



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT

GRADE/*GRAAD* 10

MATHEMATICS P2/*WISKUNDE V2*

NOVEMBER 2017

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

These marking guidelines consist of 10 pages.
Hierdie nasienriglyne bestaan uit 10 bladsye.

DEPARTMENT OF BASIC EDUCATION
PRIVATE BAG X385, PRETORIA 0001
2017 -11- 08
APPROVED MARKING GUIDELINE PUBLIC EXAMINATION


2017-01-08

NOTE:

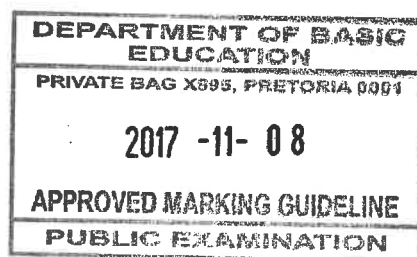
- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

LET WEL:

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.
- Dit is onaanvaarbaar dat waardes/antwoorde veronderstel word om 'n probleem op te los.

QUESTION/VRAAG 1

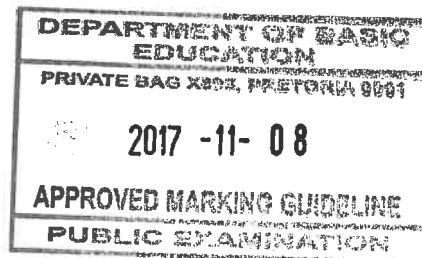
1.1	<p>34 37 43 46 48 48 52 54 58 62 68 73 78 84 90</p> <p>Median/Mediaan = 54</p>	<p>✓ arranging in ascending order/ rangskik in stygende orde ✓ answ./antw.</p> <p>(2)</p>
1.2	<p>Range/Variasiewydte = 90 – 34 = 56</p>	<p>✓ difference between max and min/ verskil tussen maks en min ✓ answ./antw.</p> <p>(2)</p>
1.3	<p>IQR(IKV) = $Q_3 - Q_1$ = 73 – 46 = 27</p>	<p>✓ $Q_1 = 46$ ✓ $Q_3 = 73$ ✓ answ./antw.</p> <p>(3)</p>
1.4		<p>✓ min. & max./maks. ✓ median/mediaan (Q_2) ✓ Q_1 and/en Q_3</p> <p>(3)</p>
		[10]



M.S.

QUESTION/VRAAG 2

2.1	30 days/dae	✓ answ./antw. (1)
2.2	$28 \leq T < 32$	✓ answ./antw. (1)
2.3	<p>The mean/Gemiddeld $(\bar{X}) = \frac{2(22) + 4(26) + 9(30) + \dots + 3(42)}{30}$</p> $= \frac{44 + 104 + 270 + 170 + 266 + 126}{30}$ $= \frac{980}{30}$ $= 32,67^\circ \text{C.}$	✓ addition/optel ✓ 30 ✓ answ./antw. (3)
2.4	$9 + 5 + 7 + 3 = 24 \text{ days/dae}$ $\% \text{ of number of days/getal dae} = \frac{24}{30} \times 100$ $= 80\%$	✓ addition/optel ✓ answ./antw. (2)
		[7]



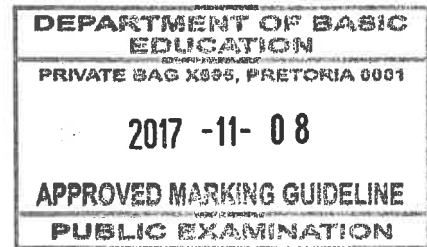
M.S

QUESTION/VRAAG 3

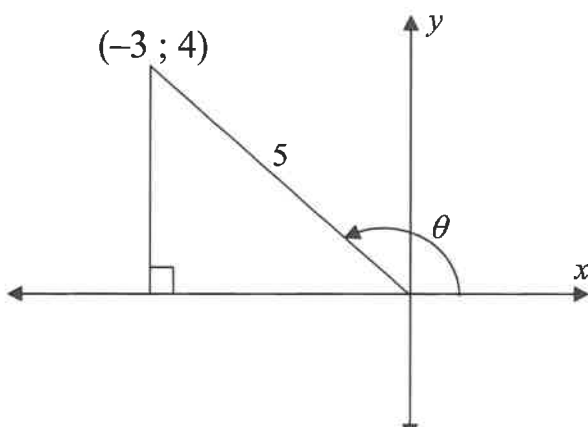
<p>3.1</p>	$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(7 - 6)^2 + (4 - 6)^2}$ $= \sqrt{(1)^2 + (-2)^2}$ $= \sqrt{5}$	<p>✓ subst. into dist formula/verv. In afstandsformule</p> <p>✓ answ./antw.</p> <p>(2)</p>
<p>3.2</p>	$\left(\frac{6+t}{2}; \frac{6+k}{2}\right) = \left(\frac{7}{2}; \frac{7}{2}\right)$ $\frac{6+t}{2} = \frac{7}{2} \qquad \frac{6+k}{2} = \frac{7}{2}$ $t = 1 \qquad k = 1$ <p>S(1;1)</p>	<p>✓ $\frac{6+t}{2} = \frac{7}{2}$</p> <p>✓ $\frac{6+k}{2} = \frac{7}{2}$</p> <p>✓ answ./antw.</p> <p>(3)</p>
<p>3.3</p>	$PR = \sqrt{(x_p - x_R)^2 + (y_p - y_R)^2}$ $= \sqrt{(7 - 0)^2 + (4 - 3)^2}$ $= \sqrt{50} \text{ (or } 5\sqrt{2} \text{ or } 7,07)$ $QS = \sqrt{(x_s - x_Q)^2 + (y_s - y_Q)^2}$ $= \sqrt{(1 - 6)^2 + (1 - 6)^2}$ $= \sqrt{50} \text{ (or } 5\sqrt{2} \text{ or } 7,07)$ <p>∴ PR = QS</p>	<p>✓ length of PR / lengte van PR</p> <p>✓ length of QS / lengte van QS</p> <p>(2)</p>
<p>3.4</p>	$m_{QR} = \frac{6-3}{6-0} = \frac{1}{2}$ $m_{RS} = \frac{3-1}{0-1} = -2$ $m_{QR} \times m_{RS}$ $= \frac{1}{2} \times -2$ $= -1$ $m_{QR} \times m_{RS} = -1$ <p>∴ QR ⊥ RS</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DEPARTMENT OF BASIC EDUCATION</p> <p>PRIVATE BAG 9589, PRETORIA 0001</p> <p>2017 -11- 08</p> <p>APPROVED MARKING GUIDELINE</p> <p>PUBLIC EXAMINATION</p> </div> <p>✓ $m_{QR} = \frac{1}{2}$</p> <p>✓ $m_{RS} = -2$</p> <p>✓ $\frac{1}{2} \times -2$</p> <p>✓ $m_{QR} \times m_{RS} = -1$</p> <p>(4)</p>
<p>3.5</p>	<p>Rectangle./Reghoek.</p> <p>The diagonals are equal and one of the interior angles is equal to 90°.</p> <p>Die hoeklyne is gelyk en een van die binnehoeke is gelyk aan 90°.</p>	<p>✓ Rectangle/Reghoek</p> <p>✓ reason/rede</p> <p>(2)</p>

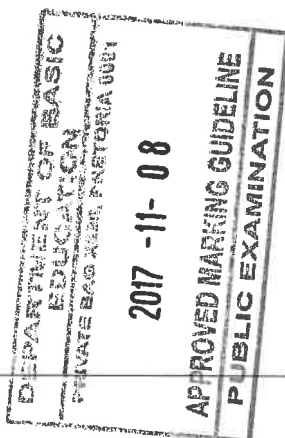
M.S

<p>3.6</p>	<p>$RS = \sqrt{5}$ Opposite sides of rectangle</p> <p>$\cos R\hat{S}Q = \frac{\sqrt{5}}{5\sqrt{2}}$</p> <p>$R\hat{S}Q = 71,57^\circ$</p> <p>OR/OF</p> <p>$QR = \sqrt{(6-0)^2 + (6-3)^2} = \sqrt{45}$</p> <p>$\sin R\hat{S}Q = \frac{\sqrt{45}}{5\sqrt{2}}$</p> <p>$R\hat{S}Q = 71,57^\circ$</p> <p>OR/OF</p> <p>$QR = \sqrt{(6-0)^2 + (6-3)^2} = \sqrt{45}$</p> <p>$RS = \sqrt{5}$ Opposite sides of rectangle</p> <p>$\tan R\hat{S}Q = \frac{\sqrt{45}}{\sqrt{5}}$</p> <p>$R\hat{S}Q = 71,57^\circ$</p>	<p>✓ $RS = \sqrt{5}$</p> <p>✓ $\cos R\hat{S}Q = \frac{\sqrt{5}}{5\sqrt{2}}$</p> <p>✓ <i>answ./antw.</i> (3)</p> <p>OR/OF</p> <p>✓ $QR = \sqrt{45}$</p> <p>✓ $\sin R\hat{S}Q = \frac{\sqrt{45}}{5\sqrt{2}}$</p> <p>✓ <i>answ./antw.</i> (3)</p> <p>OR/OF</p> <p>✓ $QR = \sqrt{45}$</p> <p>✓ $\tan R\hat{S}Q = \frac{\sqrt{45}}{\sqrt{5}}$</p> <p>✓ <i>answ./antw.</i> (3)</p> <p style="text-align: right;">[16]</p>
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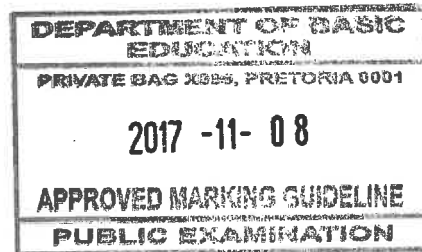


QUESTION/VRAAG 4

<p>4.1.1 (a)</p>	<p>$4 \cot \theta + 3 = 0$ $\cot \theta = -\frac{3}{4}$</p>  <p>$\cos \theta = -\frac{3}{5}$</p>	<p>✓ $\cot \theta = -\frac{3}{4}$ ✓ diagram ✓ $r = 5$ ✓ $\cos \theta = -\frac{3}{5}$</p> <p>(4)</p>
<p>4.1.1 (b)</p>	<p>$\frac{3 \sin \theta \sec \theta}{\tan \theta}$ $= 3 \left(\frac{\left(\frac{4}{5} \right) \left(-\frac{5}{3} \right)}{-\frac{4}{3}} \right)$ $= 3$</p>	<p>✓ $\frac{4}{5}$ ✓ $-\frac{5}{3}$ ✓ $-\frac{4}{3}$ ✓ answ./antw.</p> <p>(4)</p>
<p>4.1.2</p>	<p>$LHS = \left(\frac{4}{5} \right)^2 - 1$ $= -\frac{9}{25}$ $RHS = -\left(\frac{3}{5} \right)^2$ $= -\frac{9}{25}$ $\therefore \sin^2 \theta - 1 = -\cos^2 \theta.$</p>	<p>✓ subst./verv. ✓ answ./antw. ✓ answ./antw.</p> <p>(3)</p>
<p>4.2</p>	<p>$\cos 30^\circ \tan 60^\circ + \operatorname{cosec}^2 45^\circ \sin^2 60^\circ$ $= \frac{\sqrt{3}}{2} \times \sqrt{3} + \left(\frac{2}{\sqrt{2}} \right)^2 \times \left(\frac{\sqrt{3}}{2} \right)^2$ $= \frac{3}{2} + \frac{4}{2} \times \frac{3}{4}$ $= \frac{3}{2} + \frac{3}{2}$ $= 3$</p>	<p>✓ any 2 ratios correct / enige twee verhoudings korrek ✓ other 2 ratios correct / ander twee verhoudings korrek ✓ answ./antw.</p> <p>(3)</p>

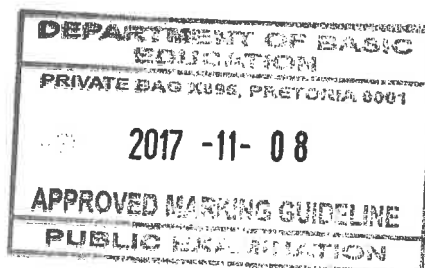


4.3	$\frac{4}{3} \sin \theta = \cos 37^\circ$ $\sin \theta = \frac{3(0,79863551)}{4}$ $\theta = 36,8^\circ$	✓ multiplying by/ <i>vermenigvuldig met</i> $\frac{3}{4}$ ✓ answ./antw.
		(2)
		[16]



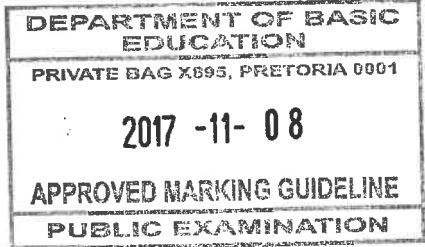
QUESTION/VRAAG 5

<p>5.1</p>		<p><i>f</i></p> <ul style="list-style-type: none"> ✓ shape/vorm ✓ x-intercept/afsnit ✓ y-intercept/afsnit <p><i>g</i></p> <ul style="list-style-type: none"> ✓ shape/vorm ✓ x-intercepts/afsnitte ✓ y-intercept/afsnit <p style="text-align: right;">(6)</p>
<p>5.2.1</p>	<p>Amplitude of/van $g = 2$</p>	<p>✓ answ./antw.</p> <p style="text-align: right;">(1)</p>
<p>5.2.2</p>	<p>Range of/Waardeversameling van $f : -2 \leq y \leq 0$ OR/OF $y \in [-2 ; 0]$</p>	<p>✓ critical values/kritieke waardes</p> <p>✓ notation/notasie</p> <p style="text-align: right;">(2)</p>
<p>5.3.1</p>	<p>2 solutions/oplossings</p>	<p>✓ answ./antw.</p> <p style="text-align: right;">(1)</p>
<p>5.3.2</p>	<p>$\sin x = 2 + 2 \cos x$ $\sin x - 1 - 2 \cos x = 1$ $f(x) - g(x) = 1$ $x = 126,87^\circ$ or $x = 180^\circ$</p>	<p>✓ manipulation / manipulasie</p> <p>✓ $x = 126,87^\circ$</p> <p>✓ $x = 180^\circ$</p> <p style="text-align: right;">(3)</p>
		<p>[13]</p>



QUESTION/VRAAG 6

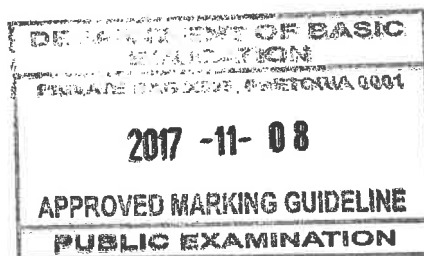
6.1	$\theta = 47^\circ$	✓ answ./antw. (1)
6.2	$\sin P = \frac{RQ}{RP}$ $\sin 47^\circ = \frac{RQ}{21}$ $RQ = 21 \sin 47^\circ$ $RQ = 15,36 \text{ m}$ <p>OR/OF</p> $\hat{P}RQ = 43^\circ$ $\cos \hat{P}RQ = \frac{RQ}{RP}$ $\cos 43^\circ = \frac{RQ}{21}$ $RQ = 21 \cos 43^\circ$ $RQ = 15,36 \text{ m}$	✓ trig. ratio/trig. verhoud ✓ correct subst./ korrekte instelling. ✓ answ./antw. (3)
6.3	$\tan S = \frac{RQ}{QS}$ $\tan S = \frac{15,36}{17}$ $\hat{S} = \tan^{-1}\left(\frac{15,36}{17}\right)$ $\hat{S} = 42,10^\circ$	✓ subst into trig ratio./verv in trig verh ✓ answ./antw. (2)
6.4	$\cos 47^\circ = \frac{PQ}{21}$ $PQ = 21 \times \cos 47^\circ$ $PQ = 14,32$ $PS = 14,32 + 17 = 31,32 \text{ m}$ <p>OR/OF</p>	$\sin 43^\circ = \frac{PQ}{21}$ $PQ = 21 \times \sin 43^\circ$ $PQ = 14,32$ $PS = 14,32 + 17 = 31,32 \text{ m}$ ✓ subst into trig. ratio/ verv in trig. verhoud ✓ PQ = 14,32 m ✓ addition/optel ✓ answ./antw. (4)



	$PQ^2 = PR^2 - RQ^2$ $= 21^2 - 15,36^2$ $= 205,07$ $PQ = 14,32$ $PS = 14,32 + 17$ $= 31,32 \text{ m}$	✓Th of Pyth/ <i>Stel van Pyth</i> ✓PQ = 14,32 m ✓addition/ <i>optel</i> ✓answ./ <i>antw.</i> (4)
		[10]

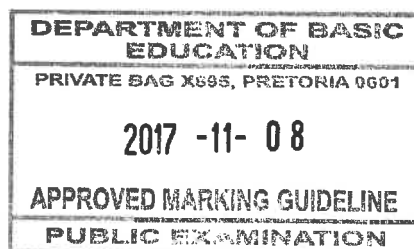
QUESTION/VRAAG 7

7.1	$V = \frac{1}{3} \pi r^2 h$ $83,38 = \frac{1}{3} \times 6,5 \pi r^2$ $r^2 = \frac{3 \times 83,38}{6,5 \pi}$ $r = 3,50 \text{ cm}$	✓subst./ <i>verv.</i> ✓answ./ <i>antw.</i> (2)
7.2	$s^2 = h^2 + r^2$ $s^2 = 6,5^2 + 3,5^2$ $s = 7,38 \text{ cm}$	✓subst./ <i>verv.</i> ✓answ./ <i>antw.</i> (2)
7.3	Surface area of the solid/ <i>Buite-oppervlakte (Oppervlakarea) van die vaste liggaam</i> $= 2\pi r^2 + \pi rs$ $= 2\pi(3,5)^2 + \pi(3,5)(7,38)$ $= 158,12 \text{ cm}^2$	✓subst./ <i>verv.</i> ✓answ./ <i>antw.</i> (2)
		[6]

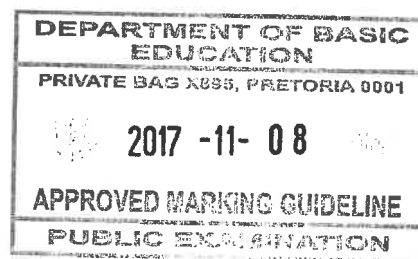


QUESTION/VRAAG 8

8.1.1	$\hat{O}_1 = 90^\circ$ Diagonal bisect at/ <i>Hoeklyne sny by</i> 90° .	✓S/R (1)
8.1.2	$\hat{L}_1 = 180^\circ - (34^\circ + 90^\circ)$ Sum of angles in/ <i>Som van hoeke</i> Δ . $= 56^\circ$	✓S ✓answ./ <i>antw.</i> (2)
8.1.3	<p>$\hat{L}_1 = \hat{L}_2 = 56^\circ$ diagonals bisect the/<i>hoeklyne sny die</i> \angles. $\hat{L}_1 + \hat{L}_2 = \hat{N}_1 + \hat{N}_2$ opp. \angles of rhombus/<i>teenoorst \anglevan die ruit</i> = $\therefore \hat{K}\hat{N}\hat{M} = 112^\circ$</p> <p>OR/OF $\hat{K}_1 = 34^\circ$ diagonals bisect the/<i>hoeklyne sny die</i> \angles.</p> <p>$\hat{K}\hat{N}\hat{M} + 68^\circ = 180^\circ$ co - int angles $KL \parallel NM$ $\therefore \hat{K}\hat{N}\hat{M} = 112^\circ$</p> <p>OR/OF $\hat{N}_2 = 56^\circ$ alt angles $KL \parallel NM$</p> <p>$\hat{N}_1 = \hat{N}_2 = 56^\circ$ diagonals bisect the/<i>hoeklyne sny die</i> \angles. $\therefore \hat{K}\hat{N}\hat{M} = 112^\circ$</p>	<p>✓S/R ✓answ./<i>antw.</i> (2)</p> <p>OR/OF ✓S/R ✓answ./<i>antw.</i> (2)</p> <p>OR/OF ✓S/R ✓answ./<i>antw.</i> (2)</p>
8.2	<p>Given/<i>Gegee</i> : $\parallel^m PQRS$ with diagonals/<i>met hoeklyne PR and/en QS</i>.</p> <p><i>R.P.T</i> : $PM = MR$</p> <p>Proof/<i>Bewys</i> : In ΔPMS and/en ΔRMQ</p> <p>1. $\hat{P}_1 = \hat{R}_1$ (alt./<i>verw. \angles, $PS \parallel QR$</i>) 2. $\hat{S}_1 = \hat{Q}_1$ (alt./<i>verw. \angles, $PS \parallel QR$</i>) 3. $PS = QR$ (opp. sides <i>parm</i> are /<i>teenoorst. sye van parm.</i> =)</p> <p>$\therefore \Delta PMS \equiv \Delta RMQ$ (AAS)</p> <p>$\Rightarrow PM = MR$ and $MS = MQ$</p> <p>OR/OF</p>	<p>✓ 1. S/R ✓ 2. S ✓ 3. S/R</p> <p>✓ congruency/<i>kongruensie</i> (AAS) (4)</p> <p>OR/OF</p>



	<p>Given/Gegee : ^m PQRS with diagonals/met hoeklyne PR and/en QS.</p> <p>R.P.T : QM = MS</p> <p>Proof/Bewys : In $\triangle PQM$ and/en $\triangle RSM$</p> <p>1. $\hat{P}_2 = \hat{R}_2$ (alt./verw. $\angle_s, QP \parallel SR$)</p> <p>2. $\hat{S}_2 = \hat{Q}_2$ (alt./verw. $\angle_s, SR \parallel PQ$)</p> <p>3. $PQ = SR$ (opp. sides parm are/teenoorst. sye van parm =)</p> <p>$\therefore \triangle PQM \equiv \triangle RSM$ (AAS)</p> <p>$\Rightarrow QM = MS$ and $PM = MR$</p>	<p>✓ 1. S/R</p> <p>✓ 2. S</p> <p>✓ 3. S/R</p> <p>✓ congruency/kongruensie (AAS)</p> <p>(4)</p>
<p>8.3</p>	<p>DB = 2DE (diagonals bisect each other)</p> <p>DE = FC (opp. side of/teenoorst. sy van //gram.)</p> <p>but/maar FC = 2KC (diagonals bisect each other)</p> <p>DE = 2KC (DE = FC)</p> <p>DB = 2(2KC) (DB = 2DE)</p> <p>DB = 4KC</p>	<p>✓ S/R</p> <p>✓ S/R</p> <p>✓ S</p> <p>✓ S</p> <p>(4)</p>
		<p>[13]</p>



QUESTION/VRAAG 9

9.1	<p>In $\triangle ACG$ F and/en H are midpoints/is middelpunte (given/gegee) $\therefore FH \parallel CG$ (line joining the midpoints/ lynstuk wat middelpunte verbind) $FE \parallel BC$ (same straight lines/dieselfde reguitlyne)</p> <p>In $\triangle AGB$, H is the midpoint/is die middelpunt $HE \parallel BG$ (proved/bewys) $\therefore E$ is the midpoint/is die middelpunt (Line drawn from midpt of side/Lyn getrek vanaf midpt van sy, // to 2nd side/na 2de sy)</p>	<p>✓ $FH \parallel CG$ ✓ reason/rede</p> <p>✓ reason/rede</p> <p>(3)</p>
9.2	<p>$\hat{A}EH = \hat{A}BC = 90^\circ$ (Corr angle/Ooreenst hoek $BC \parallel EF$)</p> <p>In $\triangle AEH$, Area/Oppervl. = $\frac{1}{2} EH \times AE$</p> $9,5 = \frac{1}{2} \times 3,5 \times AE$ $AE = \frac{38}{7} = 5,43 \text{ cm}$ $AB = 2AE$ $AB = 2\left(\frac{38}{7}\right)$ $= \frac{76}{7}$ $= 10,86 \text{ cm}$	<p>✓ subst./verv.</p> <p>✓ AE</p> <p>✓ AB</p> <p>(3)</p>
9.3	<p>$BG = 7 \text{ cm}$ (line joining the midpoints/ lynstuk wat middelpunte verbind) $BC = 14 \text{ cm}$</p> <p>In $\triangle ABC$, Area/Oppervl. = $\frac{1}{2} BC \times AB$</p> $= \frac{1}{2} \times 14 \times \frac{76}{7}$ $= 76 \text{ cm}^2$	<p>✓ S/R ✓ $BC=2BG=14$</p> <p>✓ answ./antw.</p> <p>(3)</p>
		[9]

TOTAL/TOTAAL: 100

