education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

# PROVINCIAL ASSESSMENT/
# *PROVINSIALE ASSESSERING*

## GRADE 12/*GRAAD 12*

## MATHEMATICS P2/*WISKUNDE V2*

## JUNE/*JUNIE 2024*

## MARKING GUIDELINES/*NASIENRIGLYNE*

**MARKS: 150/*PUNTE: 150***

**These marking guidelines consist of 16 pages.**
***Hierdie nasienriglyne bestaan uit 16 bladsye.***

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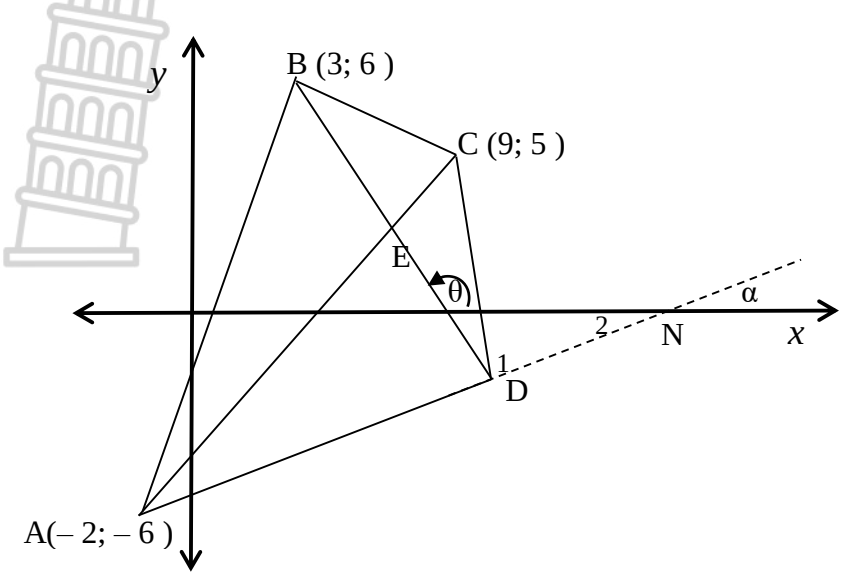
**NOTE**

- **If a candidate answers a question twice, only mark the FIRST attempt/** ***Indien `n kandidaat `n vraag twee keer antwoord, word slegs die EERSTE poging gemerk./***
- **If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.*****/Indien `n kandidaat `n poging doodgetrek het en NIE orgedoen het nie, word die doodgetrekte poging gemerk.***

- **Consistent accuracy applies in ALL aspects of the marking memorandum. Stop marking at the second calculation error./*****Konsekwente akkuraatheid word dwarsdeur die memorandum toegepas. Met die tweede berekeningsfout word nasien gestop.***
- **Assuming answers or values in order to solve a problem is NOT acceptable./**
  ***Die aanvaarding van antwoorde of waardes om `n problem op te los word NIE aanvaar nie./***

| **GEOMETRY** | |
|---|---|
| **S** | **A mark for a correct statement /*****`n Punt vir die korrekte bewering.***<br><br>**(A statement mark is independent of a reason/** ***Hierdie punt is onafhanklik van die rede.)*** |
| **R** | **A mark for a correct reason. /*****`n Punt vir die korrekte rede.***<br><br>**(A reason mark may only be awarded if the statement is correct /*****Hierdie punt word net toegeken as die berwering korrek is.)*** |
| **S/R** | **Award a mark if statement AND reason are both correct/** ***Ken die punt toe as die bewering SOWEL AS die rede korrek is.*** |

**QUESTION 1/*VRAAG 1***



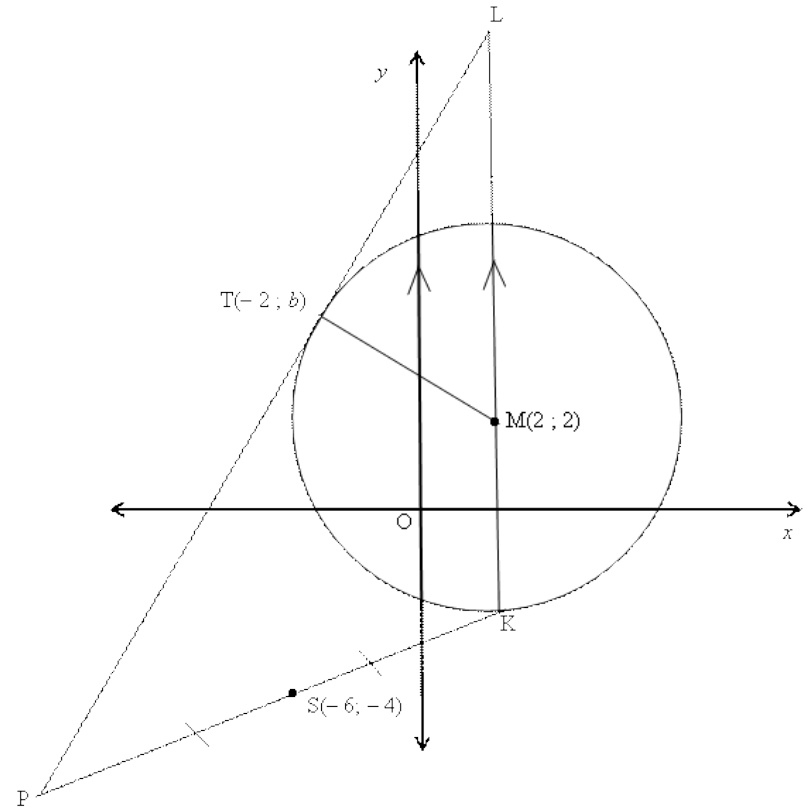

| | | |
|---|---|---|
| 1.1 | $AC = \sqrt{(5+6)^2 + (9+2)^2}$<br>$AC = 11\sqrt{2}$ | ✓substitution/*vervanging*<br>✓ answer/*antwoord*<br>(2) |
| 1.2 | $m_{AC} = \frac{5+6}{9+2}$<br>$m_{AC} = 1$ | ✓ substitution/*vervanging*<br>✓ $m_{AC} = 1$<br>(2) |
| 1.3 | $y - y_1 = m(x - x_1)$<br>C (9,5) or A (– 2; – 6)<br>$y - 5 = x - 9$ $\quad$ $y + 6 = x + 2$<br>$y = x - 4$ $\quad$ $y = x - 4$ | ✓ substituting point A or C /*vervang punt A of C*<br>✓ answer/*antwoord*<br>(2) |
| 1.4 | Diagonals of a kite intersect at right angles/<br>*Hoeklyne van vlieër sny loodreg/*<br>So BE ⊥ AC. | ✓ answer/*antwoord*<br>(1) |
| 1.5 | $m_{BD} = -1$<br>B (3; 6)<br>$y - 6 = -1(x - 3)$<br>$y = -x + 9$ | ✓ $m_{BD} = -1$<br>✓ substitution/*vervanging*<br>✓ answer/*antwoord*<br>(3) |

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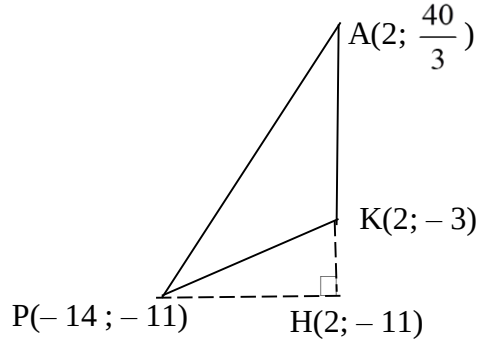
| | | |
|---|---|---|
| 1.6 | At E, $x-4=-x+9$<br>$2x=13$<br>$x=6,5$<br>$y=2,5$<br>E (6,5; 2,5) | ✓ $x-4=-x+9$<br>✓ $x=6,5$<br>✓ $y=2,5$<br>(3) |
| 1.7 | D(10;– 1) [AC symmetry line of kite/*AC lyn van simmetrie van vlieër, so AB = BD]*<br>Answer only: 3/3 | ✓ $x=10$<br>✓ $y=-1$<br>✓ motivation/*motivering*<br>(3) |
| 1.8 | $\tan\alpha=m_{AD}=\frac{5}{12}$<br>$\alpha=22,62^\circ$<br>$\hat{N}_2=\alpha=22,62^\circ$<br><br>$\tan\theta=m_{CD}=-6$<br>$\theta=99,46^\circ$<br>$\hat{D}_1=76,84^\circ$ [*ext* $\angle$ *of* $\Delta$*/buite* $\angle$ *van* $\Delta$]<br>$A\hat{D}C=103,16^\circ$ [$\angle$*s on a str line*/reguit lyn/]<br>**OR/*OF***<br><br>AB = 13, BC = $\sqrt{37}$ and/*en* $AC=11\sqrt{2}$<br><br>$AC^2=AB^2+BC^2-2AB\times BC\cos A\hat{B}C$<br><br>$(11\sqrt{2})^2=13^2+(\sqrt{37})^2-2(13)(\sqrt{37})\cos A\hat{B}C$<br>$\cos A\hat{B}C=-0,227...$<br>$A\hat{B}C=103,16^\circ$<br>$\therefore A\hat{D}C=103,16^\circ$<br>**OR/*OF***<br><br>$BE=\sqrt{3,5^2+(-3,5)^2}=\frac{7\sqrt{2}}{2}$<br><br>$\cos A\hat{D}E=\frac{3,5\sqrt{2}}{13}$<br>$A\hat{D}E=67,62^\circ$<br>$\cos C\hat{D}E=\frac{3,5\sqrt{2}}{\sqrt{37}}$<br>$C\hat{D}E=35,54^\circ$<br>$A\hat{D}C=103,16^\circ$ | ✓ $\alpha=22,62^\circ$<br>✓ $\hat{N}_2=22,62^\circ$<br><br>✓ $\theta=99,46^\circ$<br>✓ $\hat{D}_1=76,84^\circ$<br>✓ $A\hat{D}C=103,16^\circ$<br><br>✓ correct lengths/*korrekte lengtes*<br><br>✓ substitution/*vervanging*<br>✓ $\cos A\hat{B}C=-0,227...$<br>✓ $A\hat{B}C=103,16^\circ$<br>✓ answer/*antwoord*<br><br>✓ $BE=\frac{7\sqrt{2}}{2}$<br>✓ $\cos A\hat{D}E=\frac{3,5\sqrt{2}}{13}$<br>✓ $A\hat{D}E=67,62^\circ$<br>✓ $C\hat{D}E=35,54^\circ$<br>✓answer/*antwoord*<br>(5) |

**[21]**

**QUESTION 2/*VRAAG 2***

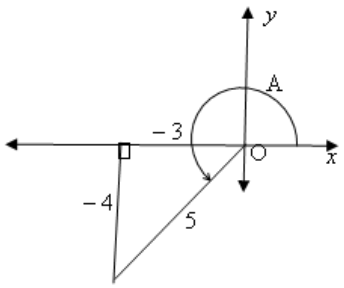



| | | |
|---|---|---|
| 2.1 | $(x-2)^2+(y-2)^2=25$<br>$(-2-2)^2+(b-2)^2=25$<br>$(b-2)^2=9$ or $16+b^2-4b+4=25$<br>$b-2=\pm 3$ $b^2-4b-5=0$<br>$(b-5)(b+1)=0$<br>$b=5$ or $b\neq -1$ | ✓ equation of the circle/ *vergelyking van sirkel*<br>✓substituting point T/ vervang T<br>✓ simplification/ vereenvoudiging<br>Factors /*Faktore*<br>✓ answer /antwoord/ (4) |
| 2.2.1 | K(2; 2 – 5)<br>K(2; – 3) | ✓ $x=2$<br>✓ $y=-3$<br>(2) |
| 2.2.2 | $m_{MT}=\frac{5-2}{-2-2}=-\frac{3}{4}$<br>$\therefore m_{PL}=\frac{4}{3}$<br>$y-y_1=m(x-x_1)$<br>$y-5=\frac{4}{3}(x+2)$<br>$y=\frac{4}{3}x+\frac{23}{3}$<br>**OR** | ✓ $m_{MT}=-\frac{3}{4}$<br>✓ $m_{PL}=\frac{4}{3}$<br>✓ substitution /vervanging/<br>✓ antwoord/*answer* |

| | | |
|---|---|---|
| | $m_{PL} = \frac{5+11}{-2+14}$<br>$m_{PL} = \frac{4}{3}$<br>$y - y_1 = m(x - x_1)$<br>$y - 5 = \frac{4}{3}(x + 2)$<br>$y = \frac{4}{3}x + \frac{23}{3}$ | ✓ substitution/ vervanging<br>✓ $m_{PL} = \frac{4}{3}$<br>✓ substituting P or T/ *vervang P of T*<br>✓ answer/ antwoord (4) |
| 2.2.3 | <br>$y = \frac{4}{3}x + \frac{23}{3}$<br>$y = \frac{4}{3}(2) + \frac{23}{3}$<br>$y = \frac{31}{3}$<br>LK = $\frac{31}{3} + 3 = \frac{40}{3}$<br>Koordinate van P/*Coordinates of P*<br>$\frac{x+2}{2} = -6$ $\frac{y-3}{2} = -4$<br>$x = -14$ $y = -5$<br>PH –hoogte/*Height* = 2 – ( – 14) = 16<br>Area of PKL = $\frac{1}{2} \times \frac{40}{3} \times 16$<br>= $\frac{320}{3}$/106,67 vk eenhede/*sq units* | ✓ $y_L = \frac{31}{3}$<br>✓ LK = $\frac{40}{3}$<br>✓ $x = -14$<br>✓ $y = -11$<br>✓ PH = 18<br>✓ substitution/*vervanging*<br>✓ answer/*antwoord* (7) |
| 2.3 | The centres of the two circles lie on the same vertical line $x = 2$ and the sum of the radii is 10/ *Die middelpunte van die twee sirkels lê op dieselfde vertikale lyn* $x = 2$ *en die som van die radius = 10*<br>$n - 2 = 10$ of/*or* $2 - n = 10$<br>$n = 12$ $n = -8$<br>Answer only: full mark/<br>Slegs antwoord: vol punte | ✓ correct method/*korrekte metode*<br>✓ sum of radii = 10/ *som van* ri = 10<br>✓ $n = 12$<br>✓ $n = -8$ (4) |

**[21]**

**QUESTION 3/*VRAAG 3***

| | | |
|---|---|---|
| 3.1 | $\frac{\cos(90^\circ + x).\sin(540^\circ + x)}{\tan(x - 180^\circ).\cos(-x)}$<br>$= \frac{-\sin x.\sin(180^0 + x)}{\tan x.\cos x}$<br>$= \frac{-\sin x.(-\sin x)}{\frac{\sin x}{\cos x}.\cos x}$<br>$= \sin x$ | ✓ $-\sin x$<br>✓ $\tan x$<br>✓ $\cos x$<br>✓ $-\sin x$<br>✓ $\frac{\sin x}{\cos x}$<br>✓ answer/*antwoord*<br>(6) |
| 3.2 | $\cos(P+Q) = \cos P.\cos Q - \sin P.\sin Q$<br>$\cos(2P) = \cos(P+P) = \cos P.\cos P - \sin P.\sin P$<br>$= \cos P.\cos P - \sin P.\sin P$<br>$= \cos^2 P - \sin^2 P$<br>$= \cos^2 P - (1 - \cos^2 P)$<br>$= \cos^2 P - 1 + \cos^2 P$<br>$= 2\cos^2 P - 1$ | ✓<br>$\cos 2P = \cos P.\cos P - \sin P.\sin P$<br>✓ $\cos^2 P - \sin^2 P$<br>✓ $1 - \cos^2 P$<br>✓ $2\cos^2 P - 1$<br>(4) |
| 3.3.1 | $\tan A = \frac{4}{3}$, $A \in [90^\circ; 360^\circ]$<br><br><br>$\sin A = -\frac{4}{5}$ | ✓ r = 5<br>✓ correct sketch and quad/<br>*korrekte skets en kwadrant*<br>✓ answer/*antwoord*<br>(3) |
| 3.3.2 | $\cos(A + 30^\circ) = \cos A.\cos 30^\circ - \sin A \sin 30^\circ$<br>$= -\frac{3}{5}\left(\frac{\sqrt{3}}{2}\right) - \left(-\frac{4}{5}\right)\left(\frac{1}{2}\right)$<br>$= \frac{4 - 3\sqrt{3}}{10}$ OR/*OF* $-0{,}12$ | ✓ expansion/*uitbreiding*<br>✓ $\frac{3}{5}\left(\frac{\sqrt{3}}{2}\right)$<br>✓ $\left(-\frac{4}{5}\right)\left(\frac{1}{2}\right)$<br>✓ answer/*antwoord*<br>(4) |

| | | |
|---|---|---|
| 3.4.1 | $\sin 78^\circ = \cos 12^\circ$<br>$= p$ | ✓ $\cos 12^\circ$<br>✓ answer/*antwoord*<br>(2) |
| 3.4.2 | $\cos 12^\circ = \cos 2(6^\circ)$<br>$p = 1 - 2\sin^2 6^0$<br>$p - 1 = -2\sin^2 6^0$<br>$\frac{1-p}{2} = \sin^2 6^0$<br>$\sin 6^0 = \pm\sqrt{\frac{1-p}{2}}$ | ✓ $\cos 2(6^\circ)$<br>✓ $p = 1 - 2\sin^2 6^\circ$<br>✓ $\frac{1-p}{2} = \sin^2 6^\circ$<br>✓ answer/*antwoord*<br>(4) |

**[23]**

**QUESTION 4/ *VRAAG 4***

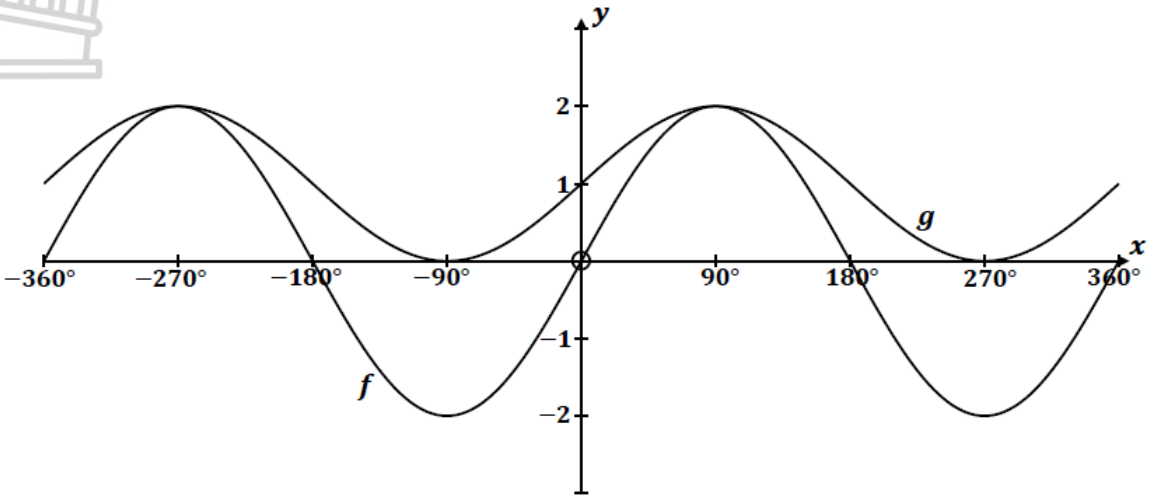
| | | |
|---|---|---|
| 4.1 | $\frac{\sin 2x - \cos 2x + 1}{\sin 2x + \cos 2x + 1} = \tan x$<br><br>LHS $= \frac{\sin 2x - \cos 2x + 1}{\sin 2x + \cos 2x + 1}$<br>$= \frac{2\sin x\cos x - (\cos^2 x - \sin^2 x) + 1}{2\sin x\cos x + (\cos^2 x - \sin^2 x) + 1}$<br>$= \frac{2\sin x\cos x - \cos^2 x + \sin^2 x + 1}{2\sin x\cos x + \cos^2 x - \sin^2 x + 1}$<br>$= \frac{2\sin x\cos x + 2\sin^2 x}{2\sin x\cos x + 2\cos^2 x}$<br>$= \frac{2\sin x(\cos x + \sin x)}{2\cos x(\sin x + \cos x)}$<br>$= \frac{\sin x}{\cos x}$<br>$= \tan x$<br>LHS = RHS | Both numerator and denominator/<br>*Sowel teller as noemer*<br><br>✓ $2\sin x\cos x$<br>✓ $\cos^2 x - \sin^2 x$<br><br>✓ $2\sin x\cos x + 2\sin^2 x$<br>✓ $2\sin x\cos x + 2\cos^2 x$<br>✓ $2\sin x(\cos x + \sin x)$<br>✓ $2\sin x(\sin x + \cos x)$<br>✓ $\frac{\sin x}{\cos x}$<br>(7) |

| | | |
|---|---|---|
| 4.2 | $\tan 22{,}5^\circ = \dfrac{\sin 45^\circ - \cos 45^\circ + 1}{\sin 45^\circ + \cos 45^\circ + 1}$<br>$= \dfrac{\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} + 1}{\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} + 1}$<br>$= \dfrac{1}{\sqrt{2}+1}$ or $\sqrt{2}-1$ | ✓ expansion/ *uitbreiding*<br>✓ substitution/*vervanging*<br>✓ answer/*antwoord*<br>(3) |
| 4.3 | $3\cos 2x = 1 + 5\cos x$<br>$3(2\cos^2 x - 1) = 1 + 5\cos x$<br>$6\cos^2 x - 3 = 1 + 5\cos x$<br>$6\cos^2 x - 5\cos x - 4 = 0$<br>$(3\cos x - 4)(2\cos x + 1) = 0$<br>$\cos x = \dfrac{4}{3}$ or $\cos x = -\dfrac{1}{2}$<br>No solution<br>$x = 120^\circ + k.360^\circ, k \in Z$<br>$x = 240^\circ + k.360^\circ, k \in Z$<br>**OR/*OF***<br>$x = \pm\cos^{-1}\left(-\dfrac{1}{2}\right) + k.360^\circ$<br>$x = \pm 120^\circ + k.360^\circ, k \in Z$ | ✓ $2\cos^2 x - 1$<br>✓ std form/*std form*<br>✓ factors/*faktore*<br>✓ both equations/*beide vergelykings*<br>✓ No solution/*geen oplossing*<br>✓ Gen Solution 1/*alg oplossing1*<br>✓ Gen Solution 2/ *alg oplossing2/* – 1 as/*if* $k \in Z$ is not included *nie aangedui*<br>(7) |

**[17]**

**QUESTION 5/*VRAAG 5***

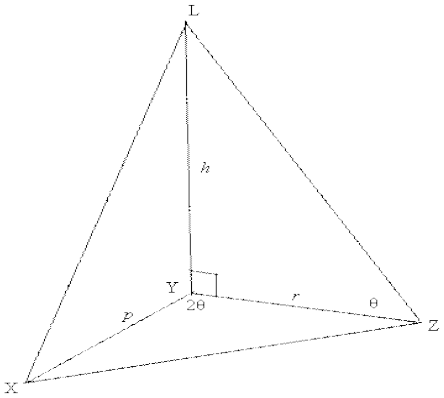
$f(x) = a\sin x$ en/*and* $g(x) = \sin x + b$ ; $x \in [-360^\circ; 360^\circ]$.




| | | |
|---|---|---|
| 5.1 | $a = 2$<br>$b = 1$ | ✓ $a = 2$<br>✓ $b = 1$<br>(2) |
| 5,2 | Amplitude = 1 | ✓ answer/*antwoord*<br>(1) |
| 5.3.1 | $x = -270^\circ$ of/*or* $x = 90^\circ$ | ✓ $x = -270^\circ$<br>✓ $x = 90^\circ$<br>(2) |
| 5.3.2 | $-360^\circ < x < -270^\circ$ or $-90^\circ < x < 90^\circ$ or $270^\circ < x < 360^\circ$<br>OF/ *OR*<br>$x \in (-360^\circ; -270^\circ)$ or $x \in (-90^\circ; 90^\circ)$ or $x \in (270^\circ; 360^\circ)$ | ✓ $-360^\circ < x < -270^\circ$<br>✓ $-90^\circ < x < 90^\circ$<br>✓ $270^\circ < x < 360^\circ$<br>OF/*OR*<br>✓ $x \in (-360^\circ; -270^\circ)$<br>✓ $x \in (-90^\circ; 90^\circ)$<br>✓ $x \in (270^\circ; 360^\circ)$<br>(3) |
| 5.3.3 | $-270^\circ < x < -90^\circ$ or $90^\circ < x < 270^\circ$<br>$x \in (-270^\circ; -90^\circ)$ or $x \in (90^\circ; 270^\circ)$ | ✓ $-270^\circ < x < -90^\circ$<br>✓ $90^\circ < x < 270^\circ$<br>OF/*OR*<br>✓ $x \in (-270^\circ; -90^\circ)$<br>✓ $x \in (90^\circ; 270^\circ)$<br>(2) |

**[10]**

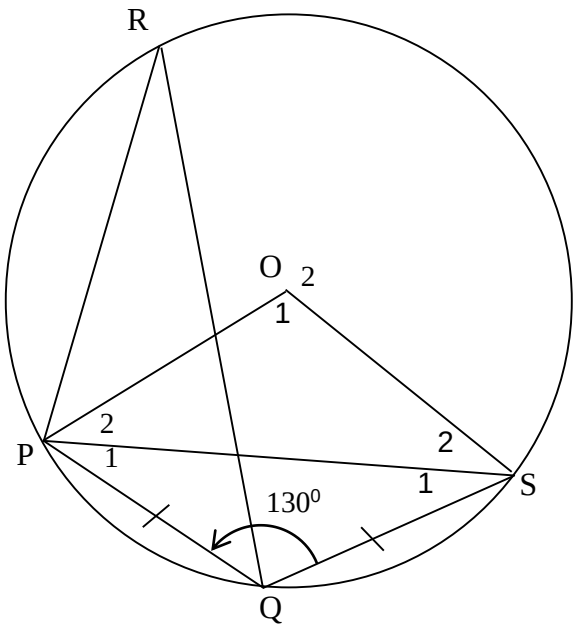
**QUESTION 6/*VRAAG 6***




| | | |
|---|---|---|
| 6.1 | $A = \frac{1}{2} \times p \times r \times \sin 2\theta$ | ✓ answer/antwoord (1) |
| 6.2 | $A = \frac{1}{2} \times p \times r \times \sin 2\theta$<br>$r = \frac{A}{\frac{1}{2} p \sin 2\theta}$<br>$r = \frac{2A}{p \sin 2\theta}$ | ✓ $r = \frac{A}{\frac{1}{2} p \sin 2\theta}$<br>✓ $r = \frac{2A}{p \sin 2\theta}$ (2) |
| 6.3 | $\tan\theta = \frac{h}{r}$<br>$h = r \tan\theta$<br>$h = \frac{2A}{p \sin 2\theta} \times \frac{\sin\theta}{\cos\theta}$<br>$h = \frac{2A}{p \times 2\sin\theta\cos\theta} \times \frac{\sin\theta}{\cos\theta}$<br>$h = \frac{A}{p\cos^2\theta}$ | ✓ $\tan\theta = \frac{h}{r}$<br>✓ $h = r\tan\theta$<br>✓ $h = \frac{2A}{p \sin 2\theta} \times \frac{\sin\theta}{\cos\theta}$<br>✓ $2\sin\theta\cos\theta$<br>✓ answer/antwoord (5) |
| 6.4.1 | $h = \frac{A}{p\cos^2\theta}$<br>$20 = \frac{A}{10\cos^2 60^\circ}$<br>$A = 50\ m^2$ | ✓ substitution/ vervanging<br>✓ answer/antwoord (2) |
| 6.4.2 | $r = \frac{2A}{p \sin 2\theta}$<br>$r = \frac{2(50)}{10 \sin 2(60^\circ)}$<br>$r = 11{,}55\ m$<br>$t^2 = 10^2 + (11{,}55)^2 - 2(10)(11{,}55)\cos 2(60^\circ)$<br>$t = 18{,}68\ m$ | ✓ substitution/ vervanging<br>✓ $r = 11{,}55\ m$<br>✓ correct substitution<br>korrekte vervanging<br>✓ substitution/vervanging (4) |

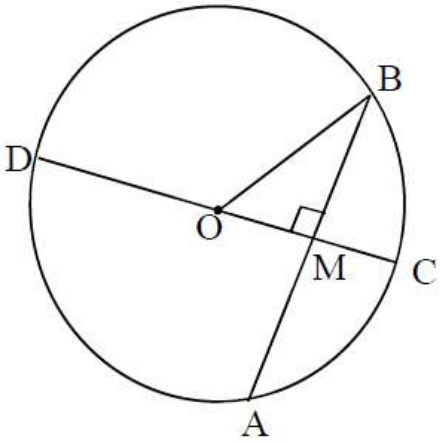
**[14]**

**QUESTION 7/*VRAAG 7***



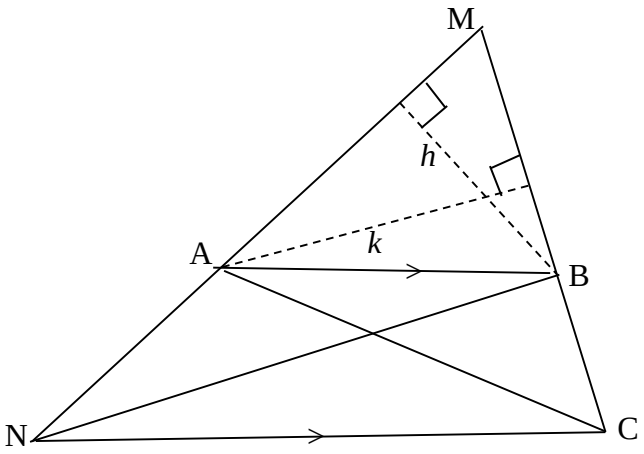

| | | |
|---|---|---|
| 7.1.1 | $\hat{S}_1 = \hat{P}_1$ [∠`e teenoor = sye/∠*s opp = sides*]<br>$2\hat{S}_1 + 130^\circ = 180^\circ$ [binne ∠`e van Δ/∠*s of a Δ*]<br>$\hat{S}_1 = 25^\circ$ | ✓ S/R<br>✓ S/R<br>✓ answer/antwoord<br>(3) |
| 7.1.2 | $\hat{R} = \hat{S}_1 = 25^\circ$ [omtrekshoeke/∠*s subt by same chord]* | ✓ S ✓ R<br>(2) |
| 7.1.3 | $\hat{O}_2 = 260^\circ$ [ mdpt ∠=2x omtreks∠/*angle at centre = 2∠ at circumf]*<br>$\hat{O}_1 = 100^\circ$ [omwenteling/∠*s around a point*] | ✓ S ✓ R<br>✓ answer/antwoord<br>(3) |

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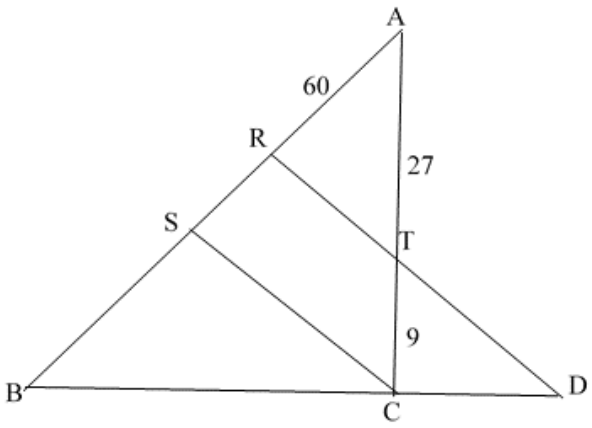
| | | |
|---|---|---|
| 7.2 |  | |
| 7.2.1 | DC = $9x$ | ✓ answer/antwoord<br>(1) |
| 7.2.2 | OM = OC – MC<br>$OM = \frac{9x}{2} - 2x$<br>$OM = 2{,}5x$ | ✓ method/*metode*<br>✓ answer/antwoord<br>(2) |
| 7.2.3 | $OB^2 = BM^2 + OM^2$<br>BM = 7 [line from centre ⊥ to chord/*radius ⊥ koord*]<br>$\left(\frac{9x}{2}\right)^2 = 7^2 + \left(\frac{5x}{2}\right)^2$<br>$\frac{81x^2}{4} = 49 + \frac{25x^2}{4}$<br>$14x^2 = 49$<br>$x^2 = 3{,}5$<br>$x = 1{,}87$<br>radius = $\frac{9}{2}(1{,}87) = 8.42$ units | ✓ S/R<br>✓ substitution/vervanging<br>✓ $x^2 = 3{,}5$<br>✓ $x = 1{,}87$<br>✓ radius = 8,42 eenhede/*units*<br>(5) |

**[16]**

**QUESTION 8/*VRAAG 8***



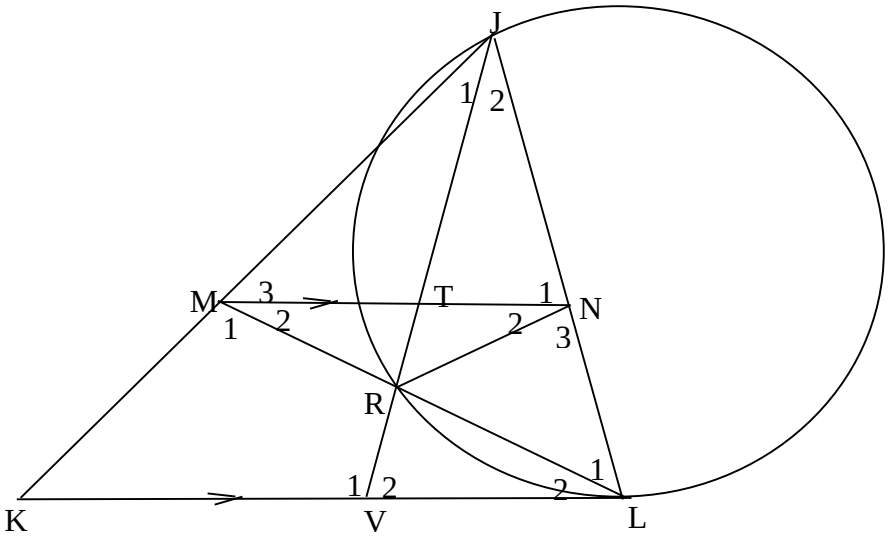

| | | |
|---|---|---|
| 8.1 | Const: Draw height k from A such that $k \perp$ MB and $h$ from B such that $h \perp$ AM.<br><br>*Konstr: Trek hoogte k vanaf A sodat $k \perp MB$ en $h$ vanaf B sodat $h \perp AM$.*<br><br>Proof/Bewys:*:*<br>$\frac{\text{area } \Delta MAB}{\text{area } \Delta ANB} = \frac{\frac{1}{2}MA \times h}{\frac{1}{2}AN \times h}$<br><br>$\frac{\text{area } \Delta MAB}{\text{area } \Delta ANB} = \frac{AM}{AN}$<br>$\frac{\text{area } \Delta MAB}{\text{area } \Delta ABC} = \frac{\frac{1}{2}MB \times k}{\frac{1}{2}BC \times k} = \frac{MB}{BC}$<br>Maar/*But* area ΔANB = area ΔABC [same base and height/ *selfde basis selfde hoogte* of/*or* RP // TM]<br><br>$\frac{MA}{AN} = \frac{MB}{BC}$ | ✓ construction/konstruksie<br><br>✓ Area $\Delta MAB = \frac{1}{2}MA \times h$<br>✓ Area $\Delta ANB = \frac{1}{2}AN \times h$<br>✓ $\frac{\text{area } \Delta MAB}{\text{area } \Delta ANB} = \frac{AM}{AN}$<br><br>✓ $\frac{\text{area } \Delta MAB}{\text{area } \Delta ABC} = \frac{MB}{BC}$<br><br>✓ S ✓ R (7) |




| | | |
|---|---|---|
| 8.2.1 | $\frac{AC}{TA}=\frac{36}{27}=\frac{4}{3}$ $\frac{AS}{AR}=\frac{80}{60}=\frac{4}{3}$<br>$\frac{AC}{TA}=\frac{AS}{AR}$<br>SC \|\| RD [converse line \|\| to one side of Δ/ *omgekeerd lyn \|\| een sy van* Δ OR Converse prop theorem, SC \|\| RD/ *Omgekeerd eweredigheid stelling* SC \|\| RD OR lyn verdeel sy eweredig | ✓ $\frac{AC}{TA}=\frac{4}{3}$<br>✓ $\frac{AS}{AR}=\frac{4}{3}$<br>✓ R<br>(3 |
| 8.2.2 | RS = 80 – 60 = 20 cm | ✓ answer/*antwoord*<br>(1) |
| 8.2.3 | $RB=\frac{3}{2}AR$<br>$RB=\frac{3}{2}(60)$<br>RB = 90cm<br>SB = 70 cm<br>$\frac{CD}{30}=\frac{20}{70}$ [line \|\| to one side of Δ/*lyn \|\| een sy van* Δ **OR/OF** [prop theorem, SC \|\| RD] **OR/*OF*** *omgekeerd eweredigheid stelling* SC \|\| RD]<br>CD = 8,57 cm | ✓ RB = 90 cm<br>✓ SB = 70 cm<br>✓ S ✓ R<br>✓ answer/*antwoord*<br>(5) |

**[16]**

**QUESTION 9/*VRAAG 9***




| | | |
|---|---|---|
| 9.1 | $\hat{L}_2 = \hat{M}_2$ [alt ∠s/verwiss∠`e/ MN \|\| KL]<br>$\hat{J}_2 = \hat{L}_2$ [tan chord theorem/raaklyn-koord stelling*]*<br>∴JMRN is a cyclic quad/ *is `n koordevierhoek* [converse of ∠s in same seg/ *omgekeerde omtrekshoeke*] | ✓ S/R<br>✓ S /R<br>✓ R<br>(3) |
| 9.2 | In ΔJNR and/*en* ΔLMK<br>$\hat{J}_2 = \hat{L}_2$ [tan chord theorem/raaklyn-koord stelling]<br>$J\hat{N}R = \hat{M}_1$ [ext ∠ of cyclic quad/buitehoek van kvh]<br>$\hat{R}_2 = \hat{K}$ [∠s of a Δ/binnehoeke van Δ]<br>∴ΔJNR \|\|\| ΔLMK [AAA/*HHH*] | ✓ S/R<br>✓ S/R<br>✓ 3rd ∠ of Δ/*3de ∠ van* Δ or/*of R* (3) |
| 9.3 | $\frac{JT}{TV} = \frac{JN}{NL}$ [Prop theorem/*Eweredigheid stelling*, , TN \|\| VL OF/*OR* Line \|\| to one side of Δ/*Lyn \|\| een sy van Δ*]<br>$JN = \frac{NL.JT}{TV}$<br>$\frac{JN}{LM} = \frac{NR}{MK}$ [ΔJNR \|\|\| ΔLMK]<br>$JN = \frac{LM.NR}{MK}$<br>$\therefore \frac{NL.JT}{TV} = \frac{LM.NR}{MK}$ | ✓ S ✓ R<br>✓ $JN = \frac{NL.JT}{TV}$<br>✓ S ✓ R<br>✓ $JN = \frac{LM.NR}{MK}$<br>(6) |

**[12]**

**TOTAAL/*TOTAL*: 150**

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