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PROVINCIAL ASSESSMENT/ PROVINSIALE ASSESSERING

GRADE 12/GRAAD 12

**MATHEMATICS P2/WISKUNDE V2
JUNE/JUNIE 2026
MARKING GUIDELINES/NASIENRIGLYNE**

MARKS/PUNTE: 150

These marking guidelines consists of 19 pages.

Hierdie nasienriglyne bestaan uit 19 bladsye.

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**NOTE**

- If a candidate answer 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. Stop marking at the second calculation error.
- Assuming answer values in order to solve a problem is NOT acceptable.

LET WEL:

- *As 'n kandidaat 'n VRAAG TWEE KEER beantwoord, sien slegs die EERSTE poging na.*
- *As 'n kandidaat 'n antwoord van 'n VRAAG doodtrek en nie oordoen nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die Nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.*

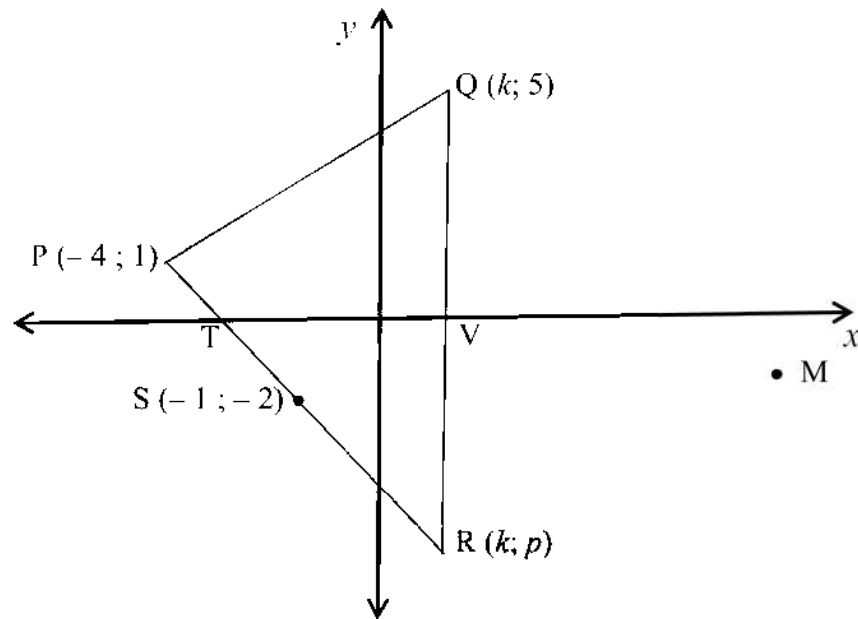
GEOMETRY	
S	A mark for a correct statement/'n Punt vir die korrekte stelling (A statement mark is independent of a reason/'n stelling is onafhanklik van die rede)
R	A mark for a correct reason/'n Punt vir die korrekte rede (A reason mark may only be awarded if the statement is correct/'n rede punt mag slegs toegeken word met korrekte stelling)
S/R	Award a mark if statement AND reason are both correct/ken 'n punt toe as die stelling EN rede beide korrek is

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QUESTION/VRAAG 1



1.1	$x = \frac{x_1 + x_2}{2} \quad y = \frac{y_1 + y_2}{2}$ $-1 = \frac{-4 + k}{2} \quad -2 = \frac{1 + p}{2}$ $k = 2 \quad p = -5$ $R(2; -5)$	$\checkmark -1 = \frac{-4 + k}{2}$ $\checkmark -2 = \frac{1 + p}{2}$ (2)
1.2	$PR = \sqrt{(1 + 5)^2 + (-4 - 2)^2}$ $PR = \sqrt{72} \text{ or } 6\sqrt{2} \text{ or } 8,49 \text{ units}$	$\checkmark \text{ substitution/vervangings}$ $\checkmark \text{ answer/antwoord}$ (2)
1.3	$m_{PR} = \frac{-5 - 1}{2 + 4} \quad \text{OR} \quad m_{PS} = \frac{1 + 2}{-4 + 1}$ $= -1 \quad = -1$	$\checkmark \text{ substitution/vervangings}$ $\checkmark \text{ answer/antwoord}$ (2)
1.4	$y - y_1 = m(x - x_1)$ $y - 1 = -1(x + 4) \quad y + 5 = -1(x - 2)$ $y - 1 = -(x + 4) \quad \text{OR} \quad y + 5 = -x + 2$ $y = -x - 3 \quad y = -x - 3$ CA from 1.3	$\checkmark \text{ substitution/vervangings}$ P, S or R $\checkmark \text{ answer/antwoord}$ (2)
1.5	$y = -x - 3$ $\text{RHS} = -x - 3$ $= -(-11) - 3$ $= 8$ $\text{LHS} = 14$ $\text{LHS} \neq \text{RHS}$ $\therefore (-11; 14) \text{ does not lie on } y = -x - 3$	$\checkmark \text{ substitution/vervangings}$ $\checkmark \text{ RHS} = 8$ $\checkmark \text{ conclusion/gevolgtrekking}$





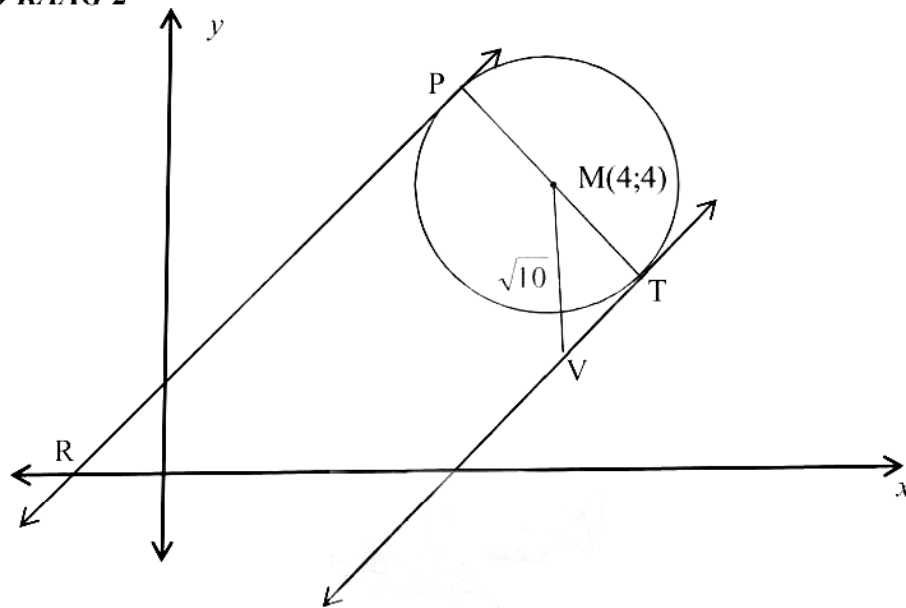
	OR $B(-11; 14)$ $m_{BP} = \frac{14-1}{-11+4}$ $m_{BP} = -\frac{13}{7}$ $m_{PR} = m_{PS} = -1$ Gradients are not the same $\therefore (-11; 14)$ does not lie on $y = -x - 3$	$\checkmark$ substitution/vervangings $\checkmark m_{BP} = -\frac{13}{7}$ $\checkmark$ conclusion/gevolgtrekking (3)
1.6	$m_{\perp} = 1$ $R(2; -5)$ $y - y_1 = m(x - x_1)$ $y + 5 = 1(x - 2)$ $y = x - 7$	$\checkmark m_{\perp} = 1$ $\checkmark$ substitution/vervangings $\checkmark$ conclusion/gevolgtrekking (3)
1.7	$M(8; -1)$	$\checkmark x = 8$ $\checkmark y = -1$ (2)
1.8	$m_{PR} = -1$ $\tan P\hat{T}V = -1$ $P\hat{T}V = 135^{\circ}$ $\hat{R} = 135^{\circ} - 90^{\circ}$ $\hat{R} = 45^{\circ}$ OR Coordinates of T $-x - 3 = 0$ $x = -3$ $T(-3; 0)$ $TR = \sqrt{(0+3)^2 + (-3-0)^2}$ $TR = \sqrt{18}$ $TV = 5$ $5^2 = (\sqrt{50})^2 + 5^2 - 2\sqrt{50}(5)\cos R$ $25 = 50 + 25 - 10\sqrt{50}\cos R$ $\cos R = \frac{\sqrt{2}}{2}$ $\hat{R} = 45^{\circ}$	$\checkmark \tan P\hat{T}V = -1$ $\checkmark P\hat{T}V = 135^{\circ}$ $\checkmark \hat{R} = 135^{\circ} - 90^{\circ}$ $\checkmark \hat{R} = 45^{\circ}$ (4) $\checkmark \tan P\hat{T}V = -1$ $\checkmark P\hat{T}V = 135^{\circ}$ $\checkmark \hat{R} = 135^{\circ} - 90^{\circ}$ $\checkmark \hat{R} = 45^{\circ}$ (4)

[20]

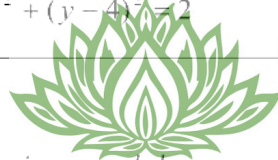


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QUESTION/VRAAG 2

2.1	$y - x - 2 = 0$ $y = x + 2$ $m_{\text{dia}} = -1$ Answer only: Full marks	✓ std form/vorm ✓ answer/antwoord (2)
2.2	$y - y_1 = m(x - x_1)$ $y - 4 = -1(x - 4)$ $y - 4 = -x + 4$ $y = -x + 8$	✓ substitution/vervangings ✓ answer/antwoord (2)
2.3	$y = -x + 8$ and $y = x + 2$ $x + 2 = -x + 8$ $2x = 6$ $x = 3$ $y = 5$ $P(3;5)$	✓ substitution/vervangings ✓ $x = 3$ ✓ $y = 5$ (3)
2.4	$PM = \sqrt{(4-5)^2 + (4-3)^2}$ subst (3;5) $PM = \sqrt{2}$ $(x-4)^2 + (y-4)^2 = 2$ OR $(x-4)^2 + (y-4)^2 = r^2$ $(3-4)^2 + (5-4)^2 = r^2$ subst (3;5) $r^2 = 2$ $\therefore (x-4)^2 + (y-4)^2 = 2$	✓ substitution/vervangings ✓ $PM = \sqrt{2}$ ✓ answer/antwoord ✓ substitution/vervangings ✓ $r^2 = 2$ ✓ answer/antwoord (3)

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2.5	$x = \frac{x_1 + x_2}{2} \quad y = \frac{y_1 + y_2}{2}$ $4 = \frac{3 + x_2}{2} \quad 4 = \frac{5 + y_2}{2}$ $x_2 = 5 \quad y_2 = 3$ $T(5;3)$	$\checkmark x_2 = 5$ $\checkmark y_2 = 3$	(2)
2.6	$PM = \sqrt{2}$ $VT^2 = (\sqrt{10})^2 - (\sqrt{2})^2$ $VT^2 = 8$ $VT = \sqrt{8} \text{ or } VT = 2\sqrt{2}$	$\checkmark VT^2 = (\sqrt{10})^2 - (\sqrt{2})^2$ $\checkmark \text{answer/antwoord}$	(2)
2.7	$y\text{-int of PR is } 2$ $y\text{-int of TV is } -2$ $k \leq -2 \text{ or } k \geq 2$	$\checkmark k \leq -2$ $\checkmark k \geq 2$	(2)
2.8	$q + \sqrt{2} = SM$ $q + \sqrt{2} = \sqrt{(4-3)^2 + (4-1)^2}$ $q + \sqrt{2} = \sqrt{10}$ $q = 1,75$	$\checkmark q + \sqrt{2} = SM$ $\checkmark \text{substitution/vervang}$ $\checkmark \text{answer/antwoord}$	(3)

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QUESTION/VRAAG 3

3.1	$\frac{\cos 200^\circ \cdot \cos(90^\circ - x) \cdot \tan(x - 180^\circ) \cdot \cos(540^\circ + x)}{\sin(360^\circ - x) \cdot \sin 110^\circ}$ $= \frac{\cos(180^\circ + 20^\circ) \cdot \sin x \cdot (\tan x) \cdot \cos(180^\circ + x)}{(-\sin x) \cdot \sin(90^\circ + 20^\circ) \text{ or } \sin 70^\circ}$ $= \frac{(-\cos 20^\circ) \sin x \left(\frac{\sin x}{\cos x} \right) (-\cos x)}{(-\sin x) \cdot \cos 20^\circ}$ $= -\sin x$	$\checkmark -\cos 20^\circ$ $\checkmark \sin x$ $\checkmark \tan x$ $\checkmark -\cos x$ $\checkmark -\sin x$ $\checkmark \cos 20^\circ \text{ or } \sin 70^\circ$ $\checkmark \frac{\sin x}{\cos x}$ $\checkmark \text{answer/antwoord}$	(8)
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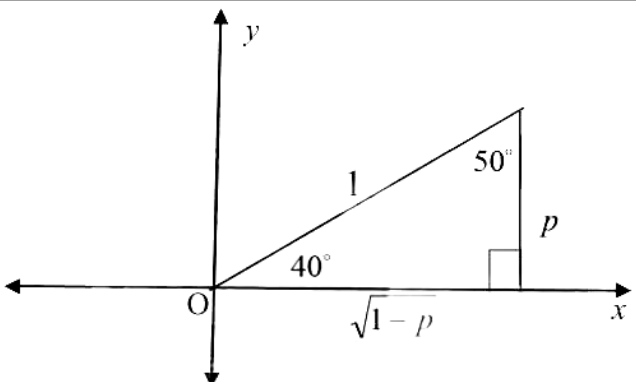
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3.2	$\frac{-\cos^2 10^\circ + \sin^2 190^\circ}{\cos(-145^\circ) \cdot \cos 235^\circ}$ $= \frac{-\cos^2 10^\circ + \sin^2(180^\circ + 10^\circ)}{\cos 145^\circ \cos 235^\circ}$ $= \frac{-\cos^2 10^\circ + (-\sin 10^\circ)^2}{\cos(180^\circ - 35^\circ) \cos(180^\circ + 55^\circ)}$ $= \frac{-\cos^2 10^\circ + \sin^2 10^\circ}{-\cos 35^\circ (-\cos 55^\circ)}$ $= \frac{-(\cos^2 10^\circ - \sin^2 10^\circ)}{\cos 35^\circ (\sin 35^\circ)}$ $= \frac{-\cos 20^\circ}{\cos 35^\circ \cdot \sin 35^\circ}$ $= \frac{-2 \cos 20^\circ}{2 \cos 35^\circ \cdot \sin 35^\circ}$ $= \frac{-2 \cos 20^\circ}{\sin 70^\circ}$ $= \frac{-2 \cos 20^\circ}{\cos 20^\circ} \quad \text{or} \quad = \frac{-2 \cos 70^\circ}{\cos 70^\circ}$ $= -2$	✓ $-\sin 10^\circ / \sin^2 10^\circ$ ✓ $-\cos 35^\circ$ ✓ $-\cos 55^\circ$ ✓ $-\cos 20^\circ$ ✓ $\sin 35^\circ$ ✓ $2 \div 2$ ✓ $\sin 70^\circ$ ✓ $\cos 20^\circ$ or $\sin 70^\circ$ ✓ answer/antwoord (9)
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3.3.1	 $\text{opp}^2 = 1 - (\sqrt{1 - p^2})^2$ $\text{opp}^2 = 1 - (1 - p^2)$ $\text{opp}^2 = p^2$ $\text{opp} = p$ $\cos 50^\circ = p$	✓ correct sketch/korrekte diagram ✓ opp = p/teenoorst = p ✓ answer/antwoord (3)
3.3.2	$\cos 70^\circ = \cos(40^\circ + 30^\circ)$ $= \cos 40^\circ \cdot \cos 30^\circ - \sin 40^\circ \cdot \sin 30^\circ$ $= \sqrt{1 - p^2} \times \frac{\sqrt{3}}{2} - p \times \frac{1}{2}$ $= \frac{\sqrt{3(1 - p^2)} - p}{2}$	✓ $\cos(40^\circ + 30^\circ)$ ✓ Expansion ✓ $\sqrt{1 - p^2} \times \frac{\sqrt{3}}{2}$ ✓ $p \times \frac{1}{2}$ (4)

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**QUESTION/VRAAG 4**

4.1	$\frac{\sin(x+45^\circ)}{\cos(x-45^\circ)} = \frac{\sin 2x + 1}{(\sin x + \cos x)^2}$ $\text{LHS} = \frac{\sin(x+45^\circ)}{\cos(x-45^\circ)}$ $= \frac{\sin x \cos 45^\circ + \cos x \sin 45^\circ}{\cos x \cos 45^\circ + \sin x \sin 45^\circ}$ $= \frac{\frac{\sqrt{2}}{2} \sin x + \frac{\sqrt{2}}{2} \cos x}{\frac{\sqrt{2}}{2} \cos x + \frac{\sqrt{2}}{2} \sin x}$ $= 1$ $\text{LHS} = \frac{\sin 2x + 1}{(\sin x + \cos x)^2}$ $= \frac{2 \sin x \cos x + \sin^2 x + \cos^2 x}{(\sin x + \cos x)(\sin x + \cos x)}$ $= \frac{(\sin x + \cos x)(\sin x + \cos x)}{(\sin x + \cos x)(\sin x + \cos x)}$ $= 1$ $\text{LHS} = \text{RHS}$ OR $\text{LHS} = \frac{\sin(x+45^\circ)}{\cos(x-45^\circ)}$ $= \frac{\sin x \cos 45^\circ + \cos x \sin 45^\circ}{\cos x \cos 45^\circ + \sin x \sin 45^\circ}$ $= \frac{\frac{\sqrt{2}}{2} \sin x + \frac{\sqrt{2}}{2} \cos x}{\frac{\sqrt{2}}{2} \cos x + \frac{\sqrt{2}}{2} \sin x}$ $= \frac{\frac{\sqrt{2}}{2} (\sin x + \cos x)}{\frac{\sqrt{2}}{2} (\sin x + \cos x)} \times \frac{(\sin x + \cos x)}{(\sin x + \cos x)}$ $= \frac{\sin^2 x + 2 \sin x \cos x + \cos^2 x}{(\sin x + \cos x)^2}$ $= \frac{1 + \sin 2x}{(\sin x + \cos x)^2}$ $\text{LHS} = \text{RHS}$	$\checkmark \sin x \cos 45^\circ + \cos x \sin 45^\circ$ $\checkmark \cos x \cos 45^\circ + \sin x \sin 45^\circ$ $\checkmark$ substitution/ <i>vervang</i> $\checkmark 1$ $\checkmark 2 \sin x \cos x$ $\checkmark \sin^2 x + \cos^2 x$ $\checkmark$ factors/ <i>gem faktore</i> $\checkmark 1$ $\checkmark \sin x \cos 45^\circ + \cos x \sin 45^\circ$ $\checkmark \cos x \cos 45^\circ + \sin x \sin 45^\circ$ $\checkmark$ substitution/ <i>vervang</i> $\checkmark$ common factor/ <i>gem faktore</i> $\checkmark \times \frac{(\sin x + \cos x)}{(\sin x + \cos x)}$ $\checkmark \sin^2 x + \cos^2 x$ $\checkmark 2 \sin x \cos x$
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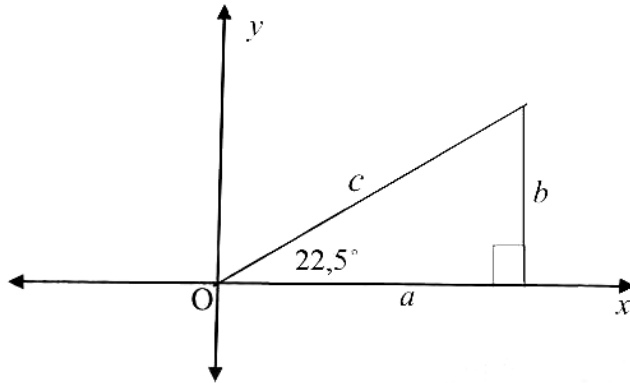
4.2	$\frac{\sin(x+45^\circ)}{\cos(x-45^\circ)} = 1$ $\sin(x+45^\circ) = \cos(x-45^\circ)$ $\sin(x+45^\circ) = \sin[90^\circ - (x-45^\circ)]$ $\sin(x+45^\circ) = \sin(135^\circ - x)$ $x+45^\circ = 135^\circ - x + k.360^\circ$ $2x = 90^\circ + k.360^\circ$ $x = 45^\circ + k.180^\circ; k \in \mathbb{Z}$ or $x+45^\circ = 180^\circ - (135^\circ - x) + k.360^\circ$ $x+45^\circ = 45^\circ + x + k.360^\circ$ No Solution $\therefore x = -135^\circ; 45^\circ$ OR/OF $\frac{\sin(x+45^\circ)}{\cos(x-45^\circ)} = 1$ $\sin(x+45^\circ) = \cos(x-45^\circ)$ $\cos[90^\circ - (x+45^\circ)] = \cos(x-45^\circ)$ $\cos(45^\circ - x) = \cos(x-45^\circ)$ $45^\circ - x = \pm(x-45^\circ) + k.360^\circ$ $45^\circ - x = x - 45^\circ + k.360^\circ$ $-2x = -90^\circ + k.360^\circ$ $x = 45^\circ - k.180^\circ; k \in \mathbb{Z}$ or $45^\circ - x = -(x-45^\circ) + k.360^\circ$ $45^\circ - x = -x - 45^\circ + k.360^\circ$ No Solution $x = -135^\circ; 45^\circ$	$\checkmark \sin(x+45^\circ) = \cos(x-45^\circ)$ $\checkmark \sin(x+45^\circ) = \sin(135^\circ - x)$ $\checkmark 1^{\text{st}} \text{ quad}/1^{\text{ste}} \text{ kwadrant}$ $\checkmark \text{ Gen Solution 1/alg opl 1}$ $\checkmark 2^{\text{nd}} \text{ quad}/2^{\text{de}} \text{ kwadrant}$ $\checkmark \text{ Gen Solution 2/alg opl 2}$ and/en No/Geen solution – 1 if/as $k \in \mathbb{Z}$ is not included/nie deel van die antwoord is nie $\checkmark \text{ answer/antwoord}$ $\checkmark \sin(x+45^\circ) = \cos(x-45^\circ)$ $\checkmark \cos(45^\circ - x) = \cos(x-45^\circ)$ $\checkmark 1^{\text{st}} \text{ quad}/1^{\text{ste}} \text{ kwadrant}$ $\checkmark \text{ Gen Solution 1/alg opl 1}$ $\checkmark 4^{\text{th}} \text{ quad}/4^{\text{de}} \text{ kwadrant}$ $\checkmark \text{ Gen Solution 2/alg opl 2}$ and/en No/Geen solution – 1 if/as $k \in \mathbb{Z}$ is not included/nie deel van die antwoord is nie $\checkmark \text{ answer/antwoord}$ (7)
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4.3

$$\cos 22,5^\circ = \frac{a}{c} \text{ and } a^2 + b^2 = c^2$$



$$\sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$2 \sin 22,5^\circ \cdot \cos 22,5^\circ = \frac{\sqrt{2}}{2}$$

$$2 \times \frac{b}{c} \times \frac{a}{c} = \frac{\sqrt{2}}{2}$$

$$\frac{2ab}{c^2} = \frac{\sqrt{2}}{2}$$

✓ correct sketch

$$\checkmark \sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\checkmark 2 \sin 22,5^\circ \cdot \cos 22,5^\circ$$

$$\checkmark \frac{b}{a} \quad \checkmark \frac{a}{c}$$

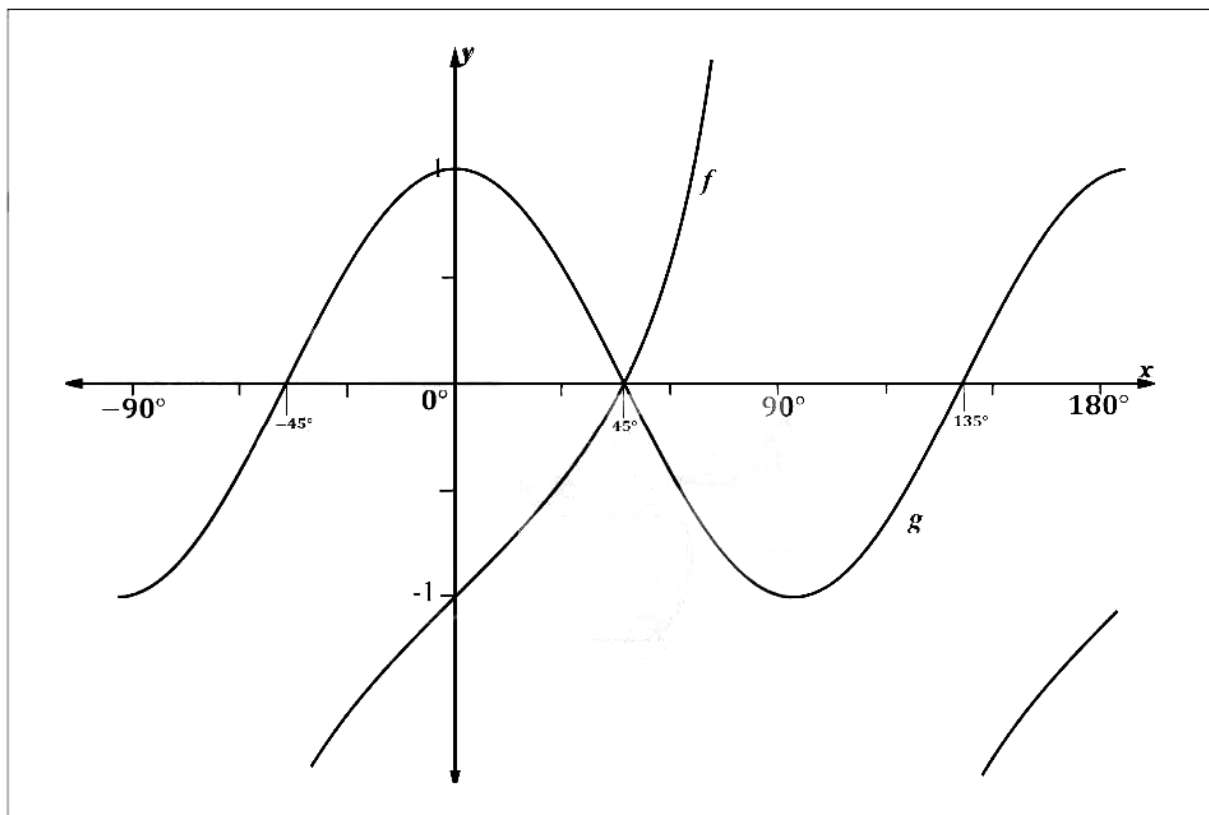
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[19]



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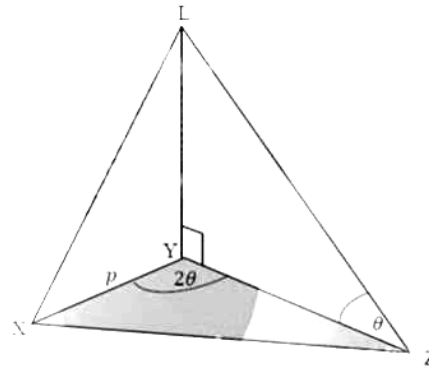
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**QUESTION/VRAAG 5**

5.1	Amplitude of $g = 1$	✓ answer/antwoord (1)
5.2	Period of g is 180°	✓ answer/antwoord (1)
5.3	$y \in [-1;1]$ or $-1 \leq y \leq 1$	✓ answer/antwoord (1)
5.4.1	$x = 0^\circ$ or $x = 180^\circ$	✓ $x = 0^\circ$ ✓ $x = 180^\circ$ (2)
5.4.2	$\tan x = \cos 2x + 1$ $\tan x - 1 = \cos 2x$ $x = 45^\circ$ Answer only: Full marks	✓ $\tan x - 1 = \cos 2x$ ✓ answer/antwoord (2)
5.4.3	$2 - 2\sin^2 x \leq \tan x$ $1 - 2\sin^2 x \leq \tan x - 1$ $\cos 2x \leq \tan x - 1$ $45^\circ \leq x < 90^\circ$	✓ $1 - 2\sin^2 x \leq \tan x - 1$ ✓ $\cos 2x \leq \tan x - 1$ ✓ end points/einde punte ✓ notation/notasie (4)

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QUESTION/VRAAG 6

6.1	$\text{Area of } \triangle XYZ = \frac{1}{2} p \cdot YZ \cdot \sin 2\theta$ $A = \frac{1}{2} p \cdot YZ \cdot \sin 2\theta$ $YZ = \frac{2A}{p \sin 2\theta} \text{ or } \frac{A}{\frac{1}{2} p \sin 2\theta}$	✓ substitution/vervangings ✓ answer/antwoord (2)
6.2	$\tan \theta = \frac{LY}{YZ}$ $LY = YZ \tan \theta$ $LY = \frac{2A}{p \sin 2\theta} \times \frac{\sin \theta}{\cos \theta}$ $LY = \frac{2A}{p \times 2 \sin \theta \cos \theta} \times \frac{\sin \theta}{\cos \theta}$ $LY = \frac{A}{p \cos^2 \theta}$ OR $\frac{LY}{\sin \theta} = \frac{YZ}{\sin (90^\circ - \theta)}$ $LY = \frac{2A}{p \sin 2\theta \cdot \cos \theta} \times \sin \theta$ $LY = \frac{2A \cdot \sin \theta}{p \times 2 \sin \theta \cos \theta \times \cos \theta}$	✓ $\tan \theta = \frac{LY}{YZ}$ ✓ $LY = YZ \tan \theta$ ✓ $LY = \frac{2A}{p \sin 2\theta} \times \frac{\sin \theta}{\cos \theta}$ ✓ $LY = \frac{2A}{p \times 2 \sin \theta \cos \theta} \times \frac{\sin \theta}{\cos \theta}$ ✓ $\frac{LY}{\sin \theta} = \frac{YZ}{\sin (90^\circ - \theta)}$ ✓ $\cos \theta$ ✓ $YZ = \frac{2A}{p \sin 2\theta}$ ✓ $2 \sin \theta \cos \theta$ (4)
6.3	$XZ^2 = 15^2 + 30^2 - 2(15)(30)\cos 120^\circ$ $XY = 39,69 \text{ m or } 15\sqrt{7} \text{ m}$	✓ substitution/vervangings ✓ answer/antwoord (2)

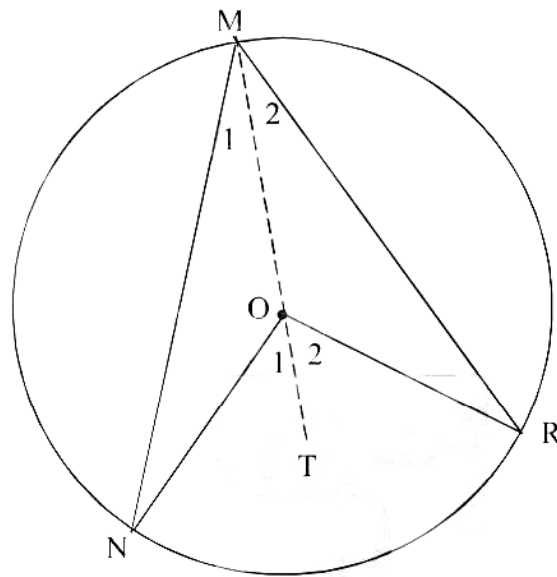
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QUESTION/VRAAG 7

7.1



Draw MO produced to T/Trek MO en verbind met T

Proof:/Bewys

$$\hat{M}_1 = \hat{N} \quad [\angle \text{s opp} = \text{sides} / \angle^{\circ} \text{teenoor} = \text{sye}]$$

$$\hat{O}_1 = 2\hat{M}_1 \quad [\text{ext } \angle \text{ of a } \Delta / \text{buite } \angle \text{ van } \Delta]$$

Similarly: $\hat{O}_2 = 2\hat{M}_2$

$$\hat{O}_1 + \hat{O}_2 = 2\hat{M}_1 + 2\hat{M}_2$$

$$\hat{NOR} = \hat{M}$$

✓ construction/konstruksie

✓ S/R

✓ S/R

✓ S

(4)

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7.2		
7.2.1	$\hat{O}LM = 90^\circ$ [rad $\perp$ tan/rklyn] $\hat{O}_2 = 46^\circ$ [sum of $\angle$ s of a Δ /som van $\angle^e$ van Δ]	$\checkmark$ S $\checkmark$ R $\checkmark$ S/R (3)
7.2.2	$\hat{P} = \hat{L}_2$ [$\angle$ s opp = sides/ $\angle^e$ teenoor = sye] $2\hat{P} = \hat{O}_2 = 46^\circ$ [$\angle$ at centre = $2 \times \angle$ at circumf/ [midp $\angle = 2 \times$ omtreks $\angle$] OR [ext $\angle$ of a Δ / buite $\angle$ van Δ] $\hat{P} = \hat{L}_2 = 23^\circ$	$\checkmark$ S/R $\checkmark$ S/R $\checkmark$ answer/antwoord (3)
7.2.3	$\hat{P}LQ = 90^\circ$ [$\angle$ subt by dia/ $\angle$ in halwe sirkel] $\hat{P} + \hat{P}LQ + \hat{Q}_1 = 180^\circ$ [sum of $\angle$ s of a Δ /som van $\angle^e$ van Δ] $23^\circ + 90^\circ + \hat{Q}_1 = 180^\circ$ $\hat{Q}_1 = 67^\circ$ [sum of $\angle$ s of a Δ /som van $\angle^e$ van Δ] OR $\hat{L}_1 + \hat{L}_2 = 90^\circ$ [rad $\perp$ tan/rklyn] $\hat{L}_1 = 67^\circ$ $\hat{Q}_1 = \hat{L}_1 = 67^\circ$ [tan chord theorem/rklyn-koord stelling] OR $\hat{L}_5 = \hat{P} = 23^\circ$ [tan chord theorem/rklyn-koord stelling] $\hat{Q}_1 = 23^\circ + 44^\circ$ $\hat{Q}_1 = 67^\circ$ [ext $\angle$ of a Δ / buite $\angle$ van Δ]	$\checkmark$ S/R $\checkmark$ S $\checkmark$ R $\checkmark$ S/R $\checkmark$ S $\checkmark$ R $\checkmark$ S $\checkmark$ R $\checkmark$ S/R (3)

[13]



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QUESTION/VRAAG 8

8.1	$C = A_3$ [tan chord theorem/rklyn-koord stelling] $\hat{D}_1 = C$ [alt $\angle$ s /verw $\angle^e$; $CA \parallel RP$] $\therefore \hat{D}_1 = \hat{A}_3$	✓ S/R ✓ S/R (2)
8.2	$\hat{D}_4 = \hat{D}_1$ vert opp $\angle$ s /regoorst $\angle^e$] $\hat{D}_4 = \hat{A}_3$ [both = $\hat{C}$ /beide = $\hat{C}$] $\therefore \hat{D}_4 = \hat{A}_3$ PADB is a cyclic quad / is 'n kvh [converse of $\angle$ s in same seg/omgekeerde $\angle^e$ in dies seg]	✓ S/R ✓ S ✓ R (3)
8.3	$\hat{B}_2 = \hat{D}_3$ [$\angle$ s in same seg/ $\angle^e$ in dies seg] $\hat{A}_1 = \hat{D}_3$ [alt $\angle$ s /verw $\angle^e$; $CA \parallel RP$] $\therefore \hat{A}_1 = \hat{B}_2$ But $\hat{B}_2 = \hat{C}$ [tan chord theorem/rklyn/koord st] $\therefore \hat{A}_1 = C$ $AD = CD$ [sides opp = $\angle$ s /sy t.o = $\angle^e$]	✓ S/R ✓ S/R ✓ S/R ✓ R (4)
8.4	Let $\hat{C} = x$ $\hat{A}_1 = \hat{C} = x$ [proven in 8.3] $\hat{B}_1 = \hat{A}_2 = y$ [both = $\hat{C}$] $\hat{C} + \hat{A}_1 + \hat{A}_2 + \hat{B}_1 = 180^\circ$ [sum of $\angle$ s of a Δ /som $\angle^e$ v Δ] $x + x + y + y = 180^\circ$ $2x + 2y = 180^\circ$ $x + y = 90^\circ$ BC is a diameter [converse: $\angle$ in a semi-circle /omgekeerde $\angle$ in halwe sirkel]	✓ S/R ✓ S/R ✓ S ✓ S ✓ R (5)
OR		



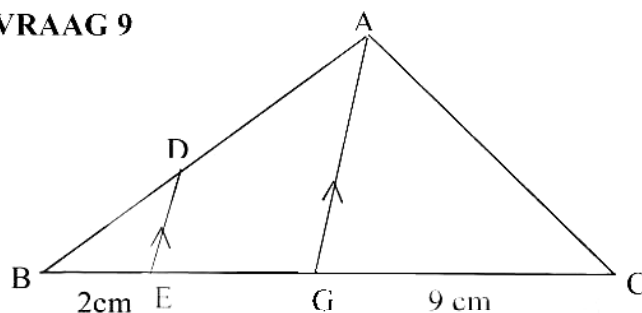


AD = DB [given/gegee] But/Maar AD = CD [proved in 8.3] D is the centre/middelpunt [CD = AD = BD] CB is a diameter/middellyn [CD = DB]	✓S/R ✓S/R ✓S ✓R ✓R
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(5)

[14]

QUESTION/VRAAG 9



9.1	$\frac{EG}{GC} = \frac{2k}{3k}$ $\frac{EG}{9} = \frac{2}{3}$ $EG = 6 \text{ cm}$ Answer only: Full marks	✓S ✓ answer/antwoord
9.2	$\frac{AB}{AD} = \frac{8}{6}$ [Prop theorem/eweredigheidstelling DE AG] $\frac{AB}{AD} = \frac{4}{3}$	✓S ✓R (2)
9.3	$\frac{BD}{12} = \frac{2}{6}$ [line to one side of Δ /lyn een sy v Δ OR Prop theorem/eweredigheidstelling DE AG] $BD = 4 \text{ cm}$ $\frac{\text{Area of } \Delta ABC}{\text{Area of quadrilateral ADEC}}$ $= \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta ABC - \text{Area of } \Delta DBE}$ $= \frac{\frac{1}{2}(16)(17)\sin \hat{B}}{\frac{1}{2}(16)(17)\sin \hat{B} - \frac{1}{2}(4)(2)\sin \hat{B}}$ $= \frac{136 \sin \hat{B}}{132 \sin \hat{B}}$ $= \frac{34}{33}$	✓S/R ✓ BD = 4 cm ✓ method/metode ✓ $\frac{1}{2}(16)(17)\sin \hat{B}$ ✓ $\frac{1}{2}(4)(2)\sin \hat{B}$ ✓ answer/antwoord

(6)

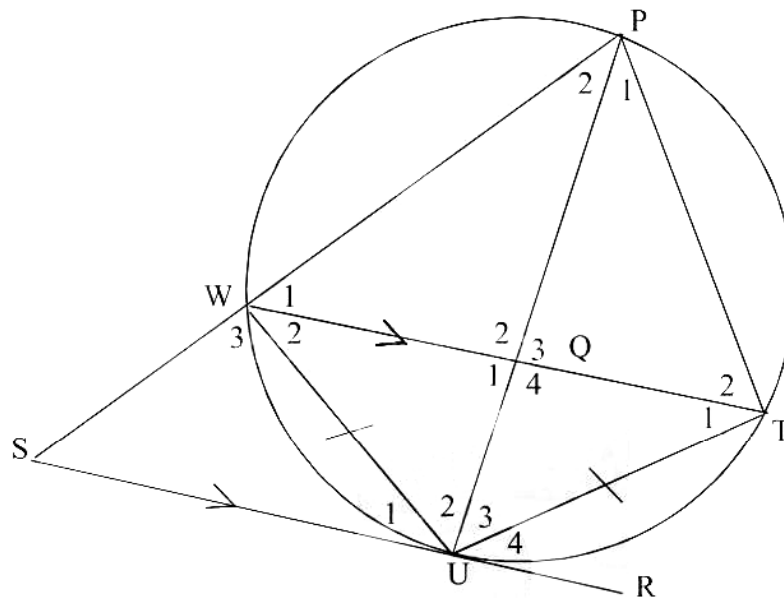
[10]



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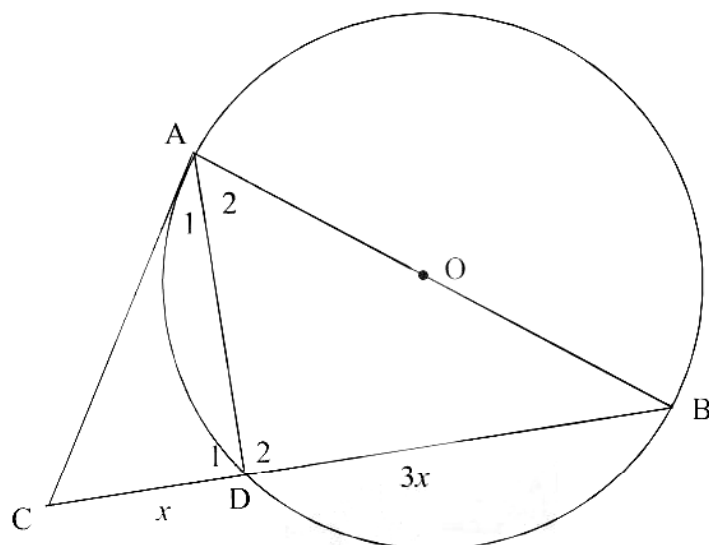
QUESTION/VRAAG 10



10.1.1	$\hat{W}_2 = \hat{U}_1$ [alt $\angle$ s / verw $\angle^e$; WT $\parallel$ SU] $\hat{W}_2 = \hat{T}_1$ [$\angle$ s opp = sides / $\angle^e$ teenoor = sye] $\therefore \hat{U}_1 = \hat{T}_1$ US is a tangent to circle PWUT. [converse tan/chord theorem/ omgekeerde rklyn-koord stelling] OR $\hat{P}_1 = \hat{P}_2$ [= chords = $\angle$ s / = koorde = $\angle^e$] $\hat{P}_1 = \hat{W}_2$ [$\angle$ s in same seg / $\angle^e$ in dies seg] $\hat{W}_2 = \hat{U}_1$ [alt $\angle$ s / verw $\angle^e$; WT $\parallel$ SU] $\therefore \hat{U}_1 = \hat{P}_2$ US is a tangent to circle PWUT. [converse tan/chord theorem/ omgekeerde rklyn-koord stelling]	✓S/R ✓S/R ✓R ✓S/R ✓S/R ✓R (3)
10.1.2	In $\triangle SPU$ and $\triangle SUW$ 1) $\hat{S} = \hat{S}$ [common / gemeenskaplik] 2) $\hat{P}_2 = \hat{U}_1$ [tan chord theorem / rklyn-koord stelling] 3) $\hat{S}\hat{U}P = \hat{W}_3$ [sum of $\angle$ s of a $\triangle$ / som $\angle^e$ v $\triangle$] $\therefore \triangle SPU \parallel \triangle SUP$ [AAA / $\angle \angle \angle$]	✓ S/R ✓ S /R ✓ R or/ 3 rd angle / of 3 ^{de} $\angle$ v $\triangle$ (3)



10.2


 $\hat{D}_2 = 90^\circ$ [$\angle$ in a semi-circle/ $\angle$ in halwe sirkel]
In $\triangle ADC$ and $\triangle BDA$ 1) $\hat{A}_1 = \hat{B}$ [tan chord theorem/rklyn-koord stelling]2) $\hat{D}_1 = \hat{D}_2 = 90^\circ$ [$\angle$ s on a str line/ $\angle$ e op RL]3) $\hat{C} = \hat{A}_2$ [sum of $\angle$ s of a $\triangle$ /som $\angle$ e v $\triangle$] $\therefore \triangle ADC \parallel \triangle BDA$ [$\angle\angle\angle$]

$$\frac{AD}{BD} = \frac{DC}{DA} \quad [\Delta s \parallel]$$

$$AD^2 = CD \cdot BD$$

$$AD^2 = x \times 3x$$

$$AD^2 = 3x^2$$

OR
 $\hat{D}_2 = 90^\circ$ [$\angle$ in a semi-circle/ $\angle$ in halwe sirkel]

$$\tan \hat{A}_1 = \frac{CD}{AD} = \frac{x}{AD}$$

$$\tan B = \frac{AD}{BD} = \frac{AD}{3x}$$

 $\hat{A}_1 = \hat{B}$ [tan chord theorem/rklyn-koord stelling]

$$\therefore \frac{AD}{3x} = \frac{x}{AD}$$

$$AD^2 = 3x^2$$

✓ S/R

✓ S/R

✓ S/R

✓ S/R or 3rd $\angle$ / of 3^{de} $\angle$ e

✓ S

✓ S

✓ S/R

✓ S

✓ S

✓ S ✓ R

✓ S

(6)

[12]

TOTAL: 150



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REPUBLIC OF SOUTH AFRICA

2026 MID-YEAR EXAMINATION ERRATA/ADDITIONS & ADJUSTMENTS TO MARKING GUIDELINES

SUBJECT	MATHEMATICS	PAPER	2
DATE	04 JUNE 2026	TIME OF ERRATA	16 :30
QUESTION	1.1	MARKS	2
QUESTION	1.5	MARKS	3
QUESTION	1.8	MARKS	4
QUESTION	4.3	MARKS	5
QUESTION	5.4.3	MARKS	4
QUESTION	6.2	MARKS	4
QUESTION	10.2	MARKS	6
TOTAL MARKS AFFECTED			33
TOTAL MARKS FOR THE PAPER AFTER ADJUSTMENT			150

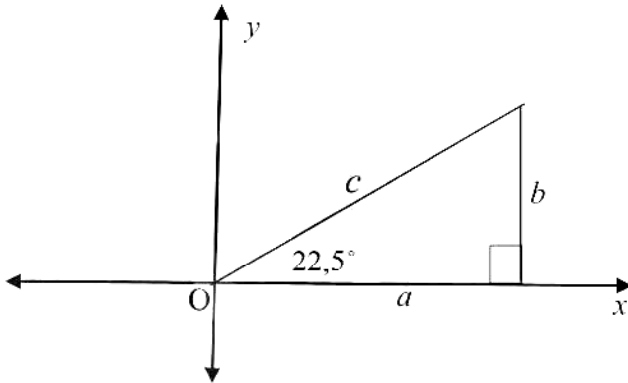
REPLACE THE ANSWERS OR WRITE ADDITIONS OR ADJUSTMENTS ON THE TABLE BELOW:

1.1	$x = \frac{x_1 + x_2}{2} \quad y = \frac{y_1 + y_2}{2}$ $-1 = \frac{-4 + k}{2} \quad -2 = \frac{1 + p}{2}$ $k = 2 \quad p = -5$ $R(2; -5)$	$\checkmark \quad -1 = \frac{-4 + k}{2}$ $\checkmark \quad -2 = \frac{1 + p}{2}$ (2)
1.5	$B(-11; 14)$ $m_{BP} = \frac{14 - 1}{-11 + 4}$ $m_{BP} = -\frac{13}{7}$ $m_{PR} = m_{PS} = -1$ Gradients are not the same $\therefore (-11; 14)$ does not lie on $y = -x - 3$	$\checkmark \text{ substitution/vervangend}$ $\checkmark \quad m_{BP} = -\frac{13}{7}$ $\checkmark \text{ conclusion/gevolgtrekking}$ (3)

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1.8	Coordinates of T $-x - 3 = 0$ $x = -3$ $T(-3;0)$ $TR = \sqrt{(0+3)^2 + (-3-0)^2}$ $TR = \sqrt{18}$ $TV = 5$ $5^2 = (\sqrt{50})^2 + 5^2 - 2\sqrt{50}(5)\cos R$ $25 = 50 + 25 - 10\sqrt{50}\cos R$ $\cos R = \frac{\sqrt{2}}{2}$ $\hat{R} = 45^\circ$	✓ $\tan \hat{P}\hat{T}\hat{V} = -1$ ✓ $\hat{P}\hat{T}\hat{V} = 135^\circ$ ✓ $\hat{R} = 135^\circ - 90^\circ$ ✓ $\hat{R} = 45^\circ$ (4)
2.1	Answer only: Full marks	
2.8	$q + \sqrt{2} = SM$	✓ $q + \sqrt{2} = SM$
3.2		✓ $-\sin 10^\circ / \sin^2 10^\circ$
4.3	$\cos 22,5^\circ = \frac{a}{c}$ and $a^2 + b^2 = c^2$  $\sin 45^\circ = \frac{\sqrt{2}}{2}$ $2 \sin 22,5^\circ \cdot \cos 22,5^\circ = \frac{\sqrt{2}}{2}$ $2 \times \frac{b}{c} \times \frac{a}{c} = \frac{\sqrt{2}}{2}$ $\frac{2ab}{c^2} = \frac{\sqrt{2}}{2}$	✓ correct sketch ✓ $\sin 45^\circ = \frac{\sqrt{2}}{2}$ ✓ $2 \sin 22,5^\circ \cdot \cos 22,5^\circ$ ✓ $\frac{b}{a}$ ✓ $\frac{a}{c}$ (5)





5.4.2	Answer only: Full marks	
5.4.3	$2 - 2 \sin^2 x \leq \tan x$ $1 - 2 \sin^2 x \leq \tan x - 1$ $\cos 2x \leq \tan x - 1$ $45^\circ \leq x < 90^\circ$	$\checkmark 1 - 2 \sin^2 x \leq \tan x - 1$ $\checkmark \cos 2x \leq \tan x - 1$ $\checkmark$ end points/einde punte $\checkmark$ notation/notasie (4)
6.2	$\frac{LY}{\sin \theta} = \frac{YZ}{\sin (90^\circ - \theta)}$ $LY = \frac{2A}{p \sin 2\theta \cdot \cos \theta} \times \sin \theta$ $LY = \frac{2A \cdot \sin \theta}{p \times 2 \sin \theta \cos \theta \times \cos \theta}$	$\checkmark \frac{LY}{\sin \theta} = \frac{YZ}{\sin (90^\circ - \theta)}$ $\checkmark \cos \theta$ $\checkmark YZ = \frac{2A}{p \sin 2\theta}$ $\checkmark 2 \sin \theta \cos \theta$ (4)
6.3	$XY = 39,69 \text{ m}$ or $15\sqrt{7} \text{ m}$	$\checkmark$ answer/antwoord
9.1	Answer only: Full marks	
10.2	$\hat{D}_2 = 90^\circ$ [$\angle$ in a semi-circle/ $\angle$ in halwe sirkel] $\tan \hat{A}_1 = \frac{CD}{AD} = \frac{x}{AD}$ $\tan B = \frac{AD}{BD} = \frac{AD}{3x}$ $\hat{A}_1 = \hat{B}$ [tan chord theorem/rklyn-koord stelling] $\therefore \frac{AD}{3x} = \frac{x}{AD}$	$\checkmark$ S/R $\checkmark$ S $\checkmark$ S $\checkmark$ S $\checkmark$ R $\checkmark$ S (6)

