3+3}$ $= \frac{1}{3}$ $y+8 = \frac{1}{3}(x+3)$ $y = \frac{1}{3}x - 7$	✓ m_{AD} ✓ substitution of m_{AD} and D(3 ; - 6) or A(-3 ; -8) <i>vervangings van m_{AD} en D(3 ; - 6) of A(-3 ; -8)</i> ✓ Equation/ <i>Vergelyking</i>	(3)

3.4	$\tan \hat{BGF} = m_{BD} = -\frac{4}{3}$ $\hat{BGF} = 126,87^\circ$ $\hat{KGF} = 53,13^\circ$ [$\angle$ s on a str. line / $\angle$ op'n reguitlyn] $\tan \hat{CFH} = 2$ $\hat{CFH} = 63,44^\circ$ $\hat{GFK} = 63,44^\circ$ [vert. opp $\angle$ s / regoorst. $\angle$ e] $\therefore \hat{CKD} = 116,57^\circ$ [ext $\angle$ of $\triangle GKF$ / buite $\angle$ van $\triangle GKF$] OR/OF $m_{AC} = 2$ $\tan \hat{CFH} = 2$ $\hat{CFH} = 63,44^\circ$ $\hat{GFK} = 63,44^\circ$ [vert. opp $\angle$ s / regoorst. $\angle$ e] $\tan \hat{BGF} = m_{BD} = -\frac{4}{3}$ $\hat{BGF} = 126,87^\circ$ $\hat{BKC} = 63,43^\circ$ [ext $\angle$ of $\triangle GKF$ / buite $\angle$ van $\triangle GKF$] $\hat{CKD} = 116,57^\circ$ [$\angle$ s on a str. line / $\angle$ op'n reguitlyn]	$\checkmark \hat{BGF} = 126,87^\circ$ $\checkmark \hat{KGF} = 53,13^\circ$ $\checkmark \hat{CFH} = 63,44^\circ$ $\checkmark \hat{GFK} = 63,44^\circ$ $\checkmark$ answer/antwoord OR/OF $\checkmark \hat{CFH} = 63,44^\circ$ $\checkmark \hat{GFK} = 63,44^\circ$ $\checkmark \hat{BGF} = 126,87^\circ$ $\checkmark \hat{BKC} = 63,43^\circ$ $\checkmark$ answer/antwoord	(5)
3.5	$K(0; -2)$ $KD = \sqrt{(0-3)^2 + (-2+6)^2}$ $= 5$ $CK = 3\sqrt{5}$ Area of $\triangle CKD$ / Oppervlakte van $\triangle CKD$ $= \frac{1}{2} \times 2\sqrt{5} \times 5 \times \sin 116,57^\circ$ $= 15$	$\checkmark K(0; -2)$ $\checkmark KD = 5$ $\checkmark CK = 3\sqrt{5}$ $\checkmark$ correct substitution korrekte vervanging $\checkmark$ answer/antwoord	(5)
3.6	$x = 3$	$\checkmark$ answer/antwoord	(1)
3.7	$E(0; -7)$ or $EK = 5$ $CD = 10$ height of/hoogete van trapezium = 3 $\text{Area of / van } EKCD = \frac{1}{2}(5+10) \times 3$ $= \frac{45}{2}$ $\frac{\text{Area of / van } \triangle CKD}{\text{Area of / van } EKCD} = 15 \times \frac{2}{45}$ $= \frac{2}{3}$	$\checkmark E(0; -7)$ or $EK = 5$ $\checkmark CD = 10$ $\checkmark$ height/hoogete = 3 $\checkmark \frac{45}{2}$ $\checkmark$ answer/antwoord	(5)
			[23]

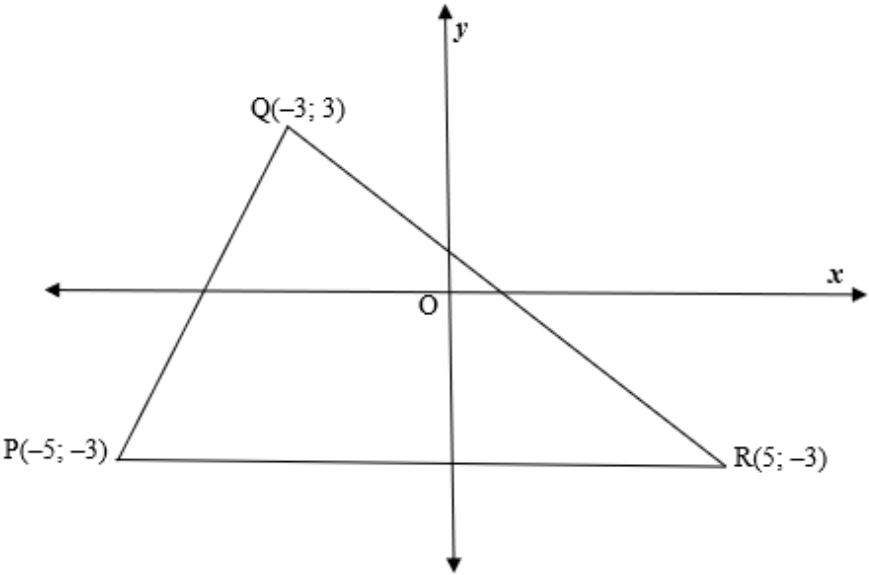
QUESTION/VRAAG 4



4.1	$x^2 + y^2 - 2x + 4y - 3 = 0$ $(x-1)^2 + (y+2)^2 = 8$ $\therefore B(1; -2)$	✓ completing square <i>voltooing van vierkant</i> ✓ x-coordinate/x-koördinaat ✓ y-coordinate/y-koördinaat	(3)
4.2	$x^2 + 0^2 - 2x + 4 \cdot 0 - 3 = 0$ $x^2 - 2x - 3 = 0$ $(x-3)(x+1) = 0$ $x \neq 3$ or $x = 1$ $\therefore A(-1; 0)$	✓ $y = 0$ ✓ standard form/ <i>standaardvorm</i> ✓ correct x-coordinate <i>korrekte x-koördinaat</i>	(3)
4.3	$m_{AB} = \frac{-2-0}{1+1}$ $= -1$	✓ substitution into correct formula <i>vervanging in korrekte formule</i> ✓ answer/ <i>antwoord</i>	(2)
4.4	$\hat{A}CE = 90^\circ$ [diameter $\perp$ tan / <i>middel lyn</i> $\perp$ <i>raak lyn</i>] $AB = 2\sqrt{2}$ radius $\therefore AC = 4\sqrt{2}$ diameter / <i>middel lyn</i> $CE^2 = 8^2 - (4\sqrt{2})^2$ $CE = 4\sqrt{2}$	✓ $\hat{A}CE = 90^\circ$ ✓ $AC = 4\sqrt{2}$ (diameter / <i>middel lyn</i>) ✓ correct use of Pyth. Theorem <i>korrekte gebruik van Pyth. Stel.</i> ✓ $CE = 4\sqrt{2}$	(4)

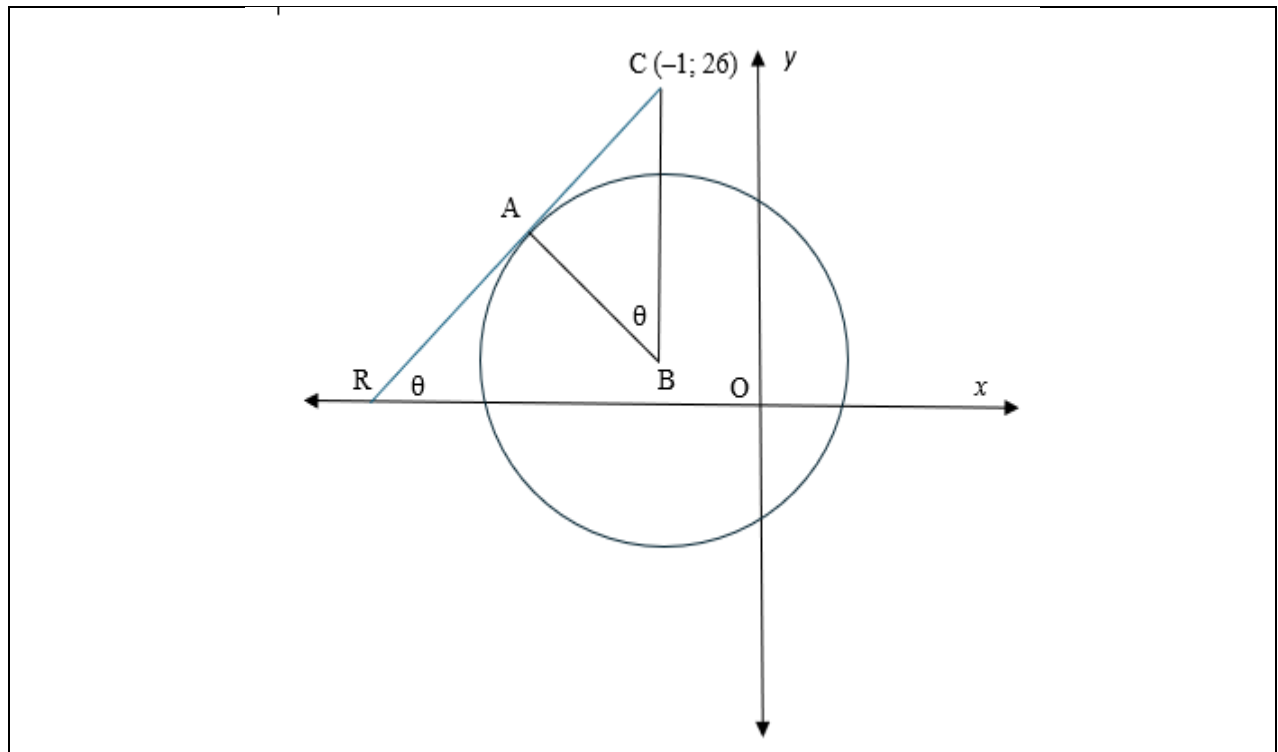
4.5	$D(x; -5)$ $GD \parallel x\text{-axis}$ $m_{AD} = m_{AB}$ collinear points/samelynige punte $\frac{-5-0}{x+1} = -1$ $-x-1 = -5$ $\therefore x = 4$ $D(4; -5)$ OR/OF $D(x; -5)$ $GD \parallel x\text{-axis} / -as$ $m_{BD} = m_{AB}$ collinear points / saamlynige punte $\frac{-2+5}{1-x} = -1$ $x-1 = 3$ $\therefore x = 4$ $D(4; -5)$ OR/OF $\hat{ACE} = 90^\circ$; $D(x; -5)$ and/en $E(7; 0)$ $DE^2 = (x-7)^2 + (-5-0)^2$ $= x^2 - 14x + 74$ $CE^2 = 32$ $CD^2 = (3-x)^2 + (-4+5)^2$ $= 10 - 6x + x^2$ $x^2 - 14x + 74 = -6x + x^2 + 10 + 32$ $-8x = -32$ $x = 4$ $D(4; -5)$	$\checkmark D(x; -5)$ $\checkmark m_{AD} = m_{AB}$ $\checkmark \frac{-5-0}{x+1} = -1$ $\checkmark \therefore x = 4$ OR/OF $\checkmark D(x; -5)$ $\checkmark m_{BD} = m_{AB}$ $\checkmark \frac{-2+5}{1-x} = -1$ $\checkmark \therefore x = 4$ OR/OF $\checkmark$ standard form of DE^2 standaardvorm van DE^2 $\checkmark$ standard form of CD^2 standaardvorm van CD^2 $\checkmark$ simplification vereenvoudiging $\checkmark x = 4$	(4)
4.6	$CD^2 = (7-4)^2 - (4\sqrt{2})^2$ $= 2$ $(x-4)^2 + (y+5)^2 = 2$	$\checkmark CD^2 = 2$ $\checkmark$ LHS of the equation LK van die vergelyking $\checkmark$ RHS of the equation RK van die vergelyking	(3)
			[19]

QUESTION/VRAAG 3

		
3.1	$QR = \sqrt{((5 - (-3))^2 + (-3 - 3)^2)}$ $= \sqrt{64 + 36}$ $= \sqrt{100}$ $= 10 \text{ units}$	✓ substitution/vervanging ✓ answer/antwoord (2) (accept surd or simplified form)
3.2	$M = \left(\frac{-3 + 5}{2}; \frac{3 + (-3)}{2} \right)$ $= (1; 0)$	✓ x value/-waarde ✓ y value/-waarde (2)
3.3	$m_{pm} = \frac{-3 - 0}{-5 - 1}$ $= \frac{-3}{-6}$ $= \frac{1}{2}$ $y - 0 = \frac{1}{2}(x - 1) \quad \text{or} \quad y + 3 = \frac{1}{2}(x + 5)$ $y = \frac{1}{2}x - \frac{1}{2} \quad \quad \quad y = \frac{1}{2}x - \frac{1}{2}$	✓ substitution/vervanging ✓ $m = \frac{1}{2}$ ✓ substitution/vervanging (1 ; 0) or/of (-5 ; -3) ✓ equation/vergelyking (4) (if $c = \frac{-1}{2}$ is determined then give full marks)

3.4	Centre (1 ; 0) $(x-1)^2 + (y-0)^2 = r^2$ sub (5;-3) or/of (-3;3)	$\checkmark (x-1)^2 + (y-0)^2 = r^2$ $\checkmark$ sub (5;-3) or/of (-3;3)
	$(5-1)^2 + (-3-0)^2 = r^2$ or/of $(-3-1)^2 + (3-0)^2 = r^2$ $16+9 = r^2$ $16+9 = r^2$ $r^2 = 25$ $r^2 = 25$ $(x-1)^2 + (y-0)^2 = 25$ $(x-1)^2 + (y-0)^2 = 25$	$\checkmark$ equation/vergeliking (3)
3.5	$MP = \sqrt{(-5-1)^2 + (-3-0)^2}$ $= \sqrt{36+9}$ $= \sqrt{45}$ $= 6,7$ radius < 6,7 $\therefore P$ lies outside circle	$\checkmark$ substitution/vervanging $\checkmark$ answer/antwoord $\checkmark$ conclusion/gevolgtrekking (3)
3.6	$\frac{x+(-5)}{2} = 1$ $\frac{y+(-3)}{2} = 0$ $x-5 = 2$ $y-3 = 0$ $x = 7$ $y = 3$ $S(7:3)$	ANSWER ONLY FULL MARKS/ SLEGS ANTWOORD VOLPUNTE $\checkmark x$ value/-waarde $\checkmark y$ value/-waarde (2)
3.7	$m_{QP} = \frac{-3-3}{-5-(-3)}$ $= 3$ $\tan \theta = 3$ $\theta = 71,57^\circ$ $QPR = \theta = 71,57^\circ$ corres $\angle$'s/ooreenkom $\angle$ 'e $PR \parallel x$ -axis/as	$\checkmark m=3$ $\checkmark \tan \theta = 3$ $\checkmark$ value of θ /waarde van θ $\checkmark$ value of $Q\hat{P}R$ /waarde van $Q\hat{P}R$ (4)
		[20]

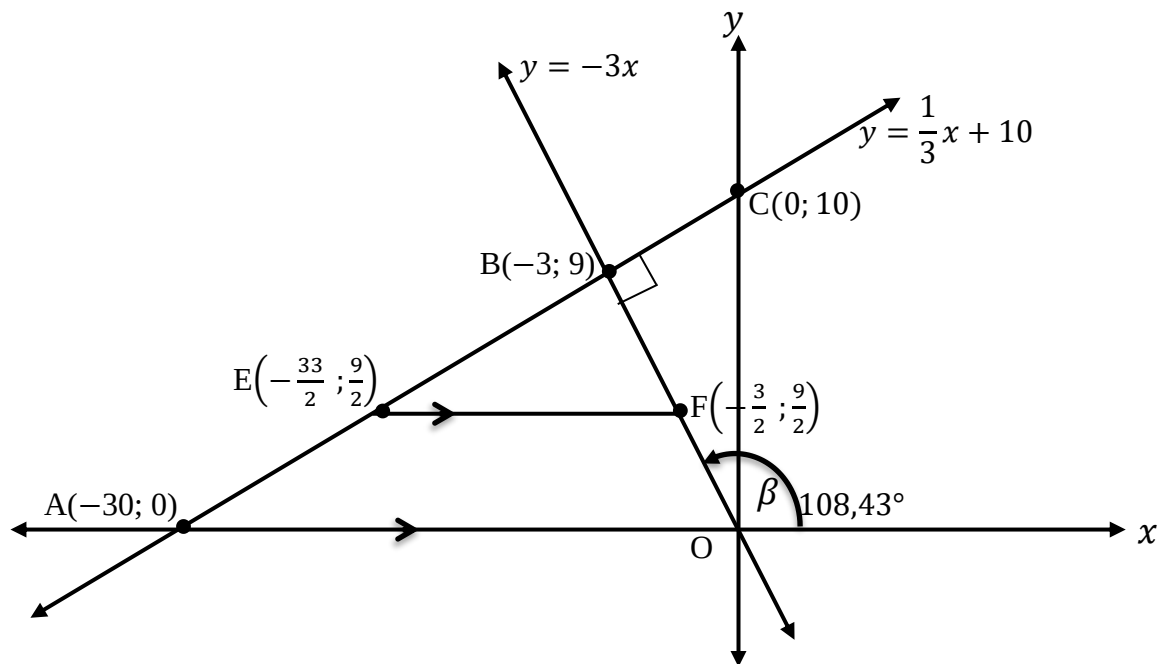
QUESTION/VRAAG 4

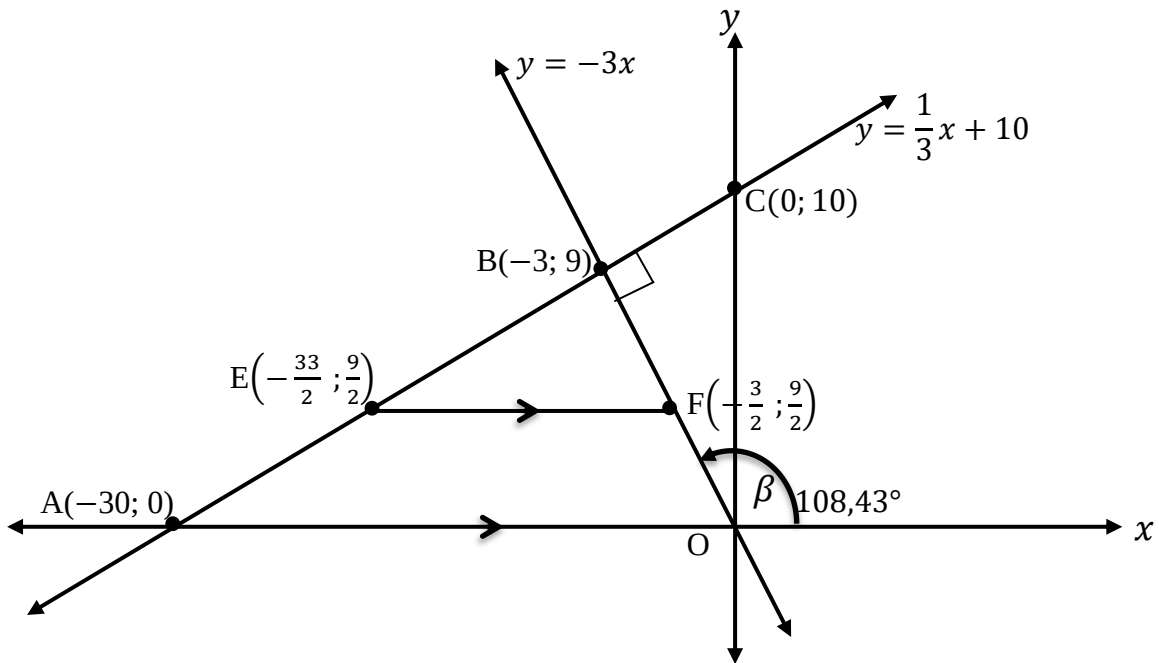


4.1	$CB = 25 \quad CA = 20$ $AB = \sqrt{(25)^2 - (20)^2}$ $= \sqrt{225}$ $= 15$ $\therefore \text{radius} = 15 \text{ units / eenhede}$	✓ value of CB/waarde van CB ✓ substitution/vervanging ✓ simplification/vereenvoudiging ✓ value of AB/waarde van AB (4)
4.2	$(x + 1)^2 + (y - 1)^2 = 225$	✓ $(x + 1)^2 + (y - 1)^2$ ✓ value/waarde of r^2 (2)
4.3	$m = \tan \theta = \frac{20}{15} = \frac{4}{3} \text{ sub } (-1; 26)$ $y - 26 = \frac{4}{3}(x + 1)$ $y = \frac{4}{3}x + 27\frac{1}{3}$	✓ value of $\tan \theta$ /waarde van $\tan \theta$ ✓ sub m and point/vervang m en punt ✓ equation/vergelyking (3) (if $c = 27\frac{1}{3}$ is determined give full marks)
4.4	$m_{\tan} = \frac{4}{3} \quad m_{\text{radius}} = \frac{-3}{4}$ $y - 1 = \frac{-3}{4}(x + 1)$ $y = \frac{-3}{4}x + \frac{1}{4}$	✓ value/waarde $m_{\tan}$ ✓ value/waarde m_{radius} ✓ substitution/vervanging of/van $(-1; 1)$ ✓ equation/vergelyking (4)

4.5	$\frac{4}{3}x + 27\frac{1}{3} = \frac{-3}{4}x + \frac{1}{4}$ $\frac{4}{3}x + \frac{3}{4}x = \frac{1}{4} - 27\frac{1}{3}$ $\frac{25}{12}x = -27,08333$ $x = -13$ $y = 10$ $A(-13;10)$	✓ equating/gelykstel ✓ simplification/vereenvoudiging ✓ value of x/waarde van x ✓ value of y/waarde van y (4) [17]
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QUESTION/VRAAG 3

[illegible]

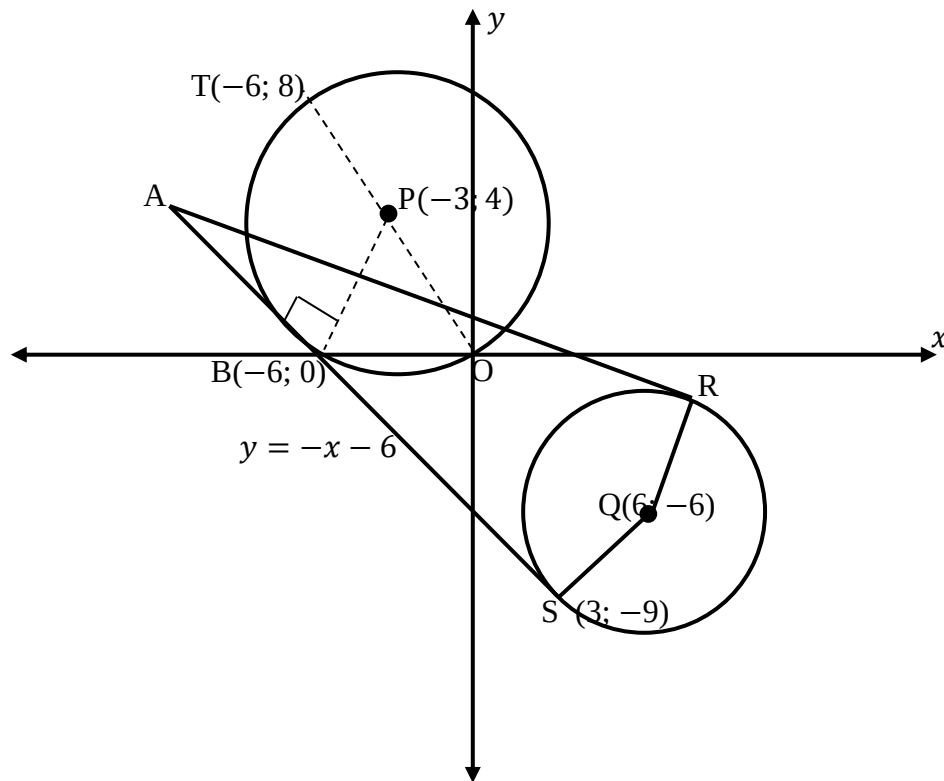


	SOLUTION/OPLOSSING	Mark descriptions Punte omskrywing	Marks Punte
3.3	At B, $\frac{1}{3}x + 10 = -3x$ $x + 30 = -9x$ $10x = -30$ $\therefore x = -3$ $\therefore y = 9 \quad \therefore B(-3; 9)$	$\checkmark$ equate/gelykstel $\checkmark$ x – value/ x - waarde $\checkmark$ y – value/ y - waarde	(3)
3.4	$BO = \sqrt{(0 + 3)^2 + (0 - 9)^2}$ $= 3\sqrt{10}$ BE = EA and/en EF AO $\therefore BF = \frac{1}{2}BO$ (line from midpt to 2 nd side/lyn uit midpt//aan 2de sy) $\therefore BF = \frac{3\sqrt{10}}{2}$ OR/OF	$\checkmark$ correct substitution of B and O korrekte substitusie van B en O $\checkmark$ $BO = 3\sqrt{10}$ $\checkmark$ S $\checkmark$ $BF = \frac{3\sqrt{10}}{2}$	(4)

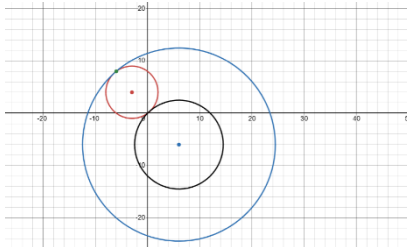
	E is the midpoint of AB and $EF \parallel AO$ <i>E is die midpt van AB en $EF \parallel AO$</i> $\therefore$ F is the midpoint of OB (line from midpt $\parallel$ to 2nd side) <i>$\therefore$ F is die midpt van OB (lyn uit midpt//aan 2de sy)</i> $F\left(\frac{0-3}{2}; \frac{0+9}{2}\right) \therefore F\left(\frac{-3}{2}; \frac{9}{2}\right)$ $BF = \sqrt{\left(-\frac{3}{2} + 3\right)^2 + \left(\frac{9}{2} - 9\right)^2}$ $= \frac{3\sqrt{10}}{2}$ OR/OF $\frac{1}{3}x + 10 = 0$ $x = -30$ $E\left(\frac{-30-3}{2}; \frac{0+9}{2}\right)$ $E = \left(-16\frac{1}{2}; 4\frac{1}{2}\right)$ $F\left(x; \frac{9}{2}\right)$ $y = -3x$ $-3x = \frac{9}{2}$ $x = -\frac{3}{2}$ $F\left(-\frac{3}{2}; \frac{9}{2}\right)$ $BF = \sqrt{\left(-\frac{3}{2} + 3\right)^2 + \left(\frac{9}{2} - 9\right)^2}$ $= \frac{3\sqrt{10}}{2}$	✓ S ✓ coordinates of F <i>koördinate van F</i> ✓ substitution/substitusie ✓ $BF = \frac{3\sqrt{10}}{2}$	(4)
3.5	Area $\Delta CBO = \frac{1}{2} \cdot BC \cdot OB$ Area $\Delta CBO = \frac{1}{2} \cdot (\sqrt{10}) \cdot (3\sqrt{10})$ Area $\Delta CBO = 15$ square units/<i>vierkante eenheid</i> OR/OF	✓ correct use of area formula <i>korrekte gebruik van opp formule</i> ✓ $BC = \sqrt{10}$ ✓ $OB = 3\sqrt{10}$ ✓ answer/antwoord	(4)

	$\widehat{BOC} = 108,43^\circ - 90^\circ$ $= 18,43^\circ$ $BF = \frac{3\sqrt{10}}{2}$ $\text{Area of } \triangle ABC = \frac{1}{2}(BO)(OC) \sin 18,43^\circ$ $= \frac{1}{2}(3\sqrt{10})(10) \sin 18,43^\circ$ $= 15 \text{ units}^2 / \text{eenh}^2$	✓ $18,43^\circ$ ✓ BF ✓ $OC = 10$ ✓ answer/antwoord	(4)
3.6	$\tan \theta = \frac{1}{3}$ $\theta = 18,43^\circ$ $\alpha = 90^\circ - 18,43^\circ$ $= 71,57^\circ$ OR/OF $\widehat{COB} = 108,43^\circ - 90^\circ$ $= 18,43^\circ$ $\alpha = \widehat{BCO} \quad \text{vert opp } \angle\text{'s/regoorst hoeke}$ $\widehat{BCO} = 180^\circ - 90^\circ - 18,43^\circ \quad \text{sum of } \angle\text{'s in } \triangle$ <i>binne \angle'e van \triangle</i> $\therefore \alpha = 71,57^\circ$	✓ $\tan \theta = \frac{1}{3}$ ✓ $\theta = 18,43^\circ$ ✓ answer/antwoord ✓ $108,43^\circ - 90^\circ$ ✓ $18,43^\circ$ ✓ answer/antwoord	(3) (3)
			[18]

QUESTION/VRAAG 4



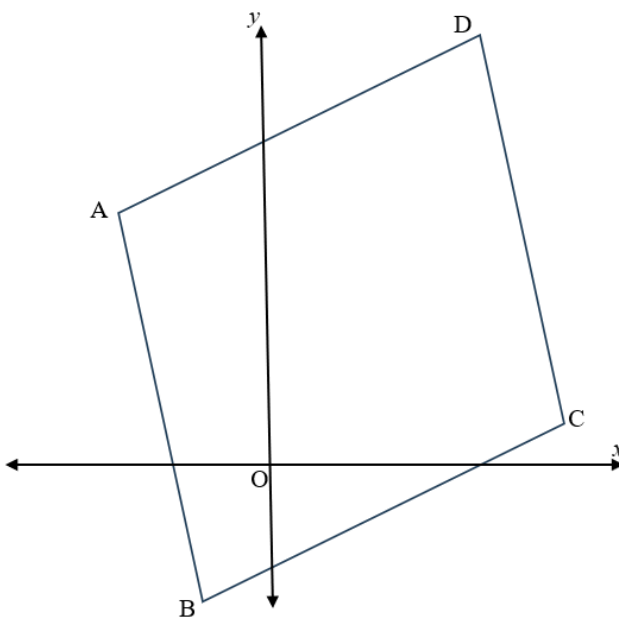
	SOLUTION/OPLOSSING	Mark descriptions Punte omskrywing	Marks Punte
4.1	$r^2 = (-3)^2 + (4)^2$ (Pythagoras) $\therefore r^2 = 25$ $\therefore (x + 3)^2 + (y - 4)^2 = 25$	$\checkmark r^2 = (-3)^2 + (4)^2$ $\checkmark$ value of r^2 / waarde van r^2 $\checkmark$ equation of circle vergelyking van sirkel	(3)
4.2	$x_P = \frac{x_O + x_T}{2}$ $y_P = \frac{y_O + y_T}{2}$ $-3 = \frac{0 + x_T}{2}$ $4 = \frac{0 + y_T}{2}$ $\therefore x_T = -6$ $\therefore y_T = 8$ $\therefore T(-6 ; 8)$	$\checkmark -3 = \frac{0 + x_T}{2}$ $\checkmark 4 = \frac{0 + y_T}{2}$ $\checkmark T(-6 ; 8)$	(3)
4.3	$x^2 - 12x + y^2 + 12y + 54 = 0$ $x^2 - 12x + 36 + y^2 + 12y + 36 = -54 + 36 + 36$ $(x - 6)^2 + (y + 6)^2 = 18$ $\therefore Q(6 ; -6)$	$\checkmark$ completing the square LHS voltooi die vierkant LHS $\checkmark (x - 6)^2 + (y + 6)^2$ $\checkmark Q(6 ; -6)$	(3)

	SOLUTION/OPLOSSING	Mark descriptions Punte omskrywing	Marks Punte
4.4	$m_{QS} = \frac{-6 - (-9)}{6 - 3}$ $\therefore m_{QS} = 1$ $\therefore m_{AS} = -1 \quad (\tan \perp \text{rad/raakl} \perp \text{radius})$ $y - y_1 = -1(x - x_1)$ Subs point/Vervang punt S(3; -9) $y + 9 = -(x - 3)$ $\therefore y = -x - 6$ OR/OF $m_{QS} = \frac{-6 - (-9)}{6 - 3}$ $\therefore m_{QS} = 1$ $\therefore m_{AS} = -1 \quad (\text{tang} \perp \text{rad/raakl} \perp \text{radius})$ $y = -x + c$ Subs point/Vervang punt S (3; -9) $-9 = -3 + c$ $\therefore c = -6 \quad \therefore y = -x - 6$	✓ correct substitution into gradient formula <i>korrekte substitusie</i> ✓ $m_{QS} = 1$ ✓ $m_{AS} = -1$ ✓ substituting point S(3; -9) <i>substitusie van punt</i> ✓ answer/antwoord	(5)
4.5	• $SQ = QR = 3\sqrt{2}$ (radii) • $AS = AR$ (tang from same pt/ <i>rklyne vanuit dieselfde punt</i>) $\therefore$ ASQR is a Kite (two pairs of adjacent sides equal) $\therefore$ ASQR is 'n vlieër (2 pare aangrensende sye is gelyk)	✓ kite/vlieër ✓ reason/rede	(2)
4.6	$PQ = \sqrt{(-3 - 6)^2 + (4 + 6)^2}$ $= \sqrt{181}$  OR/OF $PQ = r_p + k \cdot r_q \quad \text{OR/OF} \quad PQ = r_q - k r_p$ $\sqrt{181} = 5 + \sqrt{18}k \quad \sqrt{181} = \sqrt{18}k - 5$ $\sqrt{18}k = \sqrt{181} - 5 \quad \sqrt{181} + 5 = \sqrt{18}k$ $k = 1,99 \quad k = 4,35$	✓ correct substitution into distance formula <i>korrekte substitusie</i> ✓ length of/lengte van PQ ✓ $k = 1,99$ ✓ $k = 4,35$	(4)
			[20]

NSC – Marking Guidelines/Nasienriglyne

QUESTION 3 / VRAAG 3			
3.1.1	$PQ = \sqrt{(-3-5)^2 + (2-8)^2}$ $PQ = 10$	✓subst into formula / <i>vervang in formule</i> ✓answer / <i>antwoord</i>	(2)
3.1.2	$m(PQ) = \frac{2-8}{-3-5} = \frac{3}{4}$ $\tan \theta = \frac{3}{4}$ $\theta = 36,87^\circ \approx 37^\circ$	✓gradient ✓trig ratio / <i>trig verh</i> ✓answer / <i>antwoord</i>	(3)
3.1.3	$y - y_1 = m(x - x_1)$ midpt: (1 ; 5) $m(PQ) = \frac{3}{4}$ $m(\perp \text{ line}) = -\frac{4}{3}$ $y - 5 = -\frac{4}{3}(x - 1)$ $y - 5 = -\frac{4}{3}x + \frac{4}{3}$ $y = -\frac{4}{3}x + \frac{19}{3}$	✓midpt ✓gradient of $\perp$ bisector / <i>gradiënt midloodlyn</i> ✓subst into formula / <i>vervang in formule</i> ✓simplify/ <i>vereenvoudig</i> ✓answer / <i>antwoord</i>	(5)

NSC – Marking Guidelines/Nasienriglyne

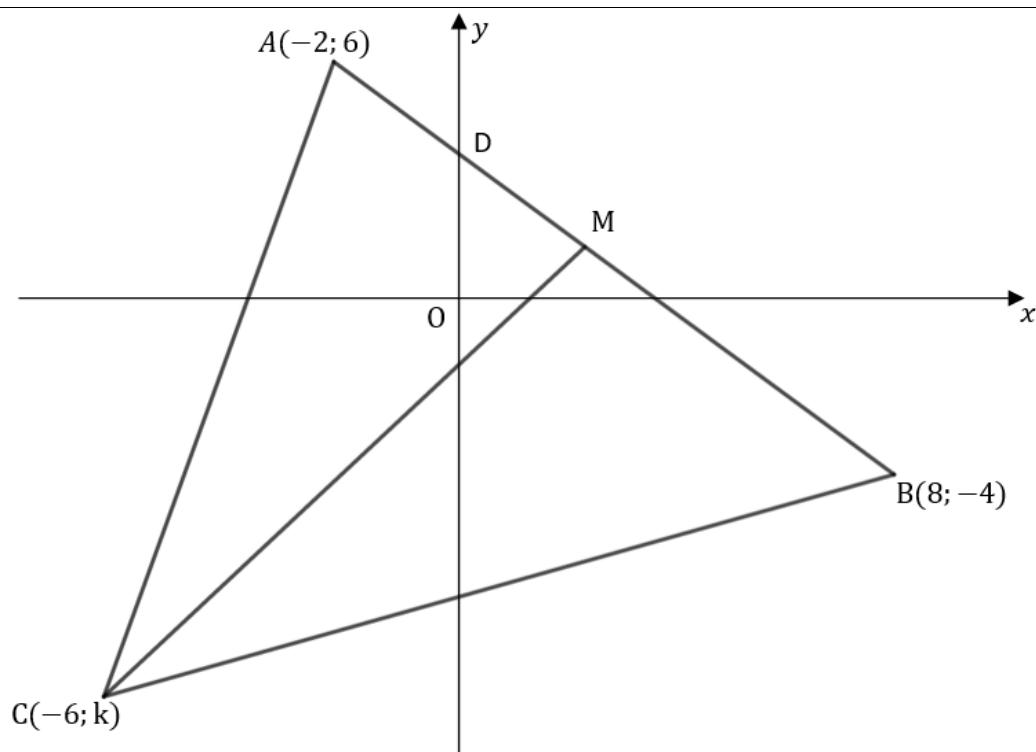
3.2			
3.2.1	$x + 3y = 10$ $3y = -x + 10$ $y = -\frac{1}{3}x + \frac{10}{3}$ $m(AC) = -\frac{1}{3}$ $m(BD) = 3$ point / punt (3 ; 9) $y - 9 = 3(x - 3)$ $y = 3x$	$\checkmark m(AC) = -\frac{1}{3}$ $\checkmark m(BD) = 3$ $\checkmark y = 3x$	(3)
3.2.2	$y = 3x$ ① $x + 3y = 10$ ② ① in ②: $x + 3(3x) = 10$ $x + 9x = 10$ $10x = 10$ $x = 1$ Subst / vervang $x = 1$ in ①: $y = 3(1) = 3$ $K(1 ; 3)$	$\checkmark$ subst ① into ② / vervang ① in ② $\checkmark$ simplify / vereenvoudig $\checkmark x = 1$ $\checkmark y = 3$	(4)
3.2.3	$B(-1 ; -3)$	$\checkmark x$ – value / waarde $\checkmark y$ – value / waarde	(2)

NSC – Marking Guidelines/*Nasienriglyne*

3.2.4	$AD = 5\sqrt{2}$ and / <i>en</i> $x + 3y = 10$ $x = 10 - 3y$ $5\sqrt{2} = \sqrt{(x-3)^2 + (y-9)^2}$ $5\sqrt{2} = \sqrt{(10-3y-3)^2 + (y-9)^2}$ $5\sqrt{2} = \sqrt{(7-3y)^2 + (y-9)^2}$ $5\sqrt{2} = \sqrt{49 - 42y + 9y^2 + y^2 - 18y + 81}$ $50 = 10y^2 - 60y + 130$ $0 = 10y^2 - 60y + 80$ $0 = y^2 - 6y + 8$ $0 = (y-4)(y-2)$ $y = 4$ or / <i>of</i> $y = 2$ $x = -2$ or / <i>of</i> $x = 4$ $A(-2 ; 4)$ $C(4 ; 2)$	$\checkmark$ subst / <i>vervang</i> $5\sqrt{2}$ $\checkmark$ subst / <i>vervang</i> $x = 10 - 3y$ $\checkmark$ simplify / <i>vereenvoudig</i> $\checkmark$ std form / <i>vorm</i> $\checkmark$ factors / <i>faktore</i> $\checkmark$ y – values / <i>waardes</i> $\checkmark$ x – values / <i>waardes</i>	(7)
3.2.5	$A'(4 ; 4)$	$\checkmark$ y – value / <i>waarde</i> $\checkmark$ x – value / <i>waarde</i>	(2)
			[28]

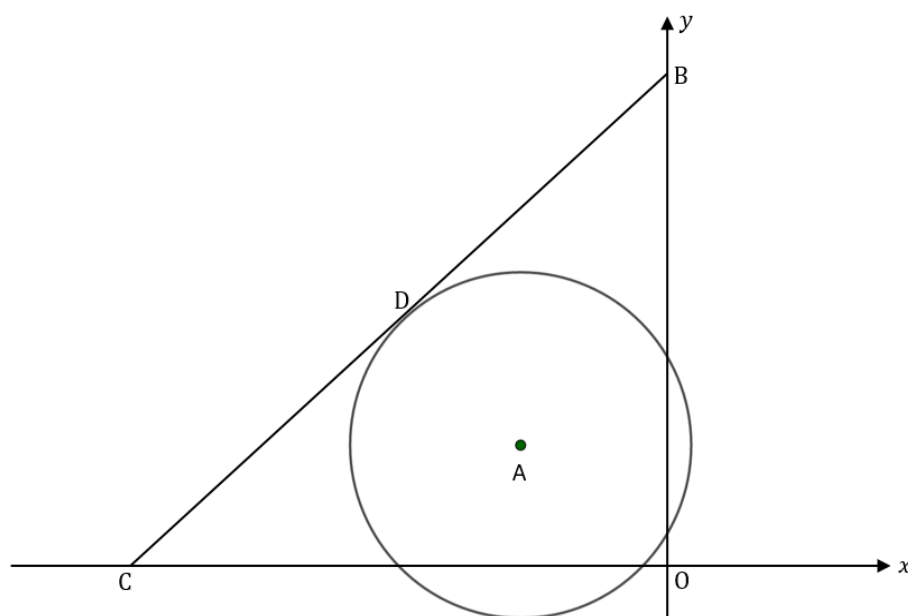
NSC – Marking Guidelines/Nasienriglyne

QUESTION 4 / VRAAG 4			
4.1	$y - y_1 = m(x - x_1) \quad m_1 = -\frac{1}{2} \quad m_2 = 2$ Point / punt $(-4 ; 2)$ $y - 2 = 2(x + 4)$ $y = 2x + 10 \quad \dots\dots\textcircled{1}$ $y = -\frac{1}{2}x + \frac{5}{2} \quad \dots\dots\textcircled{2}$ Subst / vervang $\textcircled{1}$ in $\textcircled{2}$: $2x + 10 = -\frac{1}{2}x + \frac{5}{2}$ $4x + 20 = -x + 5$ $5x = -15$ $x = -3$ $y = 4 \quad \therefore A(-3 ; 4)$	$\checkmark m_2 = 2$ $\checkmark$ equation / vergelyking $\checkmark$ equating / gelykstel $\checkmark x$ -value / waarde $\checkmark y$ -value / waarde	(5)
4.2	$\text{rad} = \sqrt{(-4+3)^2 + (2-4)^2} = \sqrt{5}$ $(x+4)^2 + (y-2)^2 = 5$	$\checkmark \text{rad} = \sqrt{5}$ $\checkmark \text{LHS} / \text{LK} \quad \checkmark \text{RHS} / \text{RK}$	(3)
4.3	y -intercepts at 3 and 5 / y -afsnitte by 3 en 5: $R(a ; 4)$ $(x-a)^2 + (y-4)^2 = 5$ through / deur $(0 ; 3)$ $(0-a)^2 + (3-4)^2 = 5$ $a^2 + 1 = 5$ $a^2 = 4$ $a = \pm 2$ $a = 2 \quad \therefore R(2 ; 4)$	$\checkmark y$ -value / waarde = 4 $\checkmark$ subst point and / vervang punt en $y = 4$ $\checkmark$ simplify / vereenvoudig $\checkmark$ value of / waarde van a	(4)
			[12]

QUESTION 3

3.1	$M\left(\frac{-2+8}{2}; \frac{6-4}{2}\right)$ $M(3; 1)$	✓ substitution ✓ answer	(2)
3.2	$AB = \sqrt{(-2+8)^2 + (6-4)^2}$ $AB = 10\sqrt{2}$ units $10\sqrt{2} = \sqrt{(-6+8)^2 + (k+4)^2}$ $200 = 196 + (k+4)^2$ $4 = k^2 + 8k + 16$ $0 = k^2 + 8k + 12$ $(k+6)(k+2) = 0$ $k = -6$ OR $k \neq -2$	✓ substitution ✓ Length of AB ✓ Equating ✓ Simplification ✓ Factorisation ✓ Conclusion	(6)
3.3	$m_{cm} = \frac{1+6}{3+6} = \frac{7}{9}$ $y = mx + c$ $1 = \frac{7}{9}(3) + c$ $c = \frac{-4}{3}$ $y = \frac{7}{9}x - \frac{4}{3}$	✓ substitution ✓ Gradient ✓ Substitution ✓ Value of c ✓ Equation ✓ Answer	(5)
3.4	(12; 8)	✓ x – value ✓ y-value	(2)

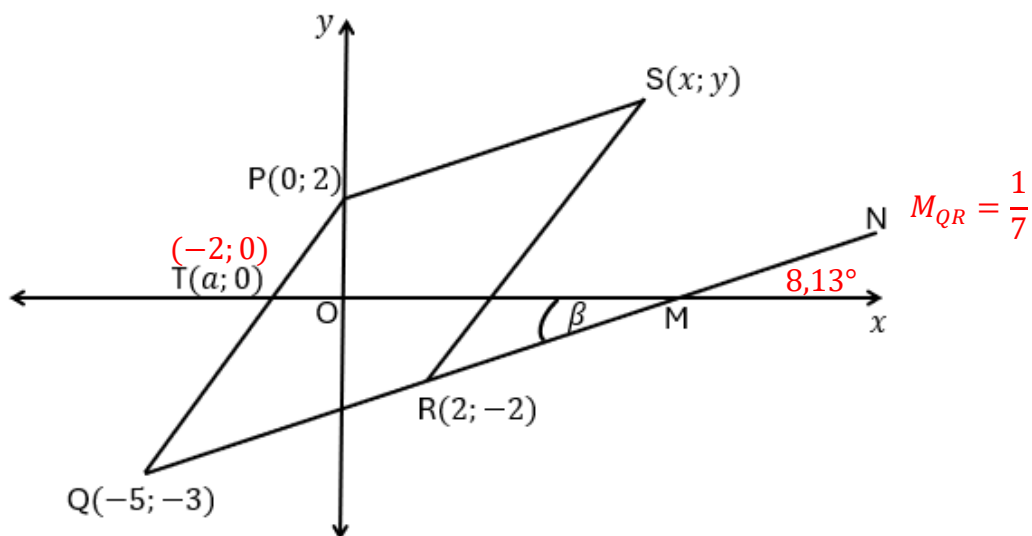
3.5	$2y = mx + 1$ $y = \frac{1}{2}mx + \frac{1}{2}$ $\tan 116,56 = \frac{m}{2}$ $m = -4$ $y = \frac{1}{2}(-4)x + \frac{1}{2}$ $y = -2x + \frac{1}{2}$	✓ dividing by 2 ✓ equation ✓ gradient ✓ equation (4)
3.6	$D(3; 9)$	✓ 3 ✓ 9 (2)
3.7	$m_{AB} = \frac{3 - (-3)}{-5 - (-3)} = -3$ $\tan \beta = -3$ $\beta = 108,43^\circ$ $\tan \alpha = \frac{3}{4}$ $\alpha = 36,87^\circ$ $\hat{B} = 108,43^\circ - 36,87^\circ$ $= 71,56^\circ$ OR $AB = \sqrt{(-5 + 3)^2 + (-3 - 3)^2} = 2\sqrt{10}$ $AC = 10$ and $BC = 10$ $(10)^2 = (10)^2 + (2\sqrt{10})^2 - 2(10)(2\sqrt{10}) \cos B$ $\cos B = \frac{\sqrt{10}}{10}$ $\hat{B} = 71,57^\circ$	✓ $m_{AB} = -3$ ✓ $\tan \beta = -3$ ✓ $108,43^\circ$ ✓ $36,87^\circ$ ✓ answer (5) OR ✓ substitution ✓ $AB = 2\sqrt{10}$ ✓ $AC = 10$ ✓ $\cos B = \frac{\sqrt{10}}{10}$ ✓ answer (5)
3.8	$\text{area } \Delta ABC = \frac{1}{2}(10)(2\sqrt{10}) \sin 71,57^\circ$ $= 30 \text{ units}^2$ OR $h_\perp = 6$ $AC = 10$ $\text{area } \Delta ABC = \frac{1}{2}(10)(6)$ $= 30 \text{ units}^2$	✓ $2\sqrt{10}$ ✓ substitution ✓ answer (3) OR ✓ $h_\perp = 6$ ✓ substitution ✓ answer (3)
		[24]

QUESTION 4

4.1	$x^2 + 6x + (3)^2 + y^2 - 6y + (-3)^2$ $= -1 + (3)^2 + (-3)^2$ $(x + 3)^2 + (y - 3)^2 = 17$ $A(-3; 3)$	$\checkmark (x + 3)^2 + (y - 3)^2$ $\checkmark 17$ $\checkmark x = -3$ $\checkmark y = 3$	(4)
4.2	$r = \sqrt{17}$	$\checkmark$ Answer	
4.3	$m_{rad} = \frac{\frac{31}{5} - 3}{-\frac{28}{5} - (-3)}$ $= -\frac{16}{13}$ $m_{tan} = \frac{13}{16}$ $y = mx + c$ $y = \frac{13}{16}x + c$ $\frac{31}{5} = \frac{13}{16}\left(-\frac{28}{5}\right) + c$ $c = \frac{43}{4}$ $y = \frac{13}{16}x + \frac{43}{4}$	$\checkmark$ Substitution $\checkmark m_{rad} = \frac{13}{16}$ $\checkmark m_{tan} = \frac{13}{16}$ $\checkmark subst \frac{13}{16} \text{ and } D\left(-\frac{28}{5}; \frac{31}{5}\right)$ $\checkmark$ Equation	(5)

4.4	$B\left(0; \frac{43}{4}\right) \Rightarrow OB = \frac{43}{4}$ $0 = \frac{13}{16}x + \frac{43}{4}$ $x = -\frac{172}{13} \Rightarrow OC = \frac{172}{13}$ $\text{Area } \triangle BCO = \frac{1}{2} \left(\frac{172}{13}\right) \left(\frac{43}{4}\right)$ $= \frac{1849}{26} \text{ units}^2$	✓ $OB = \frac{43}{4}$ ✓ $x = -\frac{172}{13}$ ✓ Substitution into area formula ✓ Answer (4)
4.5	$(x+3)^2 + (y-3)^2 = 17$ $(x+3)^2 + (-y-3)^2 = 17$ $(x+3)^2 + (y+3)^2 = 17$ OR $x^2 + 6x + y^2 - 6y = -1$ $x^2 + 6x + y^2 + 6y = -1$	✓ $(y+3)^2$ ✓ Answer (2) OR ✓ $+6y$ ✓ Answer (2)
4.6	Let $y = 0$ $x^2 + 6x = -1$ $x^2 + 6x + 1 = 0$ $x = \frac{-6 \pm \sqrt{(6)^2 - 4(1)(1)}}{2(1)}$ $x = -3 - 2\sqrt{2}$ or $x = -3 + 2\sqrt{2}$ $\text{chord} = -3 + 2\sqrt{2} - (-3 - 2\sqrt{2})$ $= 4\sqrt{2}$	✓ $y = 0$ ✓ Standard form ✓ Substitution ✓ Both solutions ✓ $4\sqrt{2}$ (5)
		[21]

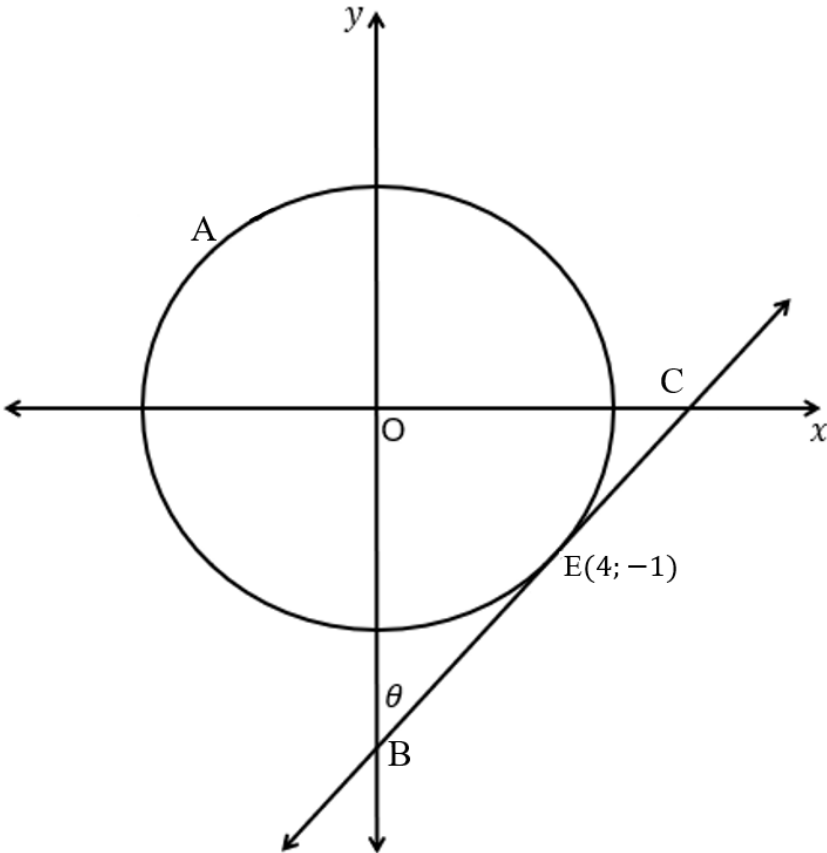
QUESTION 3 / VRAAG 3



3.1	$m_{QR} = \frac{y_2 - y_1}{x_2 - x_1}$ $m_{QR} = \frac{-3 - (-2)}{-5 - 2}$ $m_{QR} = \frac{1}{7}$ AO full marks	✓ Subst. ✓ Answer	(2)
3.2	$\tan \theta = \frac{1}{7}$ $\theta = 8,13^\circ$ $\beta = 8,13^\circ$ AO full marks	✓ $\tan \theta = \frac{1}{7}$ (subs) ✓ $\theta = 8,13^\circ$ ✓ S	(3)
3.3	$m_{PQ} = \frac{-3 - (2)}{-5 - 0}$ $m_{PQ} = 1$ $y - 2 = 1(x - 0)$ $y = x + 2$ $0 = a + 2$ $a = -2$ OR $m_{PQ} = m_{PT}$ $\frac{-3 - (2)}{-5 - 0} = \frac{2 - 0}{0 - a}$ $\frac{-5}{-5} = \frac{2}{-a}$ $a = -2$	✓ $m = 1$ ✓ straight line / subs ✓ $y = 0$ ✓ $a = -2$ ✓ Equation ✓ subs in correct formula ✓ Simplify ✓ $a = -2$	(4)

3.4	$S(0 + 7; 2 + 1)$ $S(7; 3)$	✓ 7 ✓ 3	(2)
3.5	PR: $M_{PR} \left(\frac{0+2}{2}; \frac{2-2}{2} \right) = M_{PR}(1; 0)$ QS: $M_{QS} \left(\frac{-5+7}{2}; \frac{-3+3}{2} \right) = M_{QS}(1; 0)$ $\therefore M_{PR} = M_{QS} = (1; 0)$ $\therefore$ the diagonals bisect each other/ <i>die hoeklyne halveer mekaar.</i>	✓ sub in correct formula ✓ M_{PR} ✓ M_{QS}	(3)
3.6	$PQ = \sqrt{(-5 - 0)^2 + (-3 - 2)^2} = 5\sqrt{2} = \sqrt{50} = 7,07$ $QR = \sqrt{(-5 - 2)^2 + (-3 + 2)^2} = 5\sqrt{2} = \sqrt{50} = 7,07$ $\therefore PQ = QR$ $\therefore PQR$ is an isosceles triangle/ <i>PQR is 'n gelykbenige driehoek</i>	✓ sub in correct formula ✓ PQ ✓ QR	(3)
3.7	Rhombus , parallelogram with one pair adjacent sides = / Ruit , <i>parallelogram met een paar aangrensende sye</i> = OR/ OF Rhombus/ Ruit , $m_{PR} \times m_{QS} = -2 \times \frac{1}{2} = -1$ $\therefore$ diagonals bisect perpendicular / <i>hoeklyne halveer loodreg</i>	✓ Rhombus ✓ Reason ✓ Rhombus ✓ Reason	(2)
3.8	$\beta = 8,13^\circ$ (from 3.2) $m_{PQ} = 1$ (from 3.3) $P\hat{T}M = \tan^{-1} 1$ $P\hat{T}M = 45^\circ$ $\hat{Q} = 45^\circ - 8,13^\circ$ $\hat{Q} = 36,87^\circ$	✓ $m_{PQ} = 1$ ✓ 45° ✓ Answer	(3)
			[22]

QUESTION 4 / VRAAG 4



4.1	$x^2 + y^2 = r^2$ $(4)^2 + (-1)^2 = r^2$ $r^2 = 17$ $r = \sqrt{17}$ AO full marks $x^2 + y^2 = 17$	✓ Subst. ✓ Answer ✓ Answer	(3)
4.2	$\text{Midpoint}_{AE} = \left(\frac{x + 4}{2}; \frac{y - 1}{2}\right)$ $= (0; 0)$ $\frac{x + 4}{2} = 0$ $x = -4$ $\frac{y - 1}{2} = 0$ $y = 1$ AO full marks $A(-4; 1)$	✓ -4 ✓ 1	(2)

4.3	$m_{OE} = \frac{y_2 - y_1}{x_2 - x_1}$ $m_{OE} = \frac{-1 - (0)}{4 - 0}$ $m_{OE} = -\frac{1}{4}$ $m_{BC} \times m_{OE} = -1$ $m_{BC} = 4$ $y - (-1) = 4(x - 4)$ $y = 4x - 16 - 1$ $y = 4x - 17$ OR $m_{OE} = \frac{y_2 - y_1}{x_2 - x_1}$ $m_{OE} = \frac{-1 - (0)}{4 - 0}$ $m_{OE} = -\frac{1}{4}$ $y = 4x + c$ $-1 = 4(4) + c$ $c = -17$ $y = 4x - 17$	✓ Substitute ✓ Answer ✓ subst m_{BC} and $(4; -1)$ ✓ Answer ✓ Substitute ✓ Answer ✓ Subst m_{BC} and $(4; -1)$ ✓ Answer	(4)
4.4	$y = 4x$	✓✓ Answer	(2)
4.5	$OS = 3OE$ $OS^2 = 9OE^2$ $(a - 0)^2 + (b - 0)^2 = 9(17) = 153$ $a^2 + b^2 = 153 \dots \dots \dots (1)$ $M_{OE} = M_{OS} = -\frac{1}{4}$ $\frac{0 - b}{0 - a} = -\frac{1}{4}$ $a = -4b \dots \dots \dots (2)$ Substitute (2) into (1): $(-4b)^2 + b^2 = 153$ $16b^2 + b^2 = 153$ $17b^2 = 153$ $b^2 = 9$ $b = \pm 3$ But $b < 0$ therefor $b = -3$ $a = -4(-3) = 12$ $S(12; -3)$ OR	✓ Distance ✓ 17 ✓ $-\frac{1}{4}$ (CA from 4.3) ✓ a in terms of b ✓ Subst. ✓ Value of b ✓ Value of a	(7)

[illegible]

QUESTION 3

3.1	$m_{BG} = \frac{0-4}{6-(-4)}$ $= \frac{-2}{5}$	✓A substitution in gradient formula ✓CA answer (2)
3.2	Equation of DF: $5y + 2x + 60 = 0$ $5y = -2x - 60$ $y = \frac{-2}{5}x - 12$ BG and DF have equal gradients ($m_{BG} = m_{DF} = \frac{-2}{5}$) Therefore BG $\parallel$ DF.	✓A $y = \frac{-2}{5}x - 12$ ✓A $m_{BG} = m_{DF} = \frac{-2}{5}$ (2)
3.3	D is the point of intersection of AD and DF. $\therefore \frac{1}{2}x + 6 = \frac{-2}{5}x - 12$ $5x + 60 = -4x - 120$ $x = -20$ $y = \frac{1}{2}(-20) + 6$ $= -4$ D(-20; -4)	✓CA equating ✓CA x-coordinate ✓CA substitution ✓CA y-coordinate (4)

3.4	At E: $x = -4$ Substitute in the equation of DF: $y = \frac{-2}{5}(-4) - 12$ $= \frac{-52}{5} = -10,4$ $\therefore BE = 4 - (-10,4)$ $= 14,4 \text{ units}$ OR $5y + 2x + 60 = 0$ $5y + 2(-4) + 60 = 0$ $5y = -52$ $y = -10,4$ $\therefore BE = 4 - (-10,4)$ $= 14,4 \text{ units}$	✓CA substitution ✓CA y-value ✓CA subtraction ✓CA answer (4) OR ✓A substitution ✓CA y-value ✓CA subtraction ✓CA answer (4)
3.5	x-value at D $-(-4)$ $= -20 - (-4) = -16$ $\therefore$ Height of $\triangle BDE = 16$ units Area of $\triangle BDE$ $= \frac{1}{2} \times BE \times \text{height}$ $= \frac{1}{2} \times 14,4 \times 16$ $= 115,2 \text{ units}^2$ Area of parm DJEB $= 2 \times \text{area of } \triangle BDE$ $= 230,4 \text{ units}^2$ OR x-value at D $-(-4)$ $= -20 - (-4) = -16$ $\therefore$ Height of parm DJEB $= 16$ units Area of parm DJEB $= BE \times \text{height}$ $= 14,4 \times 16$ $= 230,4 \text{ units}^2$ OR	✓CA height of $\triangle BDE$ $= 16$ units ✓CA substitution ✓CA area of $\triangle BDE$ ✓CA answer (4) OR ✓CA height of parm DJEB $= 16$ units ✓A formula ✓CA substitution ✓CA answer (4) OR

	$m_{BD} = \frac{1}{2} = \tan \hat{BCG}$ $\hat{BCG} = 26,57^\circ$ $\hat{CBE} = 180^\circ - (90^\circ + 26,57^\circ) \quad [\text{sum of } \angle \text{s of } \Delta]$ $= 63,43^\circ$ $BD = \sqrt{(-4 - (-20))^2 + (4 - (-4))^2}$ $= 8\sqrt{5}$ Area of $\triangle BDE$ $= \frac{1}{2}(BD)(BE)\sin \hat{CBE}$ $= \frac{1}{2}(8\sqrt{5})(14,4)\sin 63,43^\circ$ $= 115,2 \text{ units}^2$ Area of parm DJEB $= 2 \times \text{area of } \triangle BDE$ $= 230,4 \text{ units}^2$	✓CA size of $\hat{CBE}$ ✓CA substitution ✓CA area of $\triangle BDE$ ✓CA answer (4)
[16]		

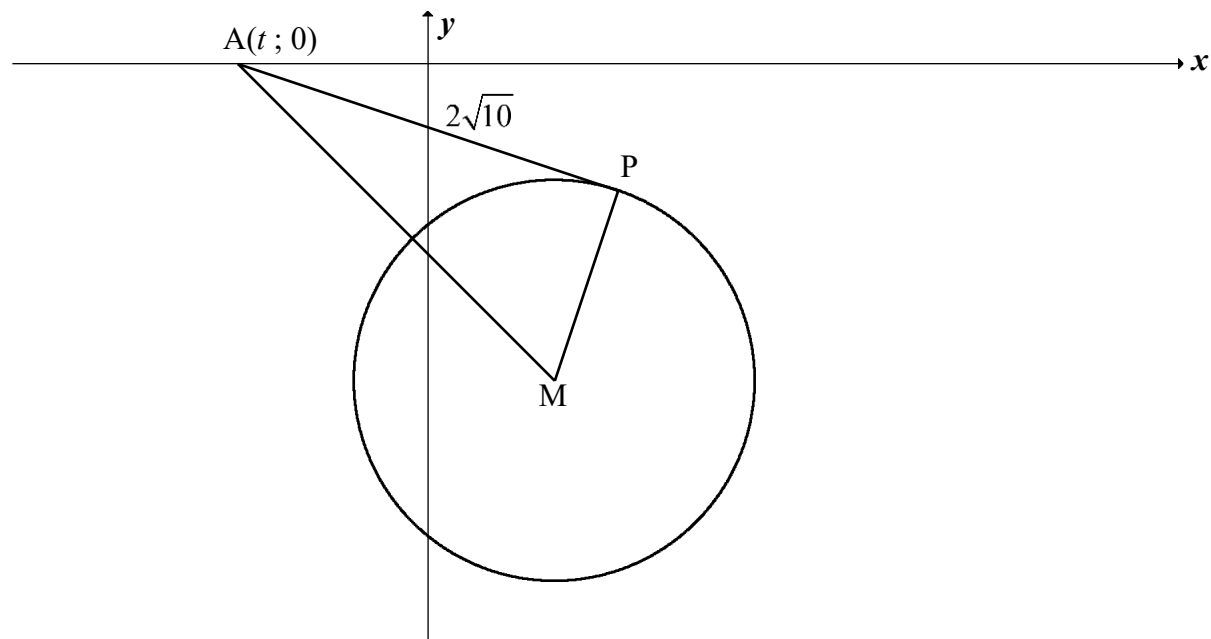
QUESTION 4

4.1.1 (a)	$M(-3; 4)$	✓A answer (1)
4.1.1 (b)	radius = $\sqrt{26} = 5,10$ units	✓A answer (1)
4.1.2	$m_{\text{tangent}} = -\frac{1}{5}$ $\therefore m_{\text{diameter}} = 5$ Substitute m_{diameter} and $M(-3; 4)$: $4 = 5(-3) + c$ $\therefore c = 19$ $y = 5x + 19$	✓A gradient of diameter ✓CA substitution ✓CA answer (3)
4.1.3	$(x+3)^2 + (y-4)^2 = 26$ $(x+3)^2 + (5x+19-4)^2 = 26$ $x^2 + 6x + 9 + 25x^2 + 150x + 225 = 26$ $26x^2 + 156x + 208 = 0$ $x^2 + 6x + 8 = 0$ $(x+4)(x+2) = 0$ $x = -4 \quad \text{or} \quad x = -2$ $y = -1 \quad \text{or} \quad y = 9$ $R(-4; -1)$	✓CA substitution ✓CA simplification ✓CA standard form ✓CA x-values ✓CA y-values ✓CA answer (6)

4.1.4	Substitute $R(-4; -1)$ in $y = -\frac{1}{5}x + k$: $-1 = -\frac{1}{5}(-4) + k$ $k = -1 - \frac{4}{5} = -\frac{9}{5}$	✓CA substitution ✓CA answer (2)
4.1.5	Let the $\angle$ of inclination of QRST = θ $\tan \theta = m_{QRST}$ $= -\frac{1}{5}$ $\therefore \theta = 180^\circ - 11,31^\circ = 168,69^\circ$ $\widehat{OQS} = 180^\circ - 168,69^\circ = 11,31^\circ$ $\therefore \widehat{OQS} = \widehat{OWV}$ $\therefore \text{WVSQ is a cyclic quadrilateral}$ [converse: $\angle$s in the same segment]	✓A $\tan \theta = -\frac{1}{5}$ ✓A $\widehat{OQS} = 11,31^\circ$ ✓A $\widehat{OQS} = \widehat{OWV}$ ✓CA reason (4)
4.2	$x^2 + y^2 + 4x \cos \theta + 8y \sin \theta + 3 = 0$ $= x^2 + 4x \cos \theta + (2 \cos \theta)^2 + y^2 + 8y \sin \theta + (4 \sin \theta)^2 = -3 + 4 \cos^2 \theta + 16 \sin^2 \theta$ $= (x + 2 \cos \theta)^2 + (y + 4 \sin \theta)^2 = -3 + 4 \cos^2 \theta + 16 \sin^2 \theta$ $r^2 = -3 + 4 \cos^2 \theta + 16 \sin^2 \theta$ $= -3 + 4(1 - \sin^2 \theta) + 16 \sin^2 \theta$ $= 1 + 12 \sin^2 \theta$ $0 \leq \sin^2 \theta \leq 1 \text{ for all values of } \theta$ $\therefore r^2 = 1 + 12 \sin^2 \theta \leq 13 \text{ for all values of } \theta$ and $\therefore r \leq \sqrt{13}$ for all values of θ OR $x^2 + y^2 + 4x \cos \theta + 8y \sin \theta + 3 = 0$ $= x^2 + 4x \cos \theta + (2 \cos \theta)^2 + y^2 + 8y \sin \theta + (4 \sin \theta)^2 = -3 + 4 \cos^2 \theta + 16 \sin^2 \theta$ $= (x + 2 \cos \theta)^2 + (y + 4 \sin \theta)^2 = -3 + 4 \cos^2 \theta + 16 \sin^2 \theta$ $r^2 = -3 + 4 \cos^2 \theta + 16 \sin^2 \theta$ $= -3 + 4 \cos^2 \theta + 16(1 - \cos^2 \theta)$ $= 13 - 12 \cos^2 \theta$ $0 \leq \cos^2 \theta \leq 1 \text{ for all values of } \theta$ $\therefore r^2 = 13 - 12 \cos^2 \theta \leq 13 \text{ for all values of } \theta$ and $\therefore r \leq \sqrt{13}$ for all values of θ	✓A completing the square ✓A expression for r^2 ✓A $r^2 = 1 + 12 \sin^2 \theta$ ✓A $\sin^2 \theta \leq 1$ ✓A $r^2 \leq 13$ (5) OR ✓A completing the square ✓A expression for r^2 ✓A $r^2 = 13 - 12 \cos^2 \theta$ ✓A $\cos^2 \theta \geq 0$ ✓A $r^2 \leq 13$ (5)
[22]		

3.4.2	F(0 ; 2,5) G(15 ; 0) <u>Draw EO</u> area OFEG = area $\triangle OFE$ + area $\triangle EOG$ $= \frac{1}{2} \left(\frac{5}{2} \right) (3) + \frac{1}{2} (15)(4)$ $= 3\frac{3}{4} + 30$ $= 33\frac{3}{4} \text{ units}^2$	✓ coordinates of F ✓ coordinates of G ✓ method ✓ area of $\triangle OFE$ ✓ area of $\triangle EOG$ ✓ area of OFEG (6)
3.5.1	Use midpoint of AC: D(2 ; 11)	✓ x ✓ y (2)
3.5.2 (a)	AC = diameter (converse $\angle$ in semi circle) Centre $\left(\frac{-6+6}{2} ; \frac{7+3}{2} \right) = (0 ; 5)$	✓ x ✓ y (2)
3.5.2 (b)	$r = \sqrt{(0-6)^2 + (5-3)^2}$ $= \sqrt{40}$ $x^2 + (y-5)^2 = 40$	✓ subst into distance formula ✓ LHS ✓ RHS (3)
		[24]

QUESTION/VRAAG 4

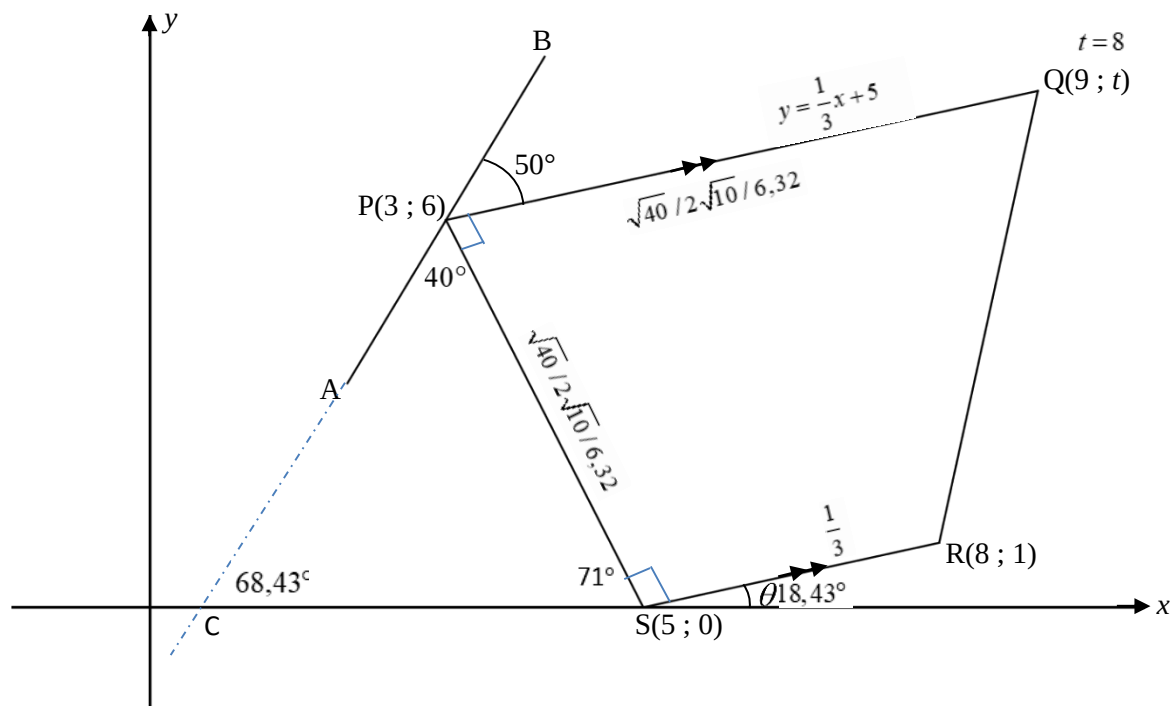


4.1	Radius $\perp$ Tangent	✓ reason (1)
4.2.1	$x^2 - 4x + 4 + y^2 + 10y + 25 = -19 + 4 + 25$ $(x - 2)^2 + (y + 5)^2 = 10$ $\therefore M(2 ; -5)$ OR/OF $M\left(-\frac{1}{2}(-4) ; -\frac{1}{2}(10) \right)$ $\therefore M(2 ; -5)$ Need to show some calculation	✓ LHS & RHS ✓ x ✓y (3) ✓ using formula ✓ x ✓y (3)
4.2.2	$r = \sqrt{2^2 + (-5)^2 - 19}$ $= \sqrt{10}$ Answer only: Full Marks/ Slegs antwoord: Volpunte	✓ answer/antwoord (1)
4.3	$AM^2 = AP^2 + MP^2 \text{ (Pyth th)}$ $(t - 2)^2 + (0 + 5)^2 = (2\sqrt{10})^2 + (\sqrt{10})^2$ $t^2 - 4t + 4 + 25 = 40 + 10$ $t^2 - 4t - 21 = 0$ $(t - 7)(t + 3) = 0$ $\therefore t = -3 \text{ (given)}$	✓ subst into distance formula ✓ correct use of Pyth th ✓ standard form ✓ factors (4)

4.4.1	$y = -5 - 3$ $= -8$ $\therefore N(5 ; -8)$	✓ substitution ✓ y-value of N (2)
4.4.2	$MN = \sqrt{(-5 - (-8))^2 + (2 - 5)^2}$ $= 3\sqrt{2} = 4,24 \text{ units}$ Radius of circle N = $\sqrt{40} = 2\sqrt{10} = 6,32 \text{ units}$ Sum of two radii = $\sqrt{10} + \sqrt{40} = 3\sqrt{10} = 9,49 \text{ units}$ $\therefore MN < \text{sum of 2 radii}$ $\therefore 2 \text{ circles intersect}$	✓ subst into distance formula ✓ MN ✓ radius of N ✓ sum of radii ✓ answer (5)
		[16]

[8]

QUESTION/VRAAG 3



3.1	$m_{SR} = \frac{1-0}{8-5}$ $= \frac{1}{3}$	✓ subst./vervang ✓ answer/antwoord (2)
3.2	Equation/Vergelyking: PQ $m_{PQ} = m_{SR} = \frac{1}{3}$ $P(3;6):$ $6 = \left(\frac{1}{3}\right)(3) + c$ CA from 3.1 only if gradient is + $\therefore c = 5$ $\therefore y = \frac{1}{3}x + 5$	✓ $m_{PQ} = m_{SR} = \frac{1}{3}$ ✓ subst. coordinates of/ vervang koördinate van P ✓ equation of PQ/ vergelyking van PQ (3)
3.3	$Q(9;t) \text{ in } y = \frac{1}{3}x + 5$ $t = \frac{1}{3}(9) + 5$ CA from 3.2 only if gradient is + $t = 8$	✓ subst. coordinates of/ vervang koördinate van P ✓ value of/ waarde van y (2)
3.4	$PQ = \sqrt{(3-9)^2 + (6-8)^2}$ $PQ = \sqrt{36+4}$ $PQ = \sqrt{40} / 2\sqrt{10} / 6,32$	✓ subst. coordinates in correct formula/ vervang koördinate in korrekte formule ✓ answer/antwoord

		(2)
3.5	$m_{PS} = \frac{6-0}{3-5} = \frac{6}{-2} = -3$ $m_{SR} = \frac{1}{3}$ $m_{PS} \times m_{RS}$ $= -3 \times \frac{1}{3}$ $= -1$ $\therefore PS \perp SR$	$\checkmark m_{PS} = -3$ $m_{PS} \times m_{RS}$ $\checkmark = -3 \times \frac{1}{3}$ $= -1$ $\checkmark$ conclusion/gevolgtrekking
3.6	$SR = \sqrt{(8-5)^2 + (1-0)^2} \quad PS = \sqrt{(5-3)^2 + (0-6)^2}$ $SR = \sqrt{9+1} \quad PS = \sqrt{4+36}$ $SR = \sqrt{10} / 3,16 \quad PS = \sqrt{40} / 2\sqrt{10} / 6,32$ $\text{area of trapezium/ oppv van trapesium} = \frac{1}{2}(PQ + RS) \cdot PS$ $= \frac{1}{2}(\sqrt{40} + \sqrt{10}) \times \sqrt{40}$ $= 30 \text{ square units / vierkante eenhede}$	$\checkmark SR$ $\checkmark PS$ $\checkmark \text{ area of trapezium/ oppv van trapezium}$ $\checkmark \sqrt{40}$ $\checkmark \sqrt{10}$ $\checkmark \text{ answer/antwoord}$
Please note: Shoe-lace method is not in CAPS. Answer (ACC) only is 6/6		(6)
3.7	$\tan \theta = \frac{1}{3}$ CA from 3.1 only if gradient is + $\therefore \theta = 18,43^\circ$ Answer only: full marks	$\checkmark \tan \alpha = m_{SR}$ $\checkmark \text{ answer/antwoord}$

(2)

4.1	A (-1; -1)	✓ answer/antwoord (1)
4.2	$\hat{ADC} = 90^\circ$ (line from centre bisect cord / <i>mdpt</i> $\square$; <i>mdpt koord</i>) FGC is a tangent to circle B / 'n raaklyn aan sirkel B $\therefore \hat{BCG} = 90^\circ$ (tan $\perp$ chord / <i>rklyn</i> $\perp$ <i>rad</i>) $m_{BC} = \frac{2-1}{3-4}$ $= -1$ $\therefore m_{AD} = -1$ CA only if BC gradient is - $\perp m_{FC} = 1$ $1 = 1(4) + c$ C (4;1): $c = -3$ $\therefore y = x - 3$	✓ $m_{BC} = -1$ ✓ $m_{FC} = 1$ ✓ equation of FC/ <i>vergelyking van FC</i> (4)
4.3	$\hat{ADF} = 90^\circ$ $FD^2 = 3^2 - \left(\frac{\sqrt{10}}{2}\right)^2$ (<i>pyth</i>) $FD^2 = 9 - \frac{10}{4}$ $FD = \sqrt{6\frac{1}{2}} = \frac{\sqrt{26}}{2} / 2,55$ $FD = DG$ $\therefore FG = 2 \times \frac{\sqrt{26}}{2}$ $\therefore FG = \sqrt{26} / 5,10$	✓ radii ✓ subst. in pyth formula/ <i>vervang in pyth formule</i> ✓ $FD = \frac{\sqrt{26}}{2} / 2,55$ ✓ $FG = \sqrt{26} / 5,10$ (4)
4.4	$AB = \sqrt{(-1-3)^2 + (-1-2)^2}$ $AB = \sqrt{16+9}$ $AB = 5$ Answer only – full marks	✓ subst. coordinates in correct formula/ <i>vervang koördinate in</i> <i>korrekte formule</i> ✓ answer/antwoord (2)
4.5	$BK = AB - AK$ $BK = 5 - 3$ $BK = 2$ $(x-3)^2 + (y-2)^2 = 4$ Answer only – full marks	✓ $BK = 2$ ✓ subst. coordinates in correct formula/ <i>vervang koördinate in</i> <i>korrekte formule</i> ✓ $r^2 = 4$ (3)
		[14]