

NOTE:

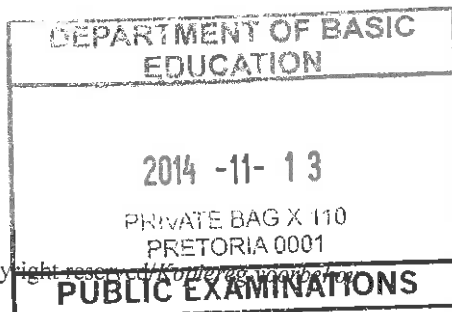
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of the marking memorandum.
- Assuming answers/values in order to solve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

NOTA:

- *As 'n kandidaat 'n vraag TWEEKEER beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n poging om die vraag te beantwoord, doodgetrek het en nie dit oorgedoen het nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienmemorandum toegepas.*
- *Aanvaarding van antwoorde/waardes om 'n probleem op te los, is ONaanvaarbaar.*

QUESTION/VRAAG 1

1.1	$\bar{x} = \frac{816}{12} = 68$	✓ $\frac{816}{12}$ ✓ 68 (2)
1.2	$\sigma = 18,42$	✓ answer/antw (1)
1.3	$(68 - 18,42 ; 68 + 18,42) = (49,58 ; 86,42)$ ∴ 6 candidates had a mark within one standard deviation of the mean/6 kandidate het 'n punt binne een standaardafwyking vanaf die gemiddelde.	✓✓ interval ✓ answer/antw (3)
1.4	$a = 22,828... = 22,83$ $b = 0,66429... = 0,66$ ∴ $\hat{y} = 0,66x + 22,83$ OR/OF $\hat{y} = 22,83 + 0,66x$	✓ value of a/ waarde van a ✓ value of b/ waarde van b ✓ equation/vgl (3)
1.5	$\hat{y} = 0,66x + 22,83$ $y = 0,66(60) + 22,83$ $62,43... \% \approx 62\%$ OR/OF $62,69\% \approx 63\%$	✓ subs of 60 into equation ✓ answer/antw (2) ✓✓ answer/antw (2)
1.6	(82 ; 62)	✓ answer/antw (1) [12]



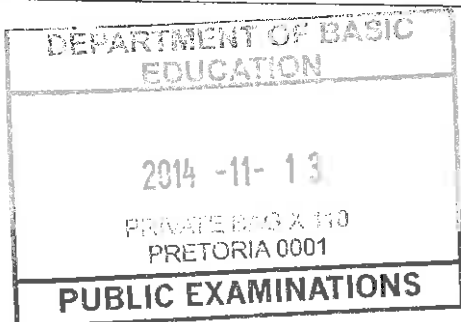
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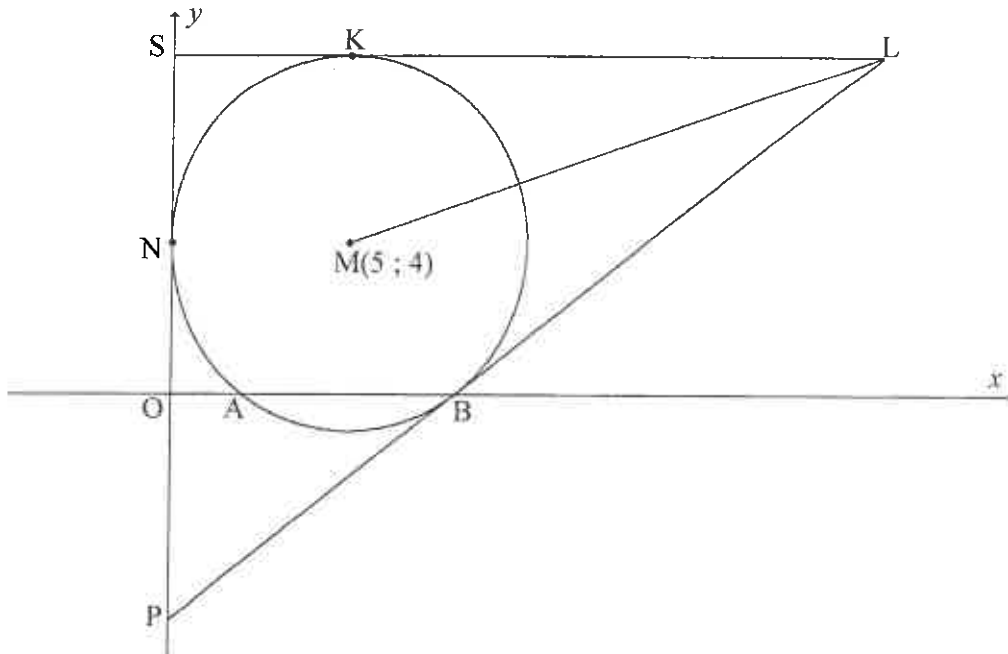
QUESTION/VRAAG 2

2.1	$50 < x \leq 60$ OR/OF $50 \leq x < 60$ OR/OF between 50 and 60/ <i>tussen 50 en 60</i>	✓ answer/antw (1)																											
2.2.1	<table border="1"> <thead> <tr> <th>Class <i>Klas</i></th> <th>Frequency <i>Frekwensie</i></th> <th>Cumulative frequency <i>Kumulatiewe frekwensie</i></th> </tr> </thead> <tbody> <tr><td>$20 < x \leq 30$</td><td>1</td><td>1</td></tr> <tr><td>$30 < x \leq 40$</td><td>7</td><td>8</td></tr> <tr><td>$40 < x \leq 50$</td><td>13</td><td>21</td></tr> <tr><td>$50 < x \leq 60$</td><td>17</td><td>38</td></tr> <tr><td>$60 < x \leq 70$</td><td>9</td><td>47</td></tr> <tr><td>$70 < x \leq 80$</td><td>5</td><td>52</td></tr> <tr><td>$80 < x \leq 90$</td><td>2</td><td>54</td></tr> <tr><td>$90 < x \leq 100$</td><td>1</td><td>55</td></tr> </tbody> </table>	Class <i>Klas</i>	Frequency <i>Frekwensie</i>	Cumulative frequency <i>Kumulatiewe frekwensie</i>	$20 < x \leq 30$	1	1	$30 < x \leq 40$	7	8	$40 < x \leq 50$	13	21	$50 < x \leq 60$	17	38	$60 < x \leq 70$	9	47	$70 < x \leq 80$	5	52	$80 < x \leq 90$	2	54	$90 < x \leq 100$	1	55	✓ 8 ✓ 55 (2)
Class <i>Klas</i>	Frequency <i>Frekwensie</i>	Cumulative frequency <i>Kumulatiewe frekwensie</i>																											
$20 < x \leq 30$	1	1																											
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$60 < x \leq 70$	9	47																											
$70 < x \leq 80$	5	52																											
$80 < x \leq 90$	2	54																											
$90 < x \leq 100$	1	55																											
2.2.2		✓ grounding at (20 ; 0)/ <i>anker by (20 ; 0)</i> ✓ plotting at upper limits/ <i>plot by boonste limiete</i> ✓ smooth shape of curve/ <i>gladde kurwe</i> (3)																											
2.3	55 – 44 (accept/ <i>aanvaar</i> 43 – 45) ≈ 11 motorists/ <i>motoriste</i> (accept/ <i>aanvaar</i> 10 – 12 motorists/ <i>motoriste</i>)	✓ 44 ✓ 11 (2) [8]																											

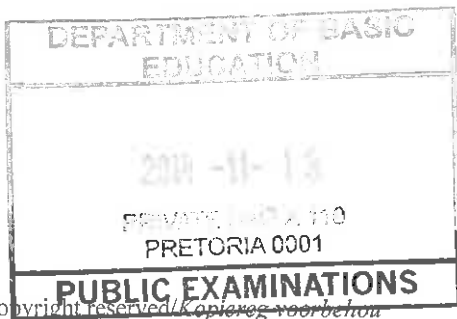


M/HH PP
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QUESTION/VRAAG 3



3.1	$r = MN = 5$	✓ answer/antw (1)	
3.2	$(x - 5)^2 + (y - 4)^2 = 25$	✓ equation/vgl (1)	
3.3	$A(x; 0)$ $(x - 5)^2 + (0 - 4)^2 = 25$ $x^2 - 10x + 25 + 16 = 25$ $x^2 - 10x + 16 = 0$ $(x - 8)(x - 2) = 0$ $\therefore x = 8$ or/of $x = 2$ $\therefore A(2; 0)$	$(x - 5)^2 + (0 - 4)^2 = 25$ $(x - 5)^2 + 16 = 25$ $(x - 5)^2 = 9$ $(x - 5) = \pm 3$ $\therefore x = 8$ or/of $x = 2$ $\therefore A(2; 0)$	✓ substitute into eq/ vervang in vgl $y = 0$ ✓ standard form/ standaardvorm or perfect square form/kwadr vorm ✓ answer/antw (3)
3.4.1	$m_{MB} = \frac{4 - 0}{5 - 8}$ $= -\frac{4}{3}$	✓ subst M and B into form/vervang M and B in form ✓ $m_{MB} = -\frac{4}{3}$ (2)	



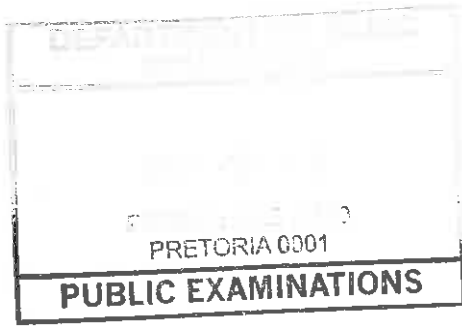
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3.4.2	$m_{MB} \times m_{PB} = -1$ (tangent \perp radius/ rkl \perp radius) $m_{PB} = \frac{3}{4}$ $y = \frac{3}{4}x + c$ OR/OF $y - y_1 = \frac{3}{4}(x - x_1)$ $0 = \frac{3}{4}(8) + c$ $y - 0 = \frac{3}{4}(x - 8)$ $y = \frac{3}{4}x - 6$ $y = \frac{3}{4}x - 6$	$m_{MB} \times m_{PB} = -1$ $m_{PB} = \frac{3}{4}$ \checkmark equation/vgl (3)
3.5	$y_K = y_M + r = 4 + 5$ $y = 9$	\checkmark 9 \checkmark equation/vgl (2)
3.6	At/By L: $\frac{3}{4}x - 6 = 9$ $3x - 24 = 36$ $3x = 60$ $x = 20$ $\therefore L(20 ; 9)$	\checkmark equating simultaneously \checkmark simplification (2)
3.7	$L(20 ; 9)$ $ML = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ OR/OF $ML = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(20 - 5)^2 + (9 - 4)^2}$ $= \sqrt{(15)^2 + (5)^2}$ $= \sqrt{225 + 25}$ $= \sqrt{(5)^2(9 + 1)}$ $= \sqrt{250}$ or / of $5\sqrt{10}$ $= \sqrt{250}$ or / of $5\sqrt{10}$	\checkmark correct subst into distance formula/ korrekte subst in afstand-formule \checkmark answer in surd form/antw in wortelvorm (2)
3.8	$MK \perp KL$ OR/OF $\hat{MKL} = 90^\circ$ (radius \perp tangent/radius \perp rkl) $\therefore ML$ is a diameter as it subtends a right angle/ ML is middellyn $r = \frac{ML}{2} = \frac{\sqrt{250}}{2} = \sqrt{\frac{125}{2}}$ or 7,91 Centre of circle = midpoint of ML /Midpt van sirkel = midpt v ML $x = \frac{5 + 20}{2} = \frac{25}{2} = 12,5$ $y = \frac{4 + 9}{2} = \frac{13}{2} = 6,5$ Centre/midpt: (12,5 ; 6,5) Equation of the circle KLM /Vgl van sirkel KLM : $\therefore (x - 12,5)^2 + (y - 6,5)^2 = \frac{250}{4} = \frac{125}{2} = 62,5$ OR/OF	\checkmark S \checkmark value of/waarde van r \checkmark $x = 12,5$ \checkmark $y = 6,5$ \checkmark answer in correct form/ antw in korrekte vorm (5)

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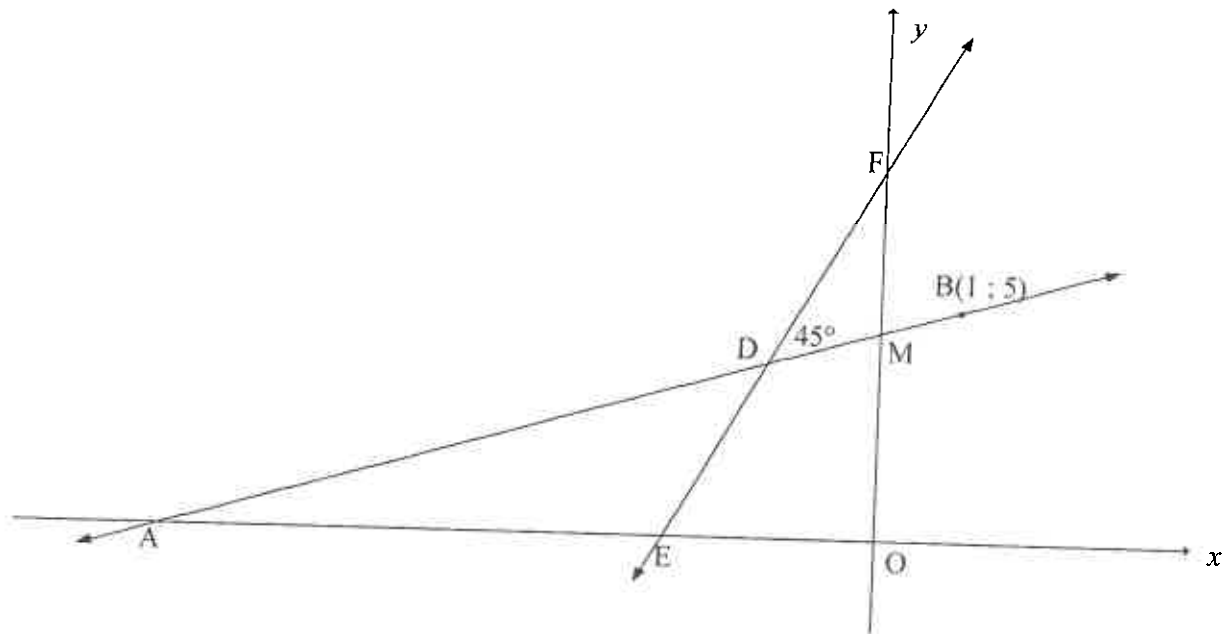
<p>MK ⊥ KL OR/OF $\hat{M}\hat{K}\hat{L} = 90^\circ$ (radius ⊥ tangent/radius ⊥ rkl) ∴ ML is a diameter as it subtends a right angle/ML is middellyn Centre of circle = midpoint of ML/Midpt van sirkel = midpt v ML $x = \frac{5+20}{2} = \frac{25}{2} = 12,5$ $y = \frac{4+9}{2} = \frac{13}{2} = 6,5$ Centre/midpt: (12,5 ; 6,5) Equation of the circle KLM /Vgl van sirkel KLM: $(x-12,5)^2 + (y-6,5)^2 = r^2$ subst (5 ; 4): $(5-12,5)^2 + (4-6,5)^2 = r^2$ $62,5 = r^2$ $\therefore (x-12,5)^2 + (y-6,5)^2 = \frac{250}{4} = \frac{125}{2} = 62,5$</p> <p>OR/OF</p> <p>By symmetry about LM/deur simmetrie om LM: MK ⊥ KL OR/OF $\hat{M}\hat{K}\hat{L} = 90^\circ$ (radius ⊥ tangent/radius ⊥ rkl) ∴ ML is a diameter as it subtends a right angle/ML is middellyn ML is a diameter /ML is 'n middellyn $r = \frac{ML}{2} = \frac{\sqrt{250}}{2} = \frac{\sqrt{125}}{\sqrt{2}}$ or/of 7,91 Centre of circle = midpoint of ML/Midpt van sirkel = midpt v ML $x = \frac{5+20}{2} = \frac{25}{2} = 12,5$ $y = \frac{4+9}{2} = \frac{13}{2} = 6,5$ Centre/midpt: (12,5 ; 6,5) Equation of the circle KLM /Vgl van sirkel KLM: $\therefore (x-12,5)^2 + (y-6,5)^2 = \frac{250}{4} = \frac{125}{2} = 62,5$</p>	<p>✓ S</p> <p>✓ $x = 12,5$ ✓ $y = 6,5$</p> <p>✓ value of/waarde van r^2</p> <p>✓ answer in correct form/antw in korrekte vorm (5)</p>
<p>MK ⊥ KL OR/OF $\hat{M}\hat{K}\hat{L} = 90^\circ$ (radius ⊥ tangent/radius ⊥ rkl) ∴ ML is a diameter as it subtends a right angle/ML is middellyn ML is a diameter /ML is 'n middellyn $r = \frac{ML}{2} = \frac{\sqrt{250}}{2} = \frac{\sqrt{125}}{\sqrt{2}}$ or/of 7,91 Centre of circle = midpoint of ML/Midpt van sirkel = midpt v ML $x = \frac{5+20}{2} = \frac{25}{2} = 12,5$ $y = \frac{4+9}{2} = \frac{13}{2} = 6,5$ Centre/midpt: (12,5 ; 6,5) Equation of the circle KLM /Vgl van sirkel KLM: $\therefore (x-12,5)^2 + (y-6,5)^2 = \frac{250}{4} = \frac{125}{2} = 62,5$</p>	<p>✓ S</p> <p>✓ value of/waarde van r</p> <p>✓ $x = 12,5$ ✓ $y = 6,5$</p> <p>✓ answer in correct form/antw in korrekte vorm (5)</p> <p>[21]</p>



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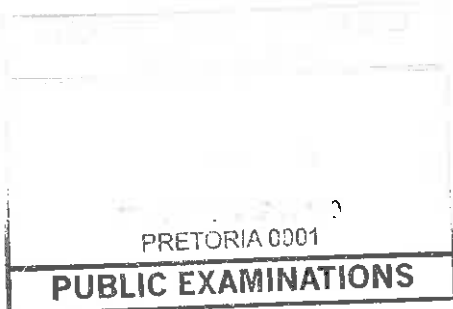
QUESTION/VRAAG 4



4.1	$y = 0: 3x + 8 = 0$ $x = -\frac{8}{3}$ $\therefore E\left(-2\frac{2}{3}; 0\right) \text{ OR/OF } E\left(-\frac{8}{3}; 0\right)$	✓ y-value/waarde ✓ x-value/waarde	(2)
4.2	$\tan \hat{DÊO} = m_{DE} = 3$ $\therefore \hat{DÊO} = 71,565\dots = 71,57^\circ$ $\hat{DÂE} = 71,565\dots^\circ - 45^\circ$ $= 26,57^\circ$	✓ $\tan \hat{DÊO} = 3$ ✓ $71,565\dots^\circ$ ✓ $26,57^\circ$	(3)
4.3	$m_{AB} = \tan 26,57^\circ$ $= \frac{1}{2}$ $y = \frac{1}{2}x + c \quad \text{OR/OF} \quad y - y_1 = \frac{1}{2}(x - x_1)$ $5 = \frac{1}{2}(1) + c \quad y - 5 = \frac{1}{2}(x - 1)$ $y = \frac{1}{2}x + 4\frac{1}{2} \quad y = \frac{1}{2}x + \frac{9}{2}$	✓ $m_{AB} = \tan 26,57^\circ$ ✓ $m_{AB} = \frac{1}{2}$ ✓ subst of m and $(1; 5)$ into formula/ subst m en $(1; 5)$ in formule ✓ equation/vgl	(4)

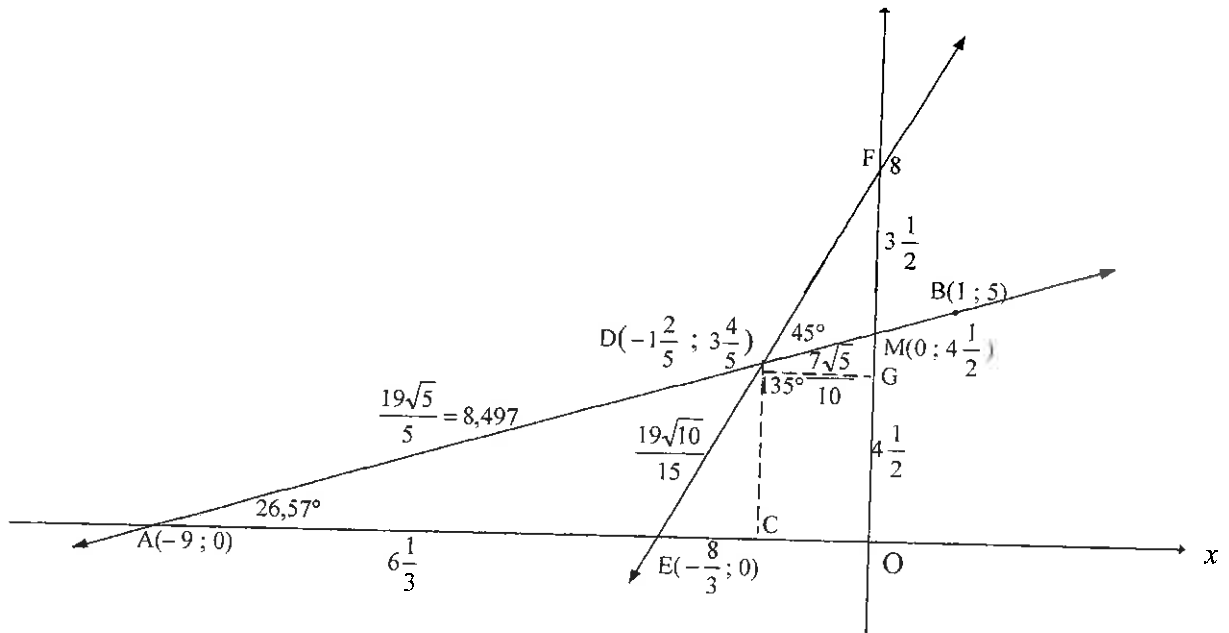
<p>4.4</p> <p>Solve $x - 2y + 9 = 0$ and $y = 3x + 8$ simultaneously:</p> $x - 2(3x + 8) + 9 = 0$ $x - 6x - 16 + 9 = 0$ $-5x = 7$ $x = -1\frac{2}{5}$ $\therefore y = 3(-1\frac{2}{5}) + 8 \quad \text{OR/OF} \quad -1\frac{2}{5} - 2y + 9 = 0$ $y = 3\frac{4}{5} \qquad \qquad \qquad y = 3\frac{4}{5}$ $\therefore D(-1\frac{2}{5}; 3\frac{4}{5})$ <p>OR/OF</p> $x = 2y - 9$ $y = 3(2y - 9) + 8$ $y = 6y - 27 + 8$ $\therefore y = 3\frac{4}{5}$ $x = 2(3\frac{4}{5}) - 9 \quad \text{OR/OF} \quad 3\frac{4}{5} = 3x + 8$ $x = -1\frac{2}{5} \qquad \qquad \qquad x = -1\frac{2}{5}$ $\therefore D(-1\frac{2}{5}; 3\frac{4}{5})$ <p>OR/OF</p> $3x + 8 = \frac{1}{2}x + 4\frac{1}{2}$ $6x + 16 = x + 9$ $5x = -7$ $\therefore x = -1\frac{2}{5}$ $\therefore y = 3(-1\frac{2}{5}) + 8 \quad \text{OR/OF} \quad y = \frac{1}{2}(-1\frac{2}{5}) + 4\frac{1}{2}$ $y = 3\frac{4}{5} \qquad \qquad \qquad y = 3\frac{4}{5}$ $\therefore D(-1\frac{2}{5}; 3\frac{4}{5})$ <p>OR/OF</p>	<p>✓ subst/vervang</p> <p>✓ x-value/waarde</p> <p>✓ subst/vervang</p> <p>✓ y-value/waarde (4)</p> <p>✓ subst/vervang</p> <p>✓ y value/waarde</p> <p>✓ subst/vervang</p> <p>✓ x-value/waarde (4)</p> <p>✓ equating/gelyk stel</p> <p>✓ x value/waarde</p> <p>✓ subst/vervang</p> <p>✓ y-value/waarde (4)</p>
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$x - 2y = -9 \dots\dots(1)$ $-6x + 2y = 16 \dots\dots(2)$ $(1) + (2):$ $-5x = 7$ $\therefore x = -1\frac{2}{5}$ $\therefore -1\frac{2}{5} - 2y = -9 \quad \text{OR/OF} \quad y = 3(-1\frac{2}{5}) + 8$ $y = 3\frac{4}{5} \qquad y = 3\frac{4}{5}$ $\therefore D(-1\frac{2}{5}; 3\frac{4}{5})$ <p>OR/OF</p> $y = 3x + 8 \dots\dots\dots(1)$ $6y = 3x + 27 \dots\dots\dots(2)$ $(1) - (2):$ $-5y = -19$ $\therefore y = 3\frac{4}{5}$ $3\frac{4}{5} = 3x + 8$ $x = 2(3\frac{4}{5}) - 9$ $x = -1\frac{2}{5}$ $\therefore D(-1\frac{2}{5}; 3\frac{4}{5})$	<p>✓ adding/optelling</p> <p>✓ x-value/waarde</p> <p>✓ subst/vervang</p> <p>✓ y-value/waarde</p> <p>(4)</p> <p>✓ subtracting/afrekkings</p> <p>✓ y-value/waarde</p> <p>✓ subst/vervang</p> <p>✓ x-value/waarde</p> <p>(4)</p>
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M/HH PP

G *Q* *E* *D*



<p>4.5</p> <p>area DMOE = area ΔAMO – area ΔADE $x_A = 2(0) - 9 \therefore A(-9; 0)$</p> <p>area ΔAMO $= \frac{1}{2} \cdot AO \cdot OM$ $= \frac{1}{2} (9)(4 \frac{1}{2})$ $= 20,25$</p> <p>area ΔADE $= \frac{1}{2} \cdot AE \cdot y_D$ $= \frac{1}{2} \cdot (AO - EO) \cdot y_D$ $= \frac{1}{2} \left(9 - 2 \frac{2}{3} \right) \left(3 \frac{4}{5} \right)$ $= 12,03$</p> <p>OR/OF</p> <p>area ΔADE $= \frac{1}{2} AD \cdot AE \cdot \sin \hat{D}AE$ $= \frac{1}{2} \left(\frac{19\sqrt{5}}{5} \right) \cdot 6 \frac{1}{3} \cdot \sin 26,57^\circ$ $= 12,03$</p> <p>\therefore area DMOE = 8,22 square units/vk eenh</p> <p>OR/OF</p>	<p>✓ correct method/ korrekte metode</p> <p>✓ $x_A = -9$</p> <p>✓ $\frac{1}{2} (9)(4 \frac{1}{2})$</p> <p>✓ $AE = 9 - 2 \frac{2}{3} = 6 \frac{1}{3}$</p> <p>✓ $y_D = 3 \frac{4}{5}$</p> <p>OR/OF</p> <p>✓ $AD = \frac{19\sqrt{5}}{5}$</p> <p>✓ $AE = 6 \frac{1}{3}$</p> <p>✓ answer/antw</p> <p>(6)</p>
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area DMOE = area rectangle DCOG + area Δ DMG + area Δ DEC

$$= \left(1\frac{2}{5} \times 3\frac{4}{5}\right) + \frac{1}{2}\left(1\frac{2}{5}\right)\left(\frac{7}{10}\right) + \frac{1}{2}\left(3\frac{4}{5}\right)\left(\frac{19}{15}\right)$$

$$= 8,22 \text{ square units/vk eenh}$$

✓ correct method/
korrekte metode

✓ $3\frac{4}{5}$

✓ $1\frac{2}{5}$ ✓ 0,7

✓ $\frac{19}{15}$

✓ answer

(6)

OR/OF

area DMOE = area Δ EDO + area Δ ODM

$$= \frac{1}{2}(EO \times y_D) + \frac{1}{2}(OM \times -x_D)$$

$$= \frac{1}{2}\left[\left(\frac{8}{3} \times \frac{19}{5}\right) + \left(\frac{9}{2} \times \frac{7}{5}\right)\right]$$

$$= \frac{1}{2}\left(\frac{304+189}{30}\right)$$

$$= \frac{493}{60} \text{ or/of } 8\frac{13}{60} \text{ or/of } 8,22 \text{ square units/vk eenh}$$

✓ correct method/
korrekte metode

✓ $y_D = \frac{19}{5}$ or $3\frac{4}{5}$

✓ $EO = \frac{8}{3}$

✓ $-x_D = \frac{7}{5}$

✓ $OM = \frac{9}{2}$ or $4\frac{1}{2}$

✓ answer/antw

(6)

OR/OF

area DMOE = area Δ EOF – area Δ DMF

$$= \frac{1}{2}(EO \times OF) - \frac{1}{2}(OF - OM)(-x_D)$$

$$= \frac{1}{2}\left[\left(\frac{8}{3} \times 8\right) + \left(\frac{7}{2} \times \frac{7}{5}\right)\right]$$

$$= \frac{1}{2}\left(\frac{640-147}{30}\right)$$

$$= \frac{493}{60} \text{ or } 8\frac{13}{60} \text{ or } 8,22 \text{ square units/vk eenh}$$

✓ correct method/
korrekte metode

✓ $y_F = 8$

✓ $EO = \frac{8}{3}$

✓ $-x_D = \frac{7}{5}$

✓ $FM = 3\frac{1}{2}$

✓ answer/antw

(6)

OR/OF

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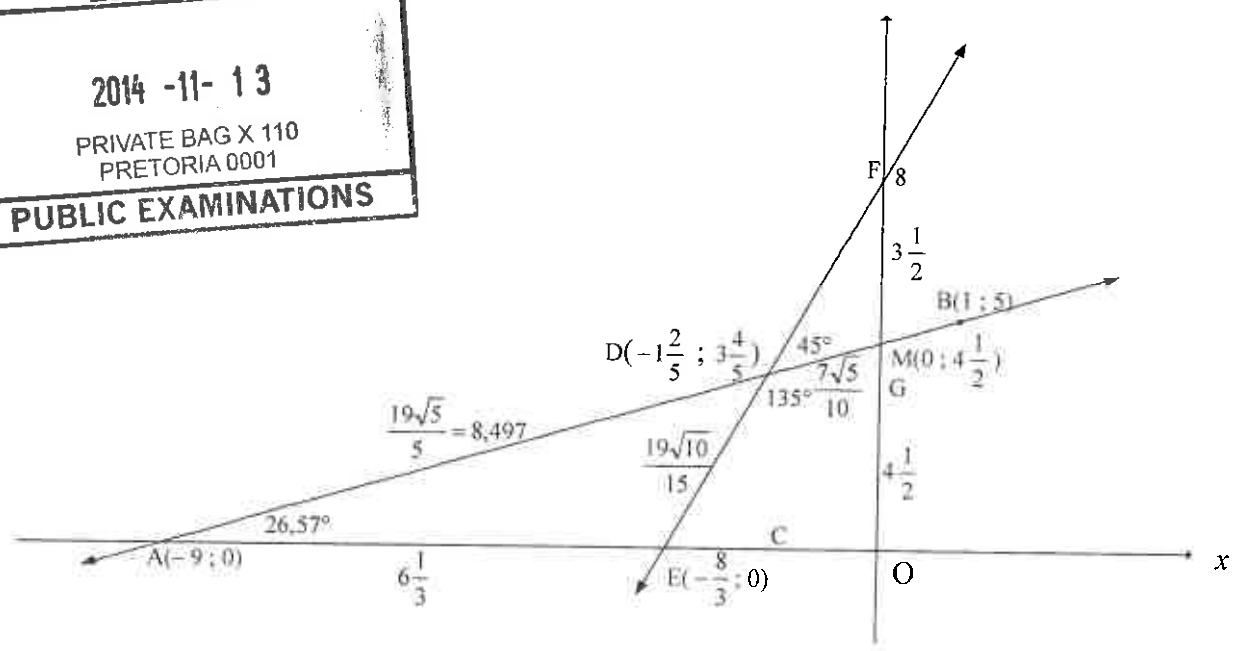
<p>area $\triangle EOM = \frac{1}{2}(EO \times OM)$</p> $= \frac{1}{2}\left(\frac{8}{3} \times \frac{9}{2}\right)$ <p>$= 6$ sq units/vk eenh</p> <p>$ED = \sqrt{\left(-\frac{7}{5} + \frac{8}{3}\right)^2 + \left(\frac{19}{5}\right)^2}$ and $DM = \sqrt{\left(\frac{7}{5}\right)^2 + \left(\frac{9}{2} - \frac{19}{5}\right)^2}$</p> $= \frac{19\sqrt{10}}{15}$ or 4,005... $= \frac{7\sqrt{5}}{10}$ or 1,565.. <p>area $\triangle EDM = \frac{1}{2}(ED \times DM \times \sin \hat{EDM})$</p> $= \frac{1}{2}\left(\frac{19\sqrt{10}}{15}\right)\left(\frac{7\sqrt{5}}{10}\right)\sin 135^\circ$ $= \frac{133}{60}$ or 2,216... <p>\therefore area DMOE = area $\triangle EOM$ + area $\triangle EDM$</p> $= 6 + 2,216...$ $= \frac{493}{60}$ or/of $8\frac{13}{60}$ or/of 8,22 square units/eenh ²	<p>✓ area $\triangle EOM$</p> <p>✓ $ED = \frac{19\sqrt{10}}{15}$</p> <p>✓ $DM = \frac{7\sqrt{5}}{10}$</p> <p>✓ area $\triangle EDM$</p> <p>✓ correct method/ korrekte metode</p> <p>✓ answer/antw</p> <p>(6) [19]</p>
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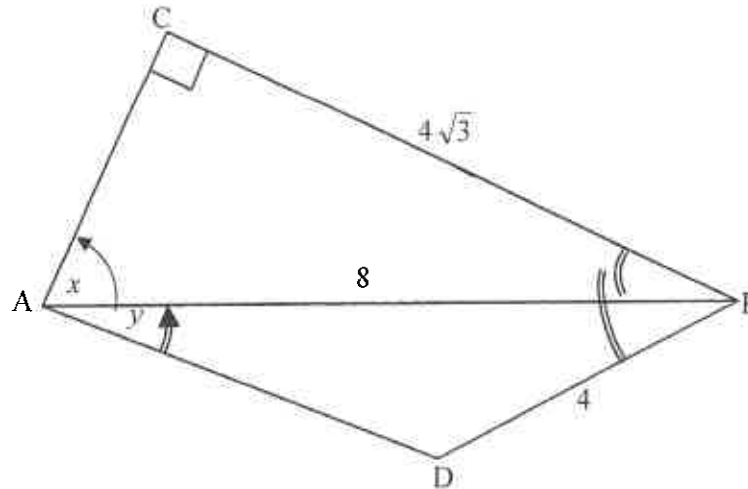
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QUESTION/VRAAG 5



<p>5.1</p>	$\sin \hat{C}AP = \frac{CP}{AP}$ $\sin x = \frac{4\sqrt{3}}{8} = \frac{\sqrt{3}}{2}$ $x = 60^\circ$ <p>OR/OF</p> $\frac{\sin 90^\circ}{8} = \frac{\sin x}{4\sqrt{3}}$ $\sin x = \frac{4\sqrt{3}}{8} = \frac{\sqrt{3}}{2}$ $x = 60^\circ$	<p>✓ correct sine ratio/ korrekte sin-verh</p> <p>✓ $\frac{\sqrt{3}}{2}$</p> <p>(2)</p> <p>✓ correct sine ratio/ korrekte sin-verh</p> <p>✓ $\frac{\sqrt{3}}{2}$</p> <p>(2)</p>
<p>5.2</p>	<p>$\hat{C}PA = \hat{D}PA = 30^\circ$ (AP bisects $\hat{D}PC$)</p> $AD^2 = AP^2 + DP^2 - 2 \cdot AP \cdot DP \cdot \cos \hat{A}PD$ $= 8^2 + 4^2 - 2(8)(4) \cos 30^\circ$ $= 8^2 + 4^2 - 2(8)(4) \left(\frac{\sqrt{3}}{2}\right)$ $= 24,57...$ <p>AD = 4,96</p>	<p>✓ $\hat{D}PA = 30^\circ$</p> <p>✓ correct subst into cosine rule/ korrekte subst in cos-reël</p> <p>✓ 24,57...</p> <p>✓ 4,96</p> <p>(4)</p>

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5.3	$\frac{\sin \hat{D}\hat{A}\hat{P}}{DP} = \frac{\sin \hat{A}\hat{P}\hat{D}}{AD}$ $\frac{\sin y}{4} = \frac{\sin 30^\circ}{4,96}$ $\sin y = \frac{4 \sin 30^\circ}{4,96}$ $= 0,403\dots$ $y = 23,78^\circ$ <p style="text-align: center;">OR/OF</p> $AD^2 = AP^2 + DP^2 - 2 \cdot AP \cdot DP \cdot \cos \hat{D}\hat{A}\hat{P}$ $4^2 = 8^2 + (4,96)^2 - 2(8)(4,96) \cdot \cos y$ $\cos y = \frac{8^2 + (4,96)^2 - 4^2}{2(8)(4,96)}$ $\cos y = 0,9148\dots$ $y = 23,82^\circ$	<p>✓ correct subst into sine rule/ <i>korrekte subst in sin-reël</i></p> <p>✓ sin y subject</p> <p>✓ 23,78°</p> <p style="text-align: right;">(3)</p> <p>✓ correct subst into cosine rule/ <i>korrekte subst in cos-reël</i></p> <p>✓ cos y subject</p> <p>✓ 23,82°</p> <p style="text-align: right;">(3)</p> <p style="text-align: right;">[9]</p>
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QUESTION/VRAAG 6

<p>6.1</p>	$\begin{aligned} & \cos^2(180^\circ + x) + \tan(x - 180^\circ) \sin(720^\circ - x) \cos x \\ & = (-\cos x)^2 + [-(-\tan x)] (-\sin x) (\cos x) \\ & = \cos^2 x + \left(\frac{\sin x}{\cos x} \right) (-\sin x) (\cos x) \\ & = \cos^2 x - \sin^2 x \\ & = \cos 2x \end{aligned}$	<ul style="list-style-type: none"> ✓ $(-\cos x)^2$ or $\cos^2 x$ ✓ $\tan x$ or $-(-\tan x)$ ✓ $-\sin x$ ✓ $\tan x = \frac{\sin x}{\cos x}$ ✓ $\cos^2 x - \sin^2 x$ <p style="text-align: right;">(5)</p>
<p>6.2</p>	$\begin{aligned} & \sin(\alpha - \beta) \\ & = \cos[90^\circ - (\alpha - \beta)] \\ & = \cos[(90^\circ - \alpha) + \beta] \\ & = \cos(90^\circ - \alpha) \cos \beta - \sin(90^\circ - \alpha) \sin \beta \\ & = \sin \alpha \cos \beta - \cos \alpha \sin \beta \end{aligned}$ <p style="text-align: center;">OR/OF</p> $\begin{aligned} & \sin(\alpha - \beta) \\ & = \cos[90^\circ - (\alpha - \beta)] \\ & = \cos[(90^\circ + \beta) + (-\alpha)] \\ & = \cos(90^\circ + \beta) \cos(-\alpha) - \sin(90^\circ + \beta) \sin(-\alpha) \\ & = (-\sin \beta) \cos \alpha - \cos \beta (-\sin \alpha) \\ & = \sin \alpha \cos \beta - \cos \alpha \sin \beta \end{aligned}$	<ul style="list-style-type: none"> ✓ rewrite as/herskryf $\cos[(90^\circ - \alpha) + \beta]$ ✓ expansion/uitbreiding ✓ simpl/vereenv <p style="text-align: right;">(3)</p> <ul style="list-style-type: none"> ✓ rewrite as/herskryf $\cos[(90^\circ + \beta) + (-\alpha)]$ ✓ expansion/uitbreiding ✓ simpl/vereenv <p style="text-align: right;">(3)</p>
<p>6.3</p>	$\begin{aligned} & x^2 - y^2 \\ & = \sin^2 76^\circ - \cos^2 76^\circ \\ & = -(\cos^2 76^\circ - \sin^2 76^\circ) \\ & = -\cos 2(76^\circ) \\ & = -\cos 152^\circ \\ & = -(-\cos 28^\circ) \end{aligned}$ <p style="text-align: center;">OR/OF</p> $\begin{aligned} & = -\cos(90^\circ + 62^\circ) \\ & = -(-\sin 62^\circ) \\ & = \sin 62^\circ \end{aligned}$ <p style="text-align: center;">OR/OF</p> $\begin{aligned} & x^2 - y^2 \\ & = \sin^2 76^\circ - \cos^2 76^\circ \\ & = \sin 76^\circ \sin 76^\circ - \cos 76^\circ \cos 76^\circ \\ & = \sin 76^\circ \cos 14^\circ - \cos 76^\circ \sin 14^\circ \\ & = \sin(76^\circ - 14^\circ) \\ & = \sin 62^\circ \end{aligned}$ <p style="text-align: center;">OR/OF</p> $\begin{aligned} & x^2 - y^2 \\ & = \sin^2 76^\circ - \cos^2 76^\circ \\ & = \cos^2 14^\circ - \sin^2 14^\circ \\ & = \cos 2(14^\circ) \\ & = \cos 28^\circ \\ & = \sin 62^\circ \end{aligned}$	<ul style="list-style-type: none"> ✓ $-(\cos^2 76^\circ - \sin^2 76^\circ)$ ✓ recognition of cos double angle ✓ $-\cos 152^\circ$ ✓ $\cos 28^\circ$ <p style="text-align: right;">(4)</p> <ul style="list-style-type: none"> ✓ $\cos 14^\circ$ ✓ $\sin 14^\circ$ ✓ recognition of sine compound angle ✓ $\sin(76^\circ - 14^\circ)$ <p style="text-align: right;">(4)</p> <ul style="list-style-type: none"> ✓ $\cos^2 14^\circ$ ✓ $\sin^2 14^\circ$ ✓ recognition of cos double angle ✓ $\cos 28^\circ$ <p style="text-align: right;">(4)</p>

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QUESTION/VRAAG 7

7.1	$0 \leq y \leq 2$ or $y \in [0; 2]$	✓ critical values/ <i>kritieke waardes</i> ✓ notation/notasie (2)
7.2	$\sin x + 1 = \cos 2x$ $\sin x + 1 = 1 - 2\sin^2 x$ $2\sin^2 x + \sin x = 0$ $\sin x(2\sin x + 1) = 0$	✓ $1 - 2\sin^2 x$ ✓ st form/st vorm (2)
7.3	$\sin x(2\sin x + 1) = 0$ $\sin x = 0$ or $\sin x = -\frac{1}{2}$ $x = 0^\circ + k \cdot 360^\circ$ or $x = 210^\circ + k \cdot 360^\circ$ or $x = 180^\circ + k \cdot 360^\circ$ or $x = 330^\circ + k \cdot 360^\circ, k \in \mathbb{Z}$ OR/OF $x = k \cdot 180^\circ, k \in \mathbb{Z}$	✓ $\sin x = 0$ or $\sin x = -\frac{1}{2}$ ✓ $0^\circ; 180^\circ$ OR/OF $x = k \cdot 180^\circ$ ✓ $210^\circ; 330^\circ$ ✓ $k \cdot 360^\circ, k \in \mathbb{Z}$ (4)
7.4		✓ y-intercept/afsnit ✓ x-intercepts/afsnitte ✓ min/max points/ <i>min/maks punte</i> (3)
7.5	$f(x) = g(x)$ at/by: $x = -30^\circ; 0^\circ; 180^\circ; 210^\circ$ $\therefore f(x + 30^\circ) = g(x + 30^\circ)$ at/by: $x = -60^\circ; -30^\circ; 150^\circ; 180^\circ$	✓ $-30^\circ; 0^\circ; 180^\circ; 210^\circ$ ✓✓ $-60^\circ; -30^\circ;$ $150^\circ; 180^\circ$ (3)
7.6	Series will converge if/Reeks sal konvergeer as: $-1 < r < 1$ $-1 < 2\cos 2x < 1$ $-\frac{1}{2} < \cos 2x < \frac{1}{2}$ $\therefore 30^\circ < x < 60^\circ$ or $x \in (30^\circ; 60^\circ)$	✓ $-1 < r < 1$ ✓ $r = 2\cos 2x$ ✓ $-\frac{1}{2} < \cos 2x < \frac{1}{2}$ ✓✓ $30^\circ < x < 60^\circ$ (5)

[19]

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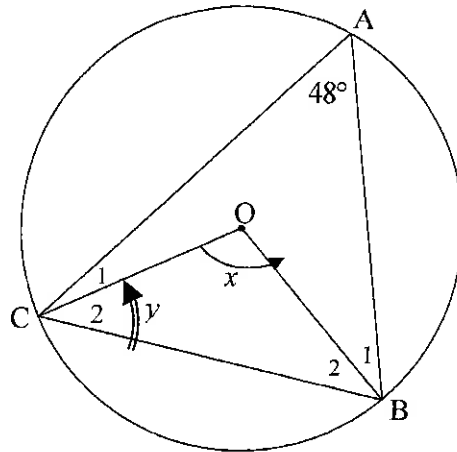
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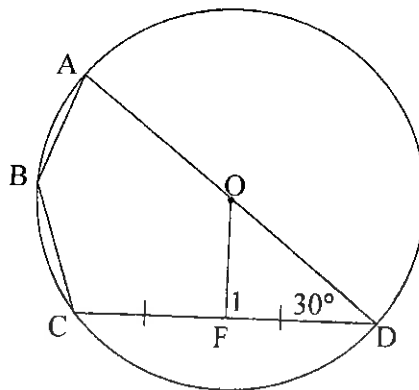
QUESTION/VRAAG 8

8.1



8.1.1	$x = 96^\circ$	(\angle at centre = $2\angle$ at circumference/ \angle by midpt = $2\angle$ by omtrek)	\checkmark S \checkmark R	(2)
8.1.2	$\hat{C}_2 + \hat{B}_2 = 180^\circ - 96^\circ = 84^\circ$ $y = \hat{B}_2 = 42^\circ$	(sum of \angle s in Δ / som v \angle e in Δ) (\angle s opp = sides/ \angle e teenoor = sye)	\checkmark S \checkmark S	(2)

8.2

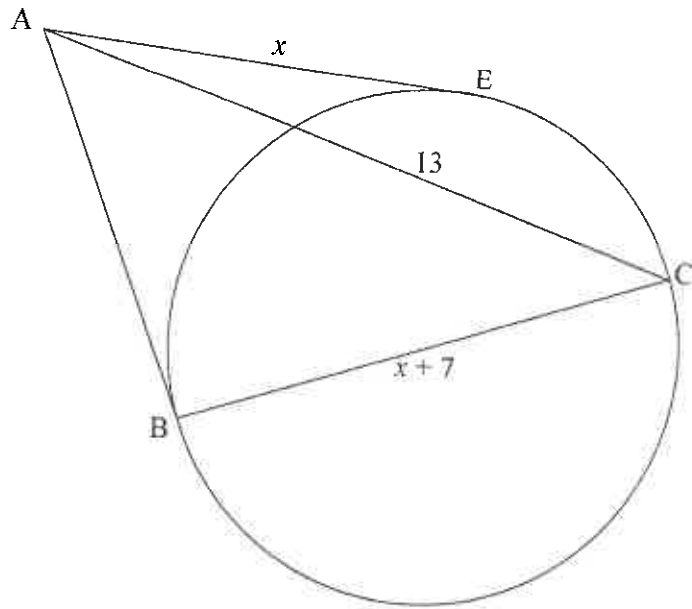


8.2.1	$\hat{F}_1 = 90^\circ$	(line from centre to midpt chord/ lyn vanaf midpt na midpt kd)	\checkmark S \checkmark R	(2)
8.2.2	$\hat{A}BC = 150^\circ$	(opposite \angle s of cyclic quad/ tos \angle e v koordevh)	\checkmark S \checkmark R	(2)

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8.3



8.3.1 (a)	tangent \perp radius/diameter / raaklyn \perp radius/middellyn	✓ R (1)
8.3.1 (b)	tangents from common pt OR tangents from same pt / raaklyne v gemeensk pt OF raaklyne vanaf dies pt	✓ R (1)
8.3.2	$AB^2 + BC^2 = AC^2$ $x^2 + (x+7)^2 = 13^2$ (Theorem of/Stelling van Pythagoras) $x^2 + x^2 + 14x + 49 = 169$ $2x^2 + 14x - 120 = 0$ $x^2 + 7x - 60 = 0$ $(x-5)(x+12) = 0$ $x = 5$ ($x \neq -12$)	✓ $AB^2 + BC^2 = AC^2$ ✓ $x^2 + (x+7)^2 = 13^2$ ✓ standard form ✓ answer (4) [14]

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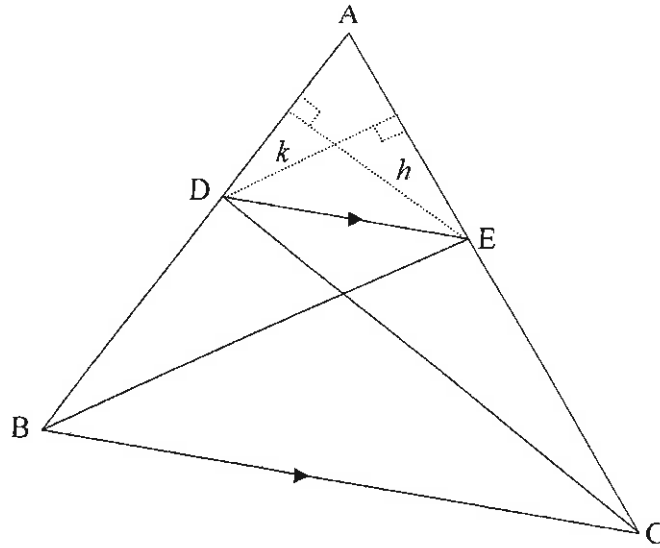
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QUESTION/VRAAG 9

9.1



9.1.1	Same base (DE) and same height (between parallel lines) <i>Dieselfde basis (DE) en dieselfde hoogte (tussen ewewydige lyne)</i>	✓ same base/ <i>dies</i> basis between lines/ <i>tussen lyne</i> (1)
9.1.2	$\frac{AD}{DB}$ $\frac{\frac{1}{2} AE \times k}{\frac{1}{2} EC \times k}$ <p>But/<i>Maar</i> area $\triangle DEB$ = area $\triangle DEC$ (Same base and same height/<i>dieselfde basis en dieselfde hoogte</i>) $\therefore \frac{\text{area } \triangle ADE}{\text{area } \triangle DEB} = \frac{\text{area } \triangle ADE}{\text{area } \triangle DEC}$ $\therefore \frac{AD}{DB} = \frac{AE}{EC}$</p>	✓ S ✓ S ✓ S ✓ R ✓ S (5)

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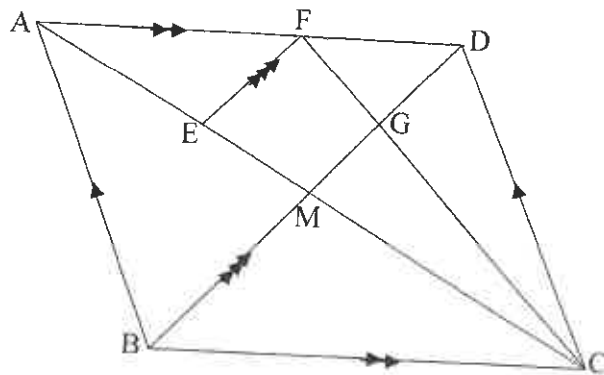
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9.2



<p>9.2.1</p>	$\frac{EM}{AM} = \frac{FD}{AD}$ $\frac{EM}{AM} = \frac{3}{7}$	<p>(Line parallel one side of Δ OR prop th; $EF \parallel BD$) (Lyn ewewydig aan sy v Δ OF eweredigt; $EF \parallel BD$)</p>	<p>✓ S ✓ R ✓ answer/antw</p>
<p>9.2.2</p>	$\frac{CM}{ME} = \frac{AM}{ME} = \frac{7}{3}$	<p>(diags of parm bisect/hoekl parm halv) (from 9.2.1/vanaf 9.2.1)</p>	<p>✓ S ✓ R ✓ answer/antw</p>
<p>9.2.3</p>	<p>h of $\Delta FDC = h$ of ΔBDC</p> $\frac{\text{area } \Delta FDC}{\text{area } \Delta BDC} = \frac{\frac{1}{2}FD \cdot h}{\frac{1}{2}BC \cdot h}$ $= \frac{FD}{AD}$ $= \frac{3}{7}$ <p>OR/OF</p> $\frac{\text{area } \Delta FDC}{\text{area } \Delta ADC} = \frac{FD}{AD} = \frac{3}{7}$ <p>But Area $\Delta ADC =$ Area ΔBDC (diags of parm bisect area) (hoekl v parm halv opp)</p> $\frac{\text{area } \Delta FDC}{\text{area } \Delta BDC} = \frac{3}{7}$	<p>($AD \parallel BC$) (opp sides of parm =) (tos sye v parm =)</p> <p>(same heights) (dieselfde hoogtes)</p>	<p>✓ $AD \parallel BC$ ✓ subst into area form/ subst in opp formule ✓ S ✓ answer/antw</p> <p>✓ S ✓ R ✓ S ✓ answer/antw</p>

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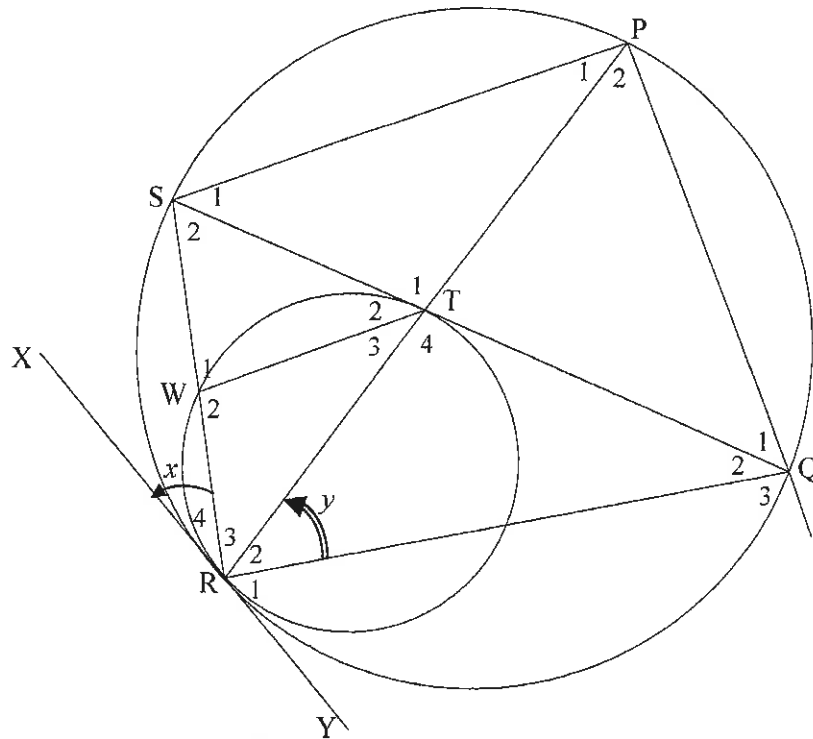
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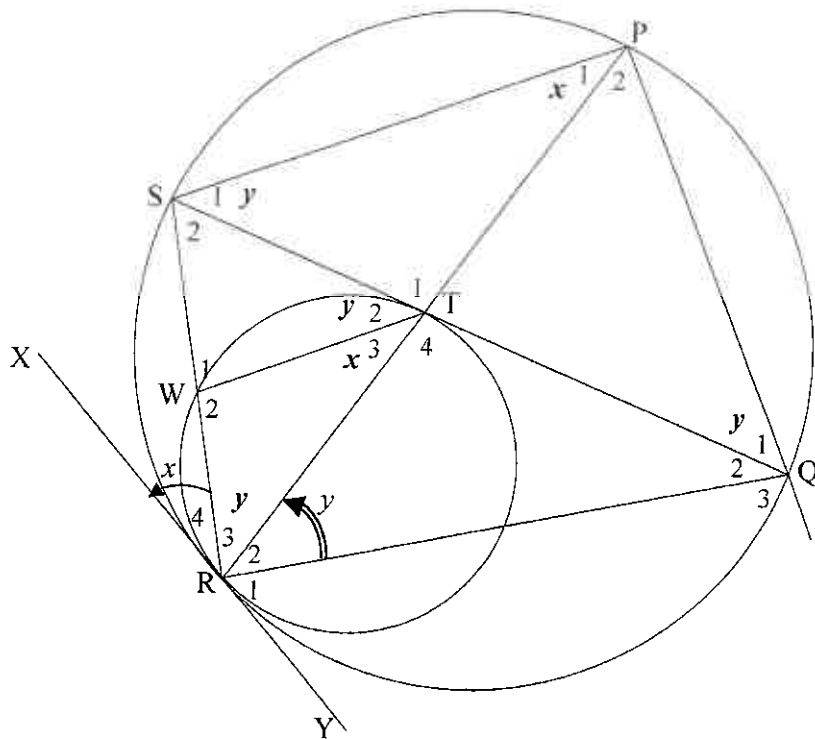
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QUESTION/VRAAG 10



10.1.1	Tangent chord theorem/Raaklyn-koordstelling	✓ R	(1)	
10.1.2	Tangent chord theorem/Raaklyn-koordstelling	✓ R	(1)	
10.1.3	Corresponding angles equal/Ooreenkomstige \angle e gelyk	✓ R	(1)	
10.1.4	\angle s subtended by chord PQ OR \angle s in same segment <i>\anglee onderspan deur dieselfde koord OF \anglee in dieselfde segment</i>	✓ R	(1)	
10.1.5	alternate \angle s/verwisselende \angle e ; WT SP	✓ R	(1)	
10.2	$\frac{RW}{RS} = \frac{RT}{RP}$ <p>(Line parallel one side of Δ OR prop th; WT SP) (Lyn ewewydig aan sy v Δ OF eweredighst: WT SP)</p> <p>OR/OF</p> $\Delta RTW \parallel \Delta RPS$ <p>(\angle; \angle; \angle)</p> $\therefore \frac{RW}{RS} = \frac{RT}{RP}$ <p>($\Delta RTW \parallel \Delta RPS$)</p> $\therefore RT = \frac{RW \cdot RP}{RS}$	✓ S ✓ R	(2)	
10.3	$y = \hat{T}_2 = \hat{R}_3$ $y = \hat{R}_3 = \hat{Q}_1$	(tan chord theorem/Rkl-koordst) (\angle s in same segment/ \angle e in dieselfde segment)	✓ S ✓ R ✓ S ✓ R	(4)

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<p>10.4</p>	<p>$\hat{Q}_3 = \hat{P}SR$ (ext \angle of cyc quad/buite \angle v kdvh) $\hat{P}SR = \hat{W}_2$ (corresp \angles/ooreenk \anglee ; WT SP) $\therefore \hat{Q}_3 = \hat{W}_2$ OR/OF $\hat{Q}_2 = x$ (\angles in same segment/\anglee in dies segment) $\hat{Q}_3 = 180^\circ - (x + y)$ (\angles on straight line/\anglee op reguitlyn) $\hat{W}_2 = 180^\circ - (x + y)$ (\angles of ΔWRT/\anglee v ΔWRT) $\therefore \hat{Q}_3 = \hat{W}_2$</p>	<p>\checkmark S \checkmark R \checkmark S \checkmark R \checkmark S \checkmark S</p>
<p>10.5</p>	<p>In ΔRTS and ΔRQP: $\hat{R}_3 = \hat{R}_2 = y$ (proven above/hierbo bewys) $\hat{S}_2 = \hat{P}_2$ (\angles in same segment/\anglee in dies segment) $\hat{R}TS = \hat{R}QP$ (3^{rd} angle of Δ) $\therefore \Delta RTS \parallel \Delta RQP$ (\angle; \angle; \angle)</p>	<p>\checkmark S \checkmark S/R \checkmark S OR/OF $(\angle$; \angle; \angle)</p>

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<p>10.6</p> $\frac{RT}{RQ} = \frac{RS}{RP}$ $\frac{RS}{RP} \times \frac{RS}{RP} = \frac{RT}{RQ} \times \frac{RS}{RP}$ $\left(\frac{RS}{RP}\right)^2 = \left(\frac{RT}{RP}\right)\left(\frac{RS}{RQ}\right)$ $= \left(\frac{RW}{RS}\right)\left(\frac{RS}{RQ}\right)$ $= \frac{RW}{RQ}$ <p>OR/OF</p> $\frac{RT}{RQ} = \frac{RS}{RP}$ <p>But $RT = \frac{WR \cdot RP}{RS}$</p> $\therefore \frac{RT}{RQ} = \frac{WR \cdot RP}{RQ \cdot RS} = \frac{RS}{RP}$ $WR \cdot RP^2 = RQ \cdot RS^2$ $\therefore \frac{WR}{RQ} = \frac{RS^2}{RP^2}$ <p>OR/OF</p> $\frac{RT}{RS} = \frac{RQ}{RP}$ $RQ = \frac{RT \cdot RP}{RS}$ <p>and $WR = \frac{RT \cdot RS}{RP}$</p> $\frac{WR}{RQ} = \frac{\frac{RT \cdot RS}{RP}}{\frac{RT \cdot RP}{RS}}$ $= \frac{RT \cdot RS}{RP} \times \frac{RS}{RT \cdot RP}$ $= \frac{RS^2}{RP^2}$	<p>($\Delta RTS \parallel \Delta RQP$)</p> <p>(proven in 10.2/bewys in 10.2)</p> <p>($\Delta RTS \parallel \Delta RQP$)</p> <p>(proven in 10.2/bewys in 10.2)</p> <p>($\Delta RTS \parallel \Delta RQP$)</p> <p>(proven in 10.2/bewys in 10.2)</p>	<p>✓ S</p> <p>✓ $\times \frac{RS}{RP}$ on both sides</p> <p>✓ $\left(\frac{RT}{RP}\right)\left(\frac{RS}{RQ}\right)$ (3)</p> <p>✓ S</p> <p>✓ $RT = \frac{WR \cdot RP}{RS}$</p> <p>✓ multiplication/ vermenigvuldig (3)</p> <p>✓ S</p> <p>✓ $WR = \frac{RT \cdot RS}{RP}$</p> <p>✓ simplification/ vereenvoudiging (3)</p> <p style="text-align: right;">(3) [20]</p>
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TOTAL/TOTAAL: 150


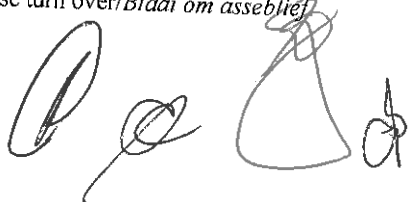
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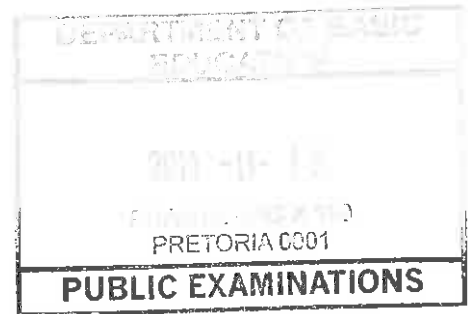
ANNEXURE A : MATHEMATICS PAPER 2 NOVEMBER 2014
MEMORANDUM NOTES TO MARKERS

- **Consistent Accuracy – when the second mistake is made: stop marking.**
Volgehoue akkuraatheid – wanneer die tweede fout gemaak word: geen punte verder.
- **Incorrect formula/Verkeerde formule: 0 marks**
- **If the learner indicates their understanding of a theorem that we are asking them to apply, we need to award the learner marks./Indien die leerder begrip toon van 'n stelling wat toegepas moet word, moet die leerder punte verdien.**

QUESTION 1

Question 1.1

- Answer only: 2 / 2 marks
- CA applies if the candidate totals incorrectly.
- CA can only be awarded if the candidate divides by 12.
- The mean must be reasonable i.e. between 42 and 95.



Question 1.3

- Answer only on condition that 1.1 and 1.2 are correct: 3 / 3 marks
- CA will apply from 1.1 and 1.2 provided the candidate shows working to get to their answer in Question 1.3.

Question 1.4

- If the candidate swaps a and b and gets $\hat{y} = 0,66 + 22,83x$ 1 / 3 marks
- If the candidate does not include the outlier: 3/3 marks

$a = 20,1776... = 20,18$	✓ value of a
$b = 0,72485... = 0,72$	✓ value of b
$\hat{y} = 20,18 + 0,72x$	✓ equation

Question 1.5

- If the candidate has excluded the outlier: $x = 63,38\% \approx 63\%$
- If the candidate has excluded the outlier and they have used the calculator:
 $x = 63,66\% \approx 64\%$
- Penalty 1 for incorrect rounding off in this question.
- Substitution must be linked with 60% (eg. 0,6)

Question 1.6

- Accept: 82% for Mathematics 1 / 1 mark
- Accept: 82% for Maths and 62% for Accounting 1/1 mark
- Accept: candidate 2 1/1 mark
- Accept: any unique identification of the correct outlier 1/1 mark

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QUESTION 2

Question 2.2.2

- If the candidate plots with the midpoints or the lower limit: max 2 / 3 marks
- If the candidate plots with the midpoints or the lower limits of the class and DOES not ground at (20 ; 0): 1 / 3 marks
- If the curve is drawn with a ruler: max 2 / 3 marks
- Only CA if the graph is a cumulative frequency graph.

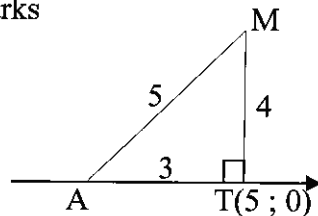
Question 2.3

- If the candidate just writes down 44 motorists: 1 / 2 marks
- Only CA if the graph is a cumulative frequency graph (using midpoints: $55 - 47 = 8$ (accept 7 - 9)). (using lower bounds: no CA marks)
- Answer only: 2 / 2 marks

QUESTION 3

Question 3.3

- If the candidate does NOT write the answer in coordinate form: 3 / 3 marks
- Answer only: 0 / 3 marks
- Alternative response:

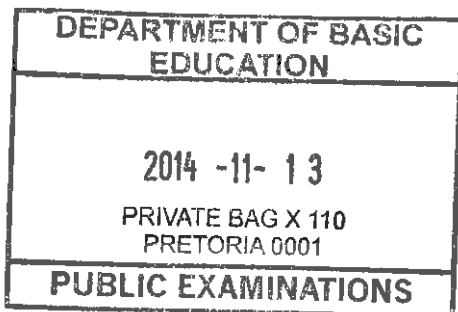


MT \perp x-axis/as

$MT = 4$ units/eenh, $AM = 5$ and/en $T(5 ; 0)$ ✓ $T(5 ; 0)$
 $AT^2 = 25 - 16$ (using/gebruik Pythagoras)
 $= 9$
 $AT = 3$ units/eenh ✓ $AT = 3$
 $OA = OT - AT = 5 - 3 = 2$
 $\therefore A(2 ; 0)$ ✓ answer

Question 3.5

- Answer only $y = 9$: 2 / 2 marks
- If the candidate just writes the answer as 9: 1 / 2 marks



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Question 3.6

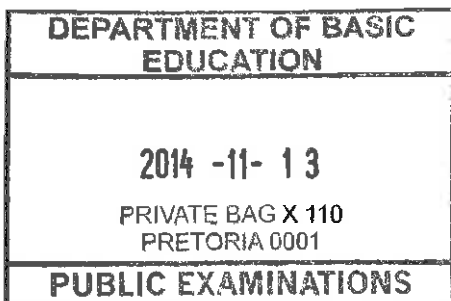
- Accept the answer: $y = \frac{3}{4}(20) - 6$ ✓ substitution of $x = 20$
 $y = 15 - 6$ ✓ simplification
 $y = 9$
- Consider the solution: $y = \frac{3}{4}(20) - 6 = 9$ 2 / 2 marks
- If the candidate starts with $\frac{3}{4}x - 6 = 9$ and gives a solution of $9 = 9$: 1 / 2 marks
- Consider the solution: $\frac{3}{4}(20) - 6 = 9$
 $9 = 9$ 1 / 2 marks

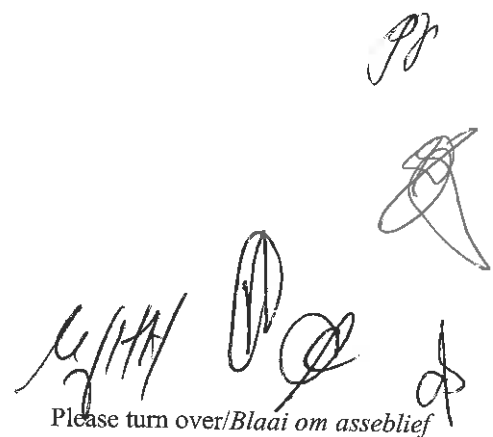
Question 3.7

- No penalty if the candidate does not simplify the surd.
- If the candidate only gives a decimal answer: max 1 / 2 marks

Question 3.8

- Alternative:
- Subs M(5 ; 4) K(5 ; 9) and L(20 ; 9)
 - M(5 ; 4): $(5 - p)^2 + (4 - q)^2 = c^2$...i
 - K(5 ; 9): $(5 - p)^2 + (9 - q)^2 = c^2$...ii
 - L(20 ; 9): $(20 - p)^2 + (9 - q)^2 = c^2$...iii ✓ all 3 equations
 - ii - i: $(4 - q)^2 = (9 - q)^2$
 $16 - 8q + q^2 = 81 - 18q + q^2$
 $10q = 65$ ✓ $q = 6,5$
 $q = 6,5$
 - iii - ii: $(20 - p)^2 = (5 - p)^2$
 $400 - 40p + p^2 = 25 - 10p + p^2$
 $375 = 30p$ ✓ $p = 12,5$
 $p = 12,5$
 - $c^2 = (20 - 12,5)^2 + (9 - 6,5)^2$ ✓ value of c^2
 $c^2 = 62,5$
 - Circle equation: $(x - 12,5)^2 + (y - 6,5)^2 = 62,5$ ✓ answer





QUESTION 4**Question 4.3**

- If the candidate takes $\tan 45^\circ$ to be the gradient of AB: 0 / 4 marks
- If the answer in Question 4.2 is NOT $26,57^\circ$ but has $m = \frac{1}{2}$: 0 / 4 marks

Question 4.4

The solution for D MUST be in the second quadrant for the CA marks to be awarded for D.

Question 4.5

- Be alert to ALL the alternatives.
- This can only be CA'd if the coordinates of D are valid.
- If no answer in 4.4, no CA in 4.5
- If D is not on the second quadrant: 0/6 marks

QUESTION 5**Question 5.3**

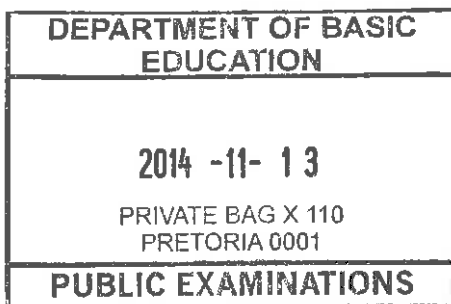
- CA with AD from Question 5.2
- Accept: $23,79^\circ$

QUESTION 6**Question 6.1**

- If the candidate does not conclude: no penalty
- If the candidate reduces $\cos^2(180^\circ + x) = -\cos^2 x$: max 3 / 5 marks

Question 6.2

- If the candidate uses $\cos(\alpha - \beta)$ expansion: max 1 / 3 marks
- If the candidate makes any mistakes: stop marking at the point of breakdown.



Handwritten signatures and initials: pp, a large stylized P, and several other illegible marks.

Question 6.3

Alternative response:

$$\begin{aligned}
 &x^2 - y^2 \\
 &= \sin^2 76^\circ - \cos^2 76^\circ \\
 &= [\sin(45^\circ + 31^\circ)]^2 - [\cos(45^\circ + 31^\circ)]^2 \\
 &= [\sin 45^\circ \cos 31^\circ + \cos 45^\circ \sin 31^\circ]^2 - [\cos 45^\circ \cos 31^\circ - \sin 45^\circ \sin 31^\circ]^2 \\
 &= \left[\frac{1}{\sqrt{2}} \times \cos 31^\circ + \frac{1}{\sqrt{2}} \times \sin 31^\circ\right]^2 - \left[\frac{1}{\sqrt{2}} \times \cos 31^\circ - \frac{1}{\sqrt{2}} \times \sin 31^\circ\right]^2 \quad \checkmark \checkmark \\
 &= \frac{1}{2} \cos^2 31^\circ + \cos 31^\circ \cdot \sin 31^\circ + \frac{1}{2} \sin^2 31^\circ - \frac{1}{2} \cos^2 31^\circ + \cos 31^\circ \sin 31^\circ - \frac{1}{2} \sin^2 31^\circ \\
 &= 2 \cos 31^\circ \sin 31^\circ \quad \checkmark \\
 &= \sin(2(31^\circ)) \quad \checkmark \\
 &= \sin 62^\circ
 \end{aligned}$$

- If the candidate uses a calculator:

$$\begin{aligned}
 &x^2 - y^2 \\
 &= \sin^2 76 - \cos^2 76 \\
 &= 0,882947... \quad \checkmark \checkmark \\
 &\sin 62 = 0,882947... \quad \checkmark \checkmark \\
 &x^2 - y^2 = \sin 62^\circ \quad 4 / 4 \text{ marks}
 \end{aligned}$$
- If the candidate uses the calculator and gets the solution:

$$\begin{aligned}
 &x^2 - y^2 = \sin 62^\circ \\
 &\sin^2 76 - \cos^2 76 = \sin 62^\circ \\
 &0,882947... = 0,882947... \quad 3 / 4 \text{ marks}
 \end{aligned}$$

QUESTION 7

Question 7.1

If the answer is $y \in [2; 0]$: 1 / 2 marks

Both critical values needed for 1 mark.

Question 7.3

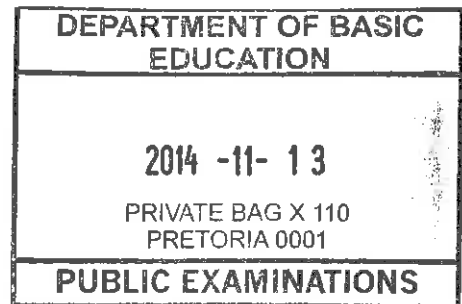
- If the candidate leaves out $k \in Z$: max 3 / 4 mark
- If the candidate divides through by $\sin x$: max 2 / 4 marks
- Award mark for $360^\circ k, k \in Z$ only if in context with correct answer.

Question 7.4

- Ignore if the candidate continues beyond the given domain.

Question 7.5

- If only two points of intersection from the graph: 1 / 3 marks
- If the candidate writes down answer only and has two correct: 1 / 3 marks



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QUESTION 8**Question 8.1.1**

If the statement is incorrect i.e. $x = 24^\circ$ and the reason is correct: 0 / 2 marks

Question 8.1.2

Answer only: 2 / 2 marks

Question 8.2.1

- The reason CANNOT be $OF \perp CD$.
- $CF = FD$ as a reason only is not acceptable as a reason. The candidate **must indicate the centre** as part of the reason.
- Midpoint **chord theorem**: accepted as a reason
- accept: **converse** line from centre \perp to chord

Question 8.2.2

- $\hat{B} = 30^\circ$ (opp \angle s cyclic quad): 0 / 2 marks
- $\hat{B} = 150^\circ$ (cyclic quad): 2 / 2 marks

Question 8.3.1 (a)

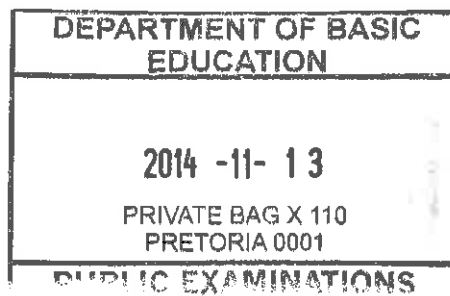
\perp can be left out in the reason.

Question 8.3.1 (b)

- $(AB = AE)$ as a reason only is NOT accepted.
- $(= \text{tangents})$ as a reason only is accepted.

Question 8.3.2

- The answer the candidate chooses must be positive.
- If they use Pythagoras' theorem incorrectly: Constitutes breakdown 0 / 4 marks
- If the candidate has the answer: $x = 5$ (Pythagoras): 4 / 4 marks
- If the candidate has the answer: $x = 5$ ($\hat{B} = 90^\circ$): 4 / 4 marks
- If the candidate has the answer $x = 5$ with no reason: 3 / 4 marks
- If the candidate gives both answers as $x = 5$ or $x = -12$ with no choice: 3 / 4 marks
- If the candidate gives $\hat{B} = 90^\circ$ as a reason it is the same as accepting Pythagoras.



Handwritten signatures and initials: PP, a circled mark, a scribble, and OP.

QUESTION 9**Question 9.1.2**

- If the word area is left out: no penalty
- If the reason is: from 9.1.1 / proved above accepted only if correct
- If the candidate uses h instead of k : max 4 / 5 marks

Question 9.2.1

- $\frac{EM}{AM} = \frac{3}{7}$ (EF \parallel BD; Prop Th): 3 / 3 marks
- Accept the reason: EF \parallel BD
- Accept the reason: Prop Th
- Answer only (no reason): 2 / 3 marks

Question 9.2.2

- Accept the reason: parallelogram
- Answer only (no reason): 2 / 3 marks

Question 9.2.3

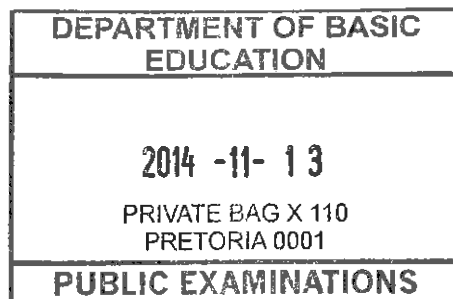
- Accept the reason: parallelogram
- Answer only (no reason): 1 / 4 marks

Alternative: $\frac{\text{area } \triangle FDC}{\text{area } \triangle BDC} = \frac{\frac{1}{2} \cdot FD \cdot DC \cdot \sin \hat{FDC}}{\frac{1}{2} \cdot BC \cdot DC \cdot \sin \hat{BCD}}$ ✓

$$= \frac{FD}{BC} \quad (\sin \hat{FDC} = \sin(180^\circ - \hat{BCD}) = \sin \hat{BCD}) \quad \checkmark \text{ (reduct form)}$$

$$= \frac{FD}{AD} \quad \checkmark$$

$$= \frac{3}{7} \quad \checkmark$$



QUESTION 10**Question 10.1.3**

- If the reason given is just: corres \angle s: 0 / 1 mark
- If the candidate just states as the reason $\hat{P}_1 = \hat{T}_3$: 1 / 1 mark

Question 10.1.4

Accept: "omtrekshoeke"
Angles on circumference

Question 10.1.5

- Alt \angle s only: 0 / 1 mark
- WT \parallel SP only: 0 / 1 mark

Question 10.2

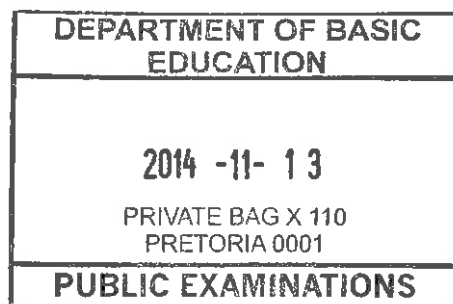
- Accept the reason: WT \parallel SP
- Accept the reason: Prop Th

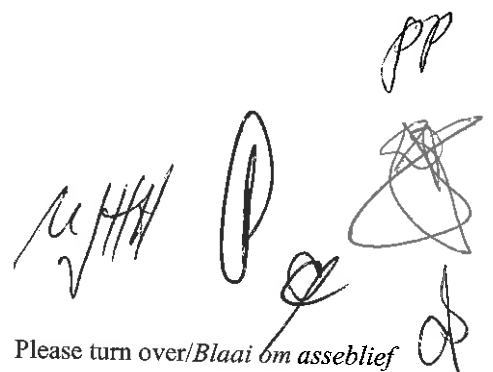
Question 10.3

\hat{S}_1 is not an acceptable option.

Question 10.5

- The candidate need only write down TWO sets of angles equal and then conclude with the reason ($\angle\angle\angle$)
- Accept reason: equiangular /gelykhoekig
- Accept: $\hat{R}\hat{T}\hat{S} = \hat{R}\hat{Q}\hat{P}$ (3^{rd} \angle in a Δ)



PP

 Please turn over/Blaai om asseblief