



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE 12/GRAAD 12**

**TECHNICAL MATHEMATICS P2/TEGNIESE WISKUNDE V2**

**NOVEMBER 2025**

**MARKING GUIDELINES/FINALE NASIENRIGLYNE**

**MARKS/PUNTE: 150**

CODE/ KODE	EXPLANATION/VERDUIDELIKING
<b>A</b>	Accuracy/Akkuraatheid
<b>AO</b>	Answer only/Slegs antwoord
<b>CA</b>	Consistent accuracy/Volgehoue akkuraatheid
<b>I</b>	Identity/Identiteit
<b>M</b>	Method/Metode
<b>NPR</b>	No penalty for rounding/Geen penalisering vir afronding nie
<b>NPU</b>	No penalty for omitting units/Geen penalisering vir eenhede weggelaat nie
<b>R</b>	Rounding/Afronding
<b>RE</b>	Reason/Rede
<b>S</b>	Simplification/Vereenvoudiging
<b>F</b>	Formula/Formule
<b>SF</b>	Substitution in correct formula/Vervanging in korrekte formule
<b>ST</b>	Statement/Bewering
<b>ST/RE</b>	Statement with reason/Bewering met rede

**These marking guidelines consist of 32 pages.  
Hierdie nasienriglyne bestaan uit 32 bladsye.**

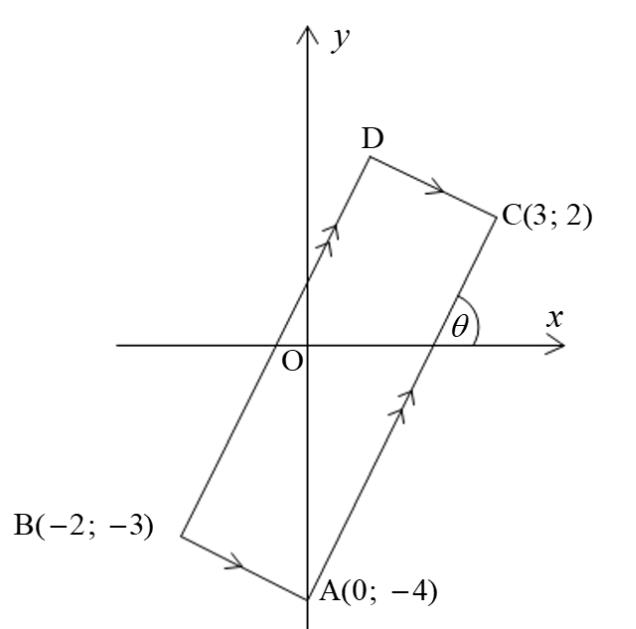
**NOTE:**

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- The method of consistent accuracy marking must be applied in all aspects of the marking guidelines where applicable as indicated by the marking code CA.
- # Shows questions where a Tolerance Range will be applied:  
**Q 2.1.3 ; Q 3.3 ; Q 6.5 & Q 10.2.3**

**LET WEL:**

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.
- Die metode van volgehoue akkuraatheid-nasien moet waar moontlik op alle aspekte van die nasienriglyne toegepas word, soos aangedui deur die nasien kode CA.
- # Toon vrae waar Toleransiewydte (Verdraagsaamheidsomvang) toegepas word:  
**V 2.1.3 ; V 3.3 ; V 6.5 & V 10.2.3**

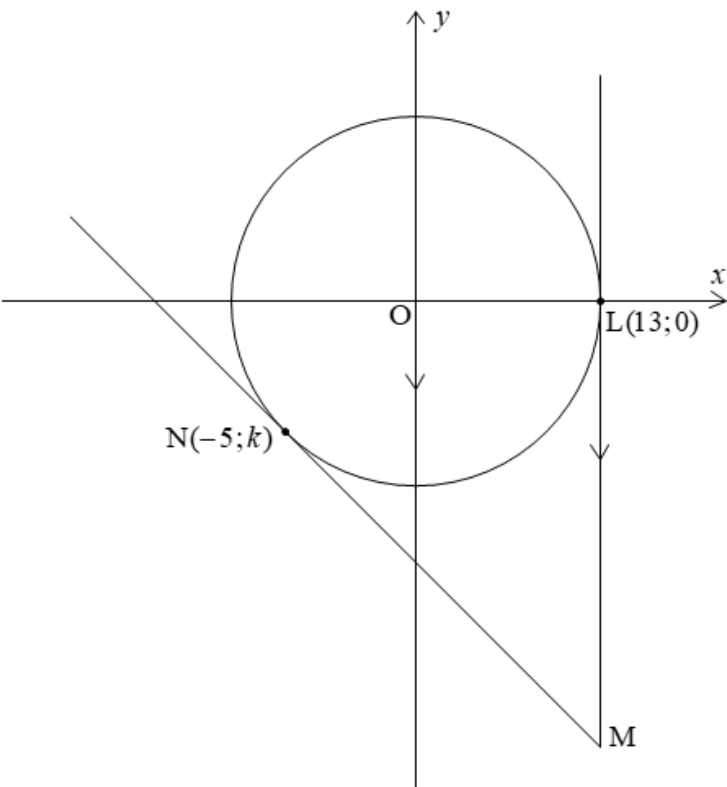
**QUESTION/VRAAG 1**

			
1.1	OA = 4 units/eenhede	✓ length of /lengte van OA	<b>A</b> (1)
1.2	$M = \left( \frac{x_A + x_B}{2} ; \frac{y_A + y_B}{2} \right)$ $= \left( \frac{0 + (-2)}{2} ; \frac{-4 + (-3)}{2} \right)$ $= \left( -1 ; -\frac{7}{2} \right) \text{ OR / OF } (-1 ; -3,5)$	✓ x - coordinate/koördinaat ✓ y - coordinate/koördinaat	<b>A</b> <b>A</b> (2)

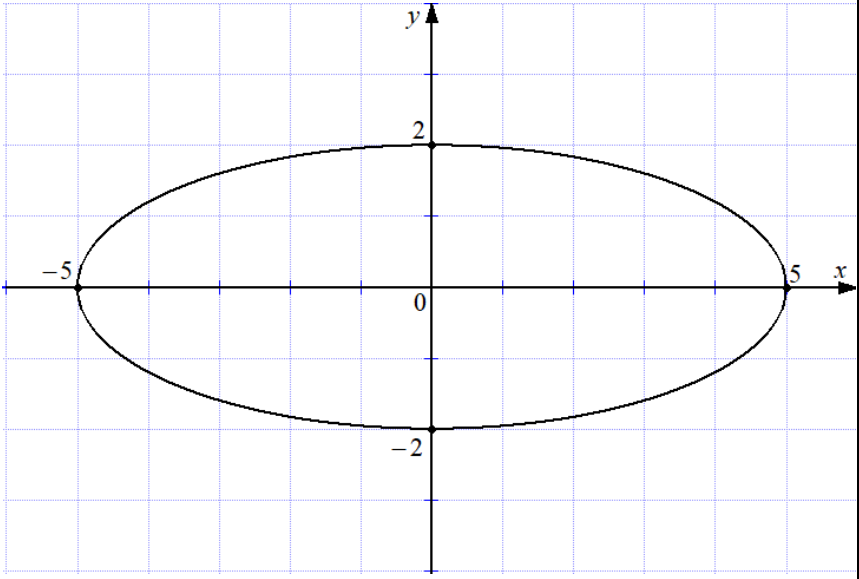
1.3	$m_{AC} = \frac{y_A - y_C}{x_A - x_C}$ $= \frac{(-4) - (2)}{(0) - (3)} \text{ OR / OF } = \frac{(2) - (-4)}{(3) - (0)}$ $= 2$ <p style="text-align: center;"><b>OR / OF</b></p> $y - y_1 = m (x - x_1)$ $(-4) - (2) = m ((0) - (3))$ $-6 = m (-3)$ $m = \frac{-6}{-3} = 2$ <p style="text-align: center;"><b>OR / OF</b></p> $y = mx + c$ $y = mx - 4$ $2 = m(3) - 4$ $3m = 6$ $m = 2$	<p>✓ SF <span style="float: right;">A</span></p> <p>✓ value of/waarde van <math>m</math> <span style="float: right;">CA</span></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>✓ SF <span style="float: right;">A</span></p> <p>✓ value of/waarde van <math>m</math> <span style="float: right;">CA</span></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>✓ SF <span style="float: right;">A</span></p> <p>✓ value of/waarde van <math>m</math> <span style="float: right;">CA</span></p> <p><b>AO: Full marks/Volpunte</b></p> <p style="text-align: right;">(2)</p>
1.4	$\tan \theta = m_{AC}$ $\theta = \tan^{-1}(2)$ $\theta \approx 63,43^\circ$	<p>✓ SF <span style="float: right;">CA</span></p> <p>✓ value of/waarde van <math>\theta</math> <span style="float: right;">CA</span></p> <p><b>AO: Full marks/Volpunte</b></p> <p><b>NPR</b></p> <p style="text-align: right;">(2)</p>
1.5	equal / gelyk <b>OR / OF</b> the same / dieselfde	<p>✓ equal/gelyk <span style="float: right;">A</span></p> <p style="text-align: right;">(1)</p>
1.6	$y - (-3) = 2 (x - (-2))$ $y + 3 = 2x + 4$ <p style="text-align: center;"><b>OR / OF</b></p> $y = 2x + 1$	<p>✓ gradient/helling <span style="float: right;">CA</span></p> <p>✓ Subst./Vervang B <span style="float: right;">A</span></p> <p>✓ equation in form <math>y = \dots</math> / vergelyking in vorm <math>y = \dots</math> <span style="float: right;">CA</span></p> <p style="text-align: right;">(3)</p>

1.7	$\cos \alpha = -\frac{\sqrt{2}}{2}$ <p>ref. / verw. <math>\angle = 45^\circ</math>  <math>\therefore \alpha = 180^\circ - 45^\circ = 135^\circ</math>  <math>\therefore m = \tan(135^\circ) = -1</math></p> <p style="text-align: center;"><b>OR / OF</b></p> $\cos \alpha = -\frac{\sqrt{2}}{2}$ $x^2 + y^2 = r^2$ $(-\sqrt{2})^2 + y^2 = (2)^2$ $y^2 = 4 - 2$ $y^2 = \pm\sqrt{2}$ $\therefore y = \sqrt{2}$ $\tan \alpha = \frac{\sqrt{2}}{-\sqrt{2}}$ $\tan \alpha = -1$ $\therefore m = -1$	<p>✓ Ref. <math>\angle</math> / Verwys. <math>\angle</math> <b>A</b>  ✓ value of/waarde van <math>\alpha</math> <b>CA</b>  ✓ value of/waarde van <math>m</math> <b>A</b></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>✓ Value of/Waarde van <math>y</math> <b>A</b>  ✓ tan ratio/verhouding <b>CA</b>  ✓ value of/waarde van <math>m</math> <b>CA</b>  (3)</p>
		<b>[14]</b>

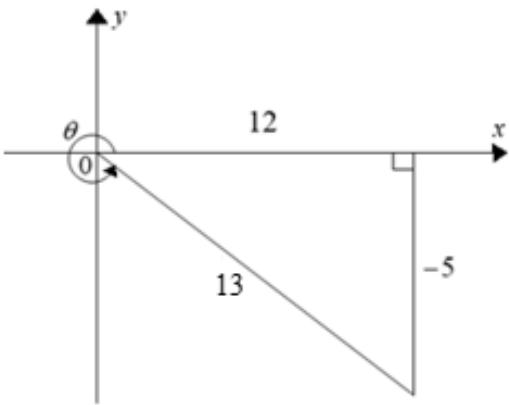
**QUESTION/VRAAG 2**

2.1			
2.1.1	$x^2 + y^2 = (13)^2$ <b>OR / OF</b> $x^2 + y^2 = 169$ <b>OR / OF</b> $x = \pm \sqrt{169 - y^2}$ <b>OR / OF</b> $y = \pm \sqrt{169 - x^2}$ <b>OR / OF</b> $(13)^2 + (0)^2 = r^2$ $169 = r^2$ $x^2 + y^2 = 169$	✓✓ equation/vergelyking <b>OR / OF</b> ✓✓ equation/vergelyking <b>OR / OF</b> ✓✓ equation/vergelyking <b>OR / OF</b> ✓✓ equation/vergelyking <b>OR / OF</b> ✓ substitution/vervanging  ✓ equation/vergelyking <b>AO: Full marks/Volpunte</b> (2)	<b>A</b>  <b>A</b>  <b>A</b>  <b>A</b>  <b>A</b>  <b>CA</b>  <b>CA</b> (2)
2.1.2	$(-5)^2 + (k)^2 = 169$ $\therefore k^2 = 144$ $\therefore k = -12$	✓ substitution/vervanging  ✓ value of/waarde van $k$ <b>AO: Full marks/Volpunte</b> (2)	<b>CA</b>  <b>CA</b> (2)

2.1.3 #	<p>Since / Omdat M(13 ; y)</p> $m_{ON} = \frac{12}{5}$ $m_{MN} = -\frac{5}{12}$ $y - (-12) = -\frac{5}{12}(x - (-5)) \text{ OR / OF } -12 = -\frac{5}{12}(-5) + c$ $y = -\frac{5}{12}x - \frac{25}{12} - 12 \qquad c = -\frac{25}{12} - 12 = -\frac{169}{12}$ $\therefore y = -\frac{5}{12}x - \frac{169}{12}$ $\therefore y = -\frac{5}{12}(13) - \frac{169}{12}$ $\therefore y = -\frac{39}{2} = -19,5$ $\therefore M(13; -19,5)$	<p>✓ value of/waarde van x    <b>A</b></p> <p>✓ gradient/gradiënt of/van ON    <b>CA</b></p> <p>✓ gradient/gradiënt of/van MN    <b>CA</b></p> <p>✓ equation/vergelyking    <b>CA</b></p> <p>✓ value of/waarde van y    <b>CA</b></p>
	<p style="text-align: center;"><b>OR / OF</b></p> <p>Since / Omdat M(13 ; y)</p> $x \cdot x_1 + y \cdot y_1 = r^2$ $-5x - 12y = 169$ $-12y = 5x + 169$ $\therefore y = -\frac{5}{12}x - \frac{169}{12}$ $\therefore y = -\frac{5}{12}(13) - \frac{169}{12}$ $\therefore y = -\frac{39}{2} = -19,5$ $\therefore M(13; -19,5)$	<p style="text-align: center;"><b>OR / OF</b></p> <p>✓ value of/waarde van x    <b>A</b></p> <p>✓ <b>F</b>    <b>A</b></p> <p>✓ subst/vervang    <b>CA</b></p> <p>✓ equation/vergelyking    <b>CA</b></p> <p>✓ value of/waarde van y    <b>CA</b></p>
	<p style="text-align: center;"><b>OR / OF</b></p> <p>Since / Omdat M(13 ; y)</p> <p>and/en <math>d_{LM} = d_{NM}</math> <math>\left( \begin{array}{l} \text{tangents from same pt. /} \\ \text{Raaklyne vanuit dies pt} \end{array} \right)</math></p> $\sqrt{(13 - (-5))^2 + (y - (-12))^2} = y$ $(13 - (-5))^2 + (y - (-12))^2 = y^2$ $324 + y^2 + 24y + 144 = y^2$ $24y = -468$ $y = -\frac{39}{2} = -19,5$ $M(13; -19,5)$	<p style="text-align: center;"><b>OR / OF</b></p> <p>✓ value of/waarde van x    <b>A</b></p> <p>✓ statement/bewering    <b>A</b></p> <p>✓ subst/vervang    <b>CA</b></p> <p>✓ squaring both sides / kwadreer beide kante    <b>CA</b></p> <p>✓ value of/waarde van y    <b>CA</b></p> <p style="text-align: right;">(5)</p>

2.2		<p>             ✓ <i>x</i>-intercept/<i>afsnit</i>    <b>A</b>              ✓ <i>y</i>-intercept/<i>afsnit</i>    <b>A</b>                ✓ elliptical shape/  <i>elliptiese vorm</i>            <b>A</b> </p> <p>(3)</p> <p><b>ACCEPT/AANVAAR:</b>  <math>\sqrt{25}</math> and / <i>en</i> <math>-\sqrt{25}</math>  <math>\sqrt{4}</math> and / <i>en</i> <math>-\sqrt{4}</math></p>
		<b>[12]</b>

**QUESTION/VRAAG 3**

3.1	$\sqrt{\sin B + \sec A}$ $= \sqrt{\sin 30,5^\circ + \sec 72^\circ}$ $= \sqrt{\sin 30,5^\circ + \frac{1}{\cos 72^\circ}}$ $\approx 1,93$	✓ substitution/vervanging <b>A</b> ✓ <b>I</b> <b>A</b> ✓ <b>S</b> <b>CA</b> <b>NPR</b> <b>AO: Full marks/Volpunte</b> <b>(3)</b>
3.2.1	 $\sin \theta = -\frac{5}{13}$ $x^2 + (-5)^2 = (13)^2$ $x = 12$ $\cos \theta = \frac{12}{13}$ <p style="text-align: center;"><b>OR / OF</b></p> $\cos \theta = \sqrt{1 - \sin^2 \theta}$ $= \sqrt{1 - \left(-\frac{5}{13}\right)^2}$ $= \frac{12}{13}$	✓ Pyth. Theorem/Stelling <b>A</b> ✓ value of/waarde van $x$ <b>CA</b> ✓ ratio/verhouding <b>CA</b> <p style="text-align: center;"><b>OR / OF</b></p> ✓ <b>I</b> <b>A</b> ✓ ratio of/verhouding van sin <b>A</b> ✓ ratio/verhouding <b>CA</b> <b>(3)</b>
3.2.2	$\cot \theta - \operatorname{cosec} \theta$ $= \left(-\frac{12}{5}\right) - \left(-\frac{13}{5}\right)$ $= \frac{1}{5}$	✓ cot ratio/verhouding <b>CA</b> ✓ cosec ratio/verhouding <b>A</b>  ✓ <b>S</b> <b>CA</b> <b>ACCEPT/AANVAAR:</b> Correct decimal values./ Korrekte desimale waardes. <b>(3)</b>

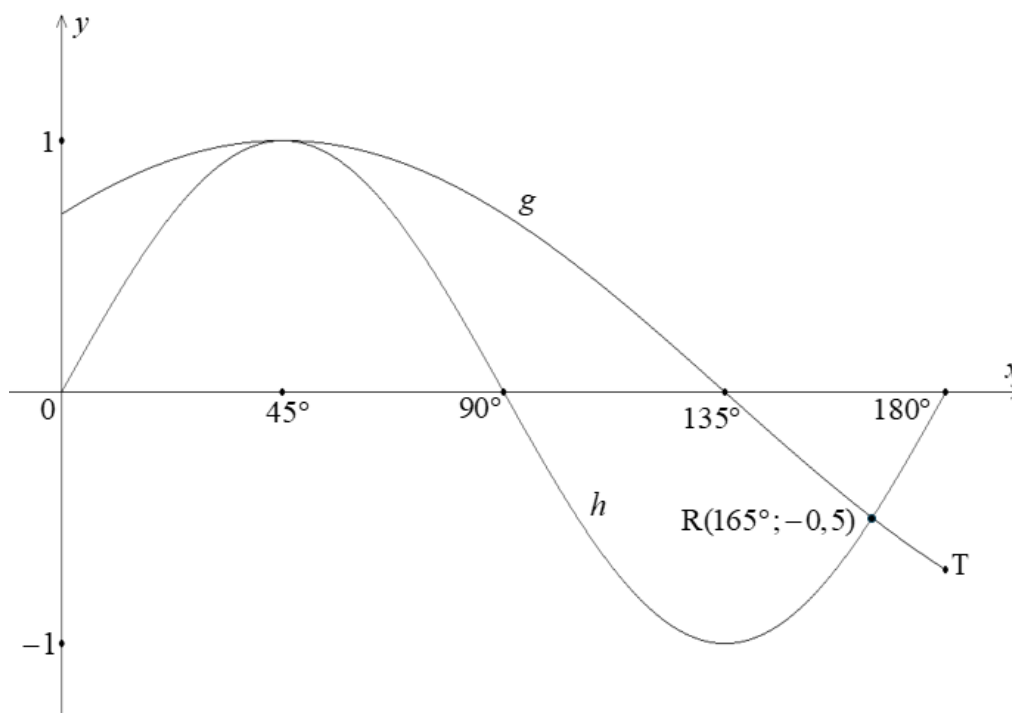


3.3 #	$\cot x = -0,587$ $\tan x = -\frac{1}{0,587}$ <b>OR / OF</b> $\tan x = -1,704$ Ref. $\angle \approx 59,59^\circ$ $x \approx 180^\circ - 59,59^\circ$ or/of $x \approx 360^\circ - 59,59^\circ$ $x \approx 120,41^\circ$ or/of $x \approx 300,41^\circ$	✓ tan ratio/verhouding <b>A</b> ✓ ref. angle/verw. hoek <b>CA</b> ✓ value of/waarde van $x$ <b>CA</b> ✓ value of waarde van $x$ <b>CA</b> (4)
		<b>[13]</b>

**QUESTION/VRAAG 4**

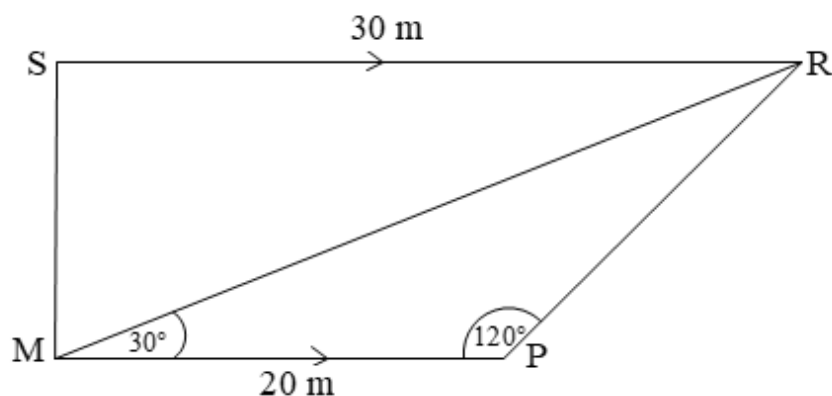
4.1.1	$\tan x$	✓ reduction/ <i>reduksie</i> <b>A</b> (1)
4.1.2	$\frac{\cos x}{\sin x}$	✓ <b>I</b> <b>A</b> (1)
4.1.3	$\{ 0^\circ ; 90^\circ ; 180^\circ ; 270^\circ ; 360^\circ \}$	✓✓ any two values/ <i>enige twee</i> waardes <b>A</b> (2)
4.1.4	$\frac{\sin(180^\circ + x) \cdot \sin(360^\circ - x) + \cos(2\pi - x) \cdot \cos x}{\sin x} + \frac{1}{\tan(180^\circ + x)}$ $= \frac{-\sin x \cdot -\sin x + \cos x \cdot \cos x}{\sin x} + \frac{1}{\tan x}$ $= \frac{\sin^2 x + \cos^2 x}{\sin x} + \frac{\cos x}{\sin x}$ $= \frac{1}{\sin x} + \frac{\cos x}{\sin x}$ $= \frac{1 + \cos x}{\sin x} \text{ OR / OF } = \operatorname{cosec} x + \cot x$	✓ $-\sin x$ <b>A</b> ✓ $-\sin x$ <b>A</b> ✓ $\cos x$ <b>A</b>  ✓ <b>I (1)</b> <b>A</b> ✓ <b>S</b> <b>CA</b> (5)
4.2.1	$\sin \theta (1 - \cos \theta)$	✓ factors/ <i>faktore</i> <b>A</b> (1)

4.2.2	$\begin{aligned} \text{LHS} &= \frac{\sin \theta - \cos \theta \cdot \sin \theta}{\cos \theta - (1 - \sin^2 \theta)} \\ &= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta - \cos^2 \theta} \\ &= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta(1 - \cos \theta)} \\ &= \frac{\sin \theta}{\cos \theta} \\ &= \tan \theta = \text{RHS} \end{aligned}$ <p style="text-align: center;"><b>OR / OF</b></p> $\begin{aligned} \text{LHS} &= \frac{\sin \theta - \cos \theta \cdot \sin \theta}{\cos \theta - (1 - \sin^2 \theta)} \\ &= \frac{\sin \theta - \cos \theta \cdot \sin \theta}{\cos \theta - 1 + \sin^2 \theta} \\ &= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta - 1 + 1 - \cos^2 \theta} \\ &= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta(1 - \cos \theta)} \\ &= \frac{\sin \theta}{\cos \theta} \\ &= \tan \theta = \text{RHS} \end{aligned}$	$\checkmark \text{ I } (\cos^2 \theta) \quad \mathbf{A}$  $\checkmark \text{ common fact/ } \textit{gemeensk. fakt} \quad \mathbf{A}$ $\checkmark \text{ S} \quad \mathbf{A}$  <p style="text-align: center;"><b>OR / OF</b></p>  $\checkmark \text{ I } (1 - \cos^2 \theta) \quad \mathbf{A}$  $\checkmark \text{ common fact/ } \textit{gemeensk. fakt} \quad \mathbf{A}$ $\checkmark \text{ S} \quad \mathbf{A}$ (3)
		<b>[13]</b>

**QUESTION/VRAAG 5**

5.1	$m = 2$ and / en $p = 45^\circ$	✓ value of/waarde van $p$ <b>A</b> ✓ value of/waarde van $m$ <b>A</b> (2)
5.2	$180^\circ$	✓ period/periode <b>A</b> (1)
5.3	1	✓ value/waarde <b>A</b> (1)
5.4.1	$165^\circ < x \leq 180^\circ$  <b>OR / OF</b> $x \in (165^\circ ; 180^\circ ]$  <b>OR / OF</b> $x > 165^\circ$ and / en $x \leq 180^\circ$  <b>OR / OF</b> Greater than $165^\circ$ and smaller or equal to $180^\circ$ . / Groter as $165^\circ$ en kleiner of gelyk aan $180^\circ$ .	✓ endpoints/eindpunte <b>A</b> ✓ notation/notasie <b>A</b> <b>OR / OF</b> ✓ endpoints/eindpunte <b>A</b> ✓ notation/notasie <b>A</b> <b>OR / OF</b> ✓ endpoints/eindpunte <b>A</b> ✓ notation/notasie <b>A</b> <b>OR / OF</b> ✓ endpoints/eindpunte <b>A</b> ✓ Correct interval/Korrekte interval <b>A</b> (2)

5.4.2	$0^\circ \leq x \leq 90^\circ$  $135^\circ \leq x \leq 180^\circ$   <p style="text-align: center;"><b>OR / OF</b></p> $x \in [0^\circ ; 90^\circ]$  or / of  $x \in [135^\circ ; 180^\circ]$   <p style="text-align: center;"><b>OR / OF</b></p> $x \geq 0^\circ$ and / en $x \leq 90^\circ$  or / of  $x \geq 135^\circ$ and / en $x \leq 180^\circ$   <p style="text-align: center;"><b>OR / OF</b></p> From $0^\circ$ to $90^\circ$ / Vanaf $0^\circ$ tot by $90^\circ$  or / of  From $135^\circ$ to $180^\circ$ / Vanaf $135^\circ$ tot by $180^\circ$	✓ critical values/ kritiese waardes A  ✓ notation/ notasie A  ✓ critical values/ kritiese waardes A  ✓ notation/ notasie A  <p style="text-align: center;"><b>OR / OF</b></p> ✓ critical values/ kritiese waardes A  ✓ notation/ notasie A  ✓ critical values/ kritiese waardes A  ✓ notation/ notasie A  <p style="text-align: center;"><b>OR / OF</b></p> ✓ critical values/ kritiese waardes A  ✓ notation/ notasie A  ✓ critical values/ kritiese waardes A  ✓ notation/ notasie A  <p style="text-align: center;"><b>OR / OF</b></p> ✓ endpoints/ eindpunte A  ✓ Correct interval/ Regte interval A  ✓ endpoints/ eindpunte A  ✓ Correct interval/ Regte interval A (4)
5.5	$h(x) = \sin 2x - 1$  <p style="text-align: center;"><b>OR / OF</b></p> $h(x) = \sin mx - 1$	✓ $\sin 2x - 1$ CA  <p style="text-align: center;"><b>OR / OF</b></p> ✓ $\sin mx - 1$ A (1)
		[11]

**QUESTION/VRAAG 6****NOTE:**

If an angle of  $90^\circ$  is assumed – **BREAKDOWN**, hence no marks may be awarded.

**NOTA:**

Indien 'n hoek van  $90^\circ$  aangeneem word = **AFBREEK**, vervolgens mag geen punte toegeken word nie.

6.1	$\hat{M R P} = 180^\circ - 120^\circ - 30^\circ$ $= 30^\circ$	✓ size of/grootte van $\hat{M R P}$ <b>A</b> (1)
6.2	Isosceles triangle/Gelykbenige driehoek <b>OR / OF</b> Obtuse angled triangle/Stomphoekige driehoek	✓ isosceles/gelykbenig <b>A</b> <b>OR / OF</b> ✓ obtuse angled/Stomphoekig <b>A</b> (1)
6.3	$\frac{MR}{\sin P} = \frac{MP}{\sin \hat{M R P}}$ $\frac{MR}{\sin 120^\circ} = \frac{20}{\sin 30^\circ}$ $MR = \frac{20 \sin 120^\circ}{\sin 30^\circ}$ $MR = 20\sqrt{3} \text{ units} \approx 34,64 \text{ units}$ <b>OR / OF</b> $MP = PR = 20 \text{ m}$ $MR = \sqrt{(20)^2 + (20)^2 - 2(20)(20)\cos 120^\circ}$ $= 20\sqrt{3} \text{ units} \approx 34,64 \text{ units}$	✓ sine rule/sinusreël <b>A</b>  ✓ Subst. / Vervang. <b>CA</b>  ✓ length of/lengte van MR <b>CA</b>  <b>OR / OF</b> ✓ length / lengte PR <b>A</b> ✓ Subst. into / Vervang. in cosine rule/cosinusreël <b>CA</b>  ✓ length /lengte MR <b>CA</b> (3)

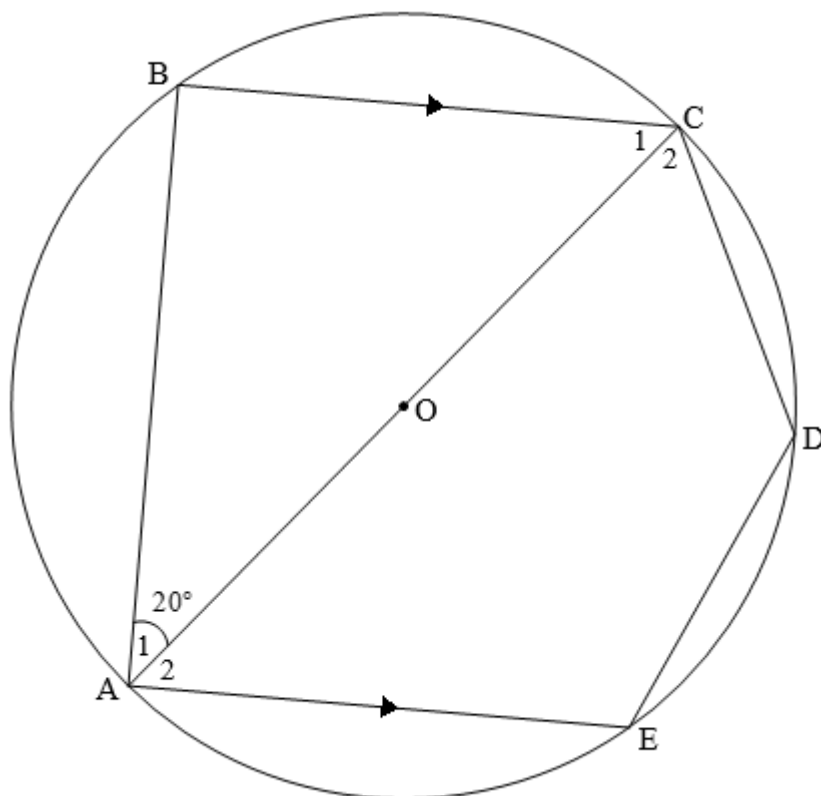
6.4	$\hat{MRS} = 30^\circ$ (alt. $\angle$ s/verw. $\angle$ e; $SR \parallel MP$ )	✓ <b>ST</b> <b>A</b> ✓ <b>RE</b> <b>A</b> (2)
6.5 #	$SM^2 = SR^2 + MR^2 - 2SR \cdot MR \cos \hat{MRS}$ $SM^2 = (30)^2 + (20\sqrt{3})^2 - 2(30)(20\sqrt{3})\cos 30^\circ$ $= 300$ $SM = 10\sqrt{3} \approx 17,32$ $SM^2 + SR^2 = (10\sqrt{3})^2 + (30)^2$ $= 1200$ $MR^2 = (20\sqrt{3})^2$ $= 1\,200$ $\therefore SM^2 + SR^2 = MR^2$ $\therefore \triangle MRS$ is a right-angled triangle $\therefore \triangle MRS$ is 'n reghoekige driehoek  <p style="text-align: center;"><b>OR / OF</b></p> $SM^2 = SR^2 + MR^2 - 2SR \cdot MR \cos \hat{MRS}$ $SM^2 = (30)^2 + (20\sqrt{3})^2 - 2(30)(20\sqrt{3})\cos 30^\circ$ $= 300$ $SM = 10\sqrt{3} \approx 17,32$ $\cos \hat{S} = \frac{(10\sqrt{3})^2 + (30)^2 - (20\sqrt{3})^2}{2(10\sqrt{3})(30)}$ $\hat{S} = \cos^{-1}\left(\frac{0}{600\sqrt{3}}\right)$ $\hat{S} = 90^\circ$ $\therefore \triangle MRS$ is a right-angled triangle $\therefore \triangle MRS$ is 'n reghoekige driehoek  <p style="text-align: center;"><b>OR / OF</b></p>	✓ <b>SF</b> cosine rule/ <i>cosinusreël</i> <b>CA</b>  ✓ length of/ <i>lengte van</i> SM <b>CA</b>  ✓ value of/ <i>waarde van</i> $SM^2 + SR^2$ <b>CA</b>  ✓ value of/ <i>waarde van</i> $MR^2$ <b>CA</b> ✓ $SM^2 + SR^2 = MR^2$ <b>CA</b>  <p style="text-align: center;"><b>OR / OF</b></p> ✓ <b>SF</b> cosine rule/ <i>cosinusreël</i> <b>CA</b> ✓ length of/ <i>lengte van</i> SM <b>CA</b>  ✓ <b>SF</b> cosine rule/ <i>cosinusreël</i> <b>CA</b> ✓ $\cos^{-1}\left(\frac{0}{600\sqrt{3}}\right)$ <b>CA</b> ✓ Size of/ <i>grootte van</i> $\hat{S}$ <b>CA</b>  <p style="text-align: center;"><b>OR / OF</b></p>

$SM^2 = SR^2 + MR^2 - 2SR \cdot MR \cos \hat{MRS}$ $SM^2 = (30)^2 + (20\sqrt{3})^2 - 2(30)(20\sqrt{3})\cos 30^\circ$ $= 300$ $SM = 10\sqrt{3} \approx 17,32$ $\frac{\sin \hat{S}}{s} = \frac{\sin \hat{R}}{r}$ $\frac{\sin \hat{S}}{20\sqrt{3}} = \frac{\sin 30^\circ}{10\sqrt{3}}$ $\sin \hat{S} = 1$ $\hat{S} = \sin^{-1}(1)$ $\hat{S} = 90^\circ$ <p><math>\therefore \Delta MRS</math> is a right-angled triangle  <math>\therefore \Delta MRS</math> is 'n reghoekige driehoek</p> <p style="text-align: center;"><b>OR / OF</b></p> $\sin 30^\circ = \frac{h}{20\sqrt{3}}$ $h = 20\sqrt{3} \cdot \sin 30^\circ$ $h = 10\sqrt{3} \approx 17,32$ <hr/> $SM = \sqrt{(30)^2 + (20\sqrt{3})^2 - 2(30)(20\sqrt{3}) \cdot \cos 30^\circ}$ $SM = 10\sqrt{3} \approx 17,32$ <p><math>\therefore SM</math> = Perp. height/<i>loodregte hoogte</i>          Therefor <math>SMR</math> is a right-angled triangle. /  <i>Daarom is <math>SMR</math> 'n reghoekige driehoek.</i></p>	<p>✓ <b>SF</b> cosine rule/ <i>cosinusreël</i> <b>CA</b></p> <p>✓ length of/<i>lengte van</i> <math>SM</math> <b>CA</b></p> <p>✓ <b>SF</b> sine rule/<i>sinusreël</i> <b>CA</b></p> <p>✓ <math>\sin^{-1}(1)</math> <b>CA</b></p> <p>✓ Size of/<i>grootte</i> van <math>\hat{S}</math> <b>CA</b></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>✓ sine ratio/<i>verh.</i> <b>CA</b></p> <p>✓ <math>h</math> <b>CA</b></p> <p>✓ <b>SF</b> cosine rule/ <i>cosinusreël</i> <b>CA</b></p> <p>✓ length of/<i>lengte van</i> <math>SM</math> <b>CA</b></p> <p>✓ Conclusion/ <i>Gevolgtrekking</i> <b>CA</b> (5)</p>
	<b>[12]</b>



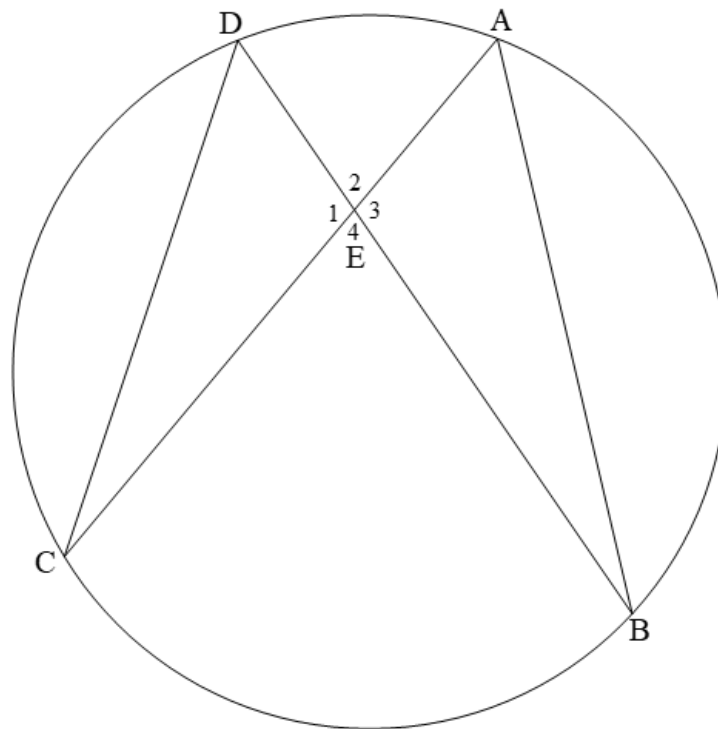
**QUESTION/VRAAG 7**

7.1



7.1.1	<p>The angle subtended by the diameter at the circumference of the circle is <math>90^\circ</math>. (<math>\angle</math> in semi-circle) /</p> <p><i>Die omtrekshoek wat deur die middellyn onderspan word, is <math>90^\circ</math>. (<math>\angle</math> in halwe sirkel)</i></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>Diameter subtends right angle. / <i>Diameter onderspan regtehoek.</i></p>	<p>✓ <b>RE</b>      <b>A</b></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>✓ <b>RE</b>      <b>A</b> (1)</p>
7.1.2	<p><math>\hat{A}_2 = 70^\circ</math> (co-int <math>\angle</math>s / <i>ko-binne <math>\angle</math>e</i>; <math>BC \parallel AE</math>)</p> <p><math>\therefore \hat{D} = 110^\circ</math> <math>\left( \begin{array}{l} \text{opp } \angle\text{s of cyclic quad /} \\ \text{teenoorst } \angle\text{e van kdvk} \end{array} \right)</math></p> <p style="text-align: center;"><b>OR / OF</b></p> <p><math>\hat{C}_1 = 70^\circ</math> (Int. <math>\angle</math>s <math>\Delta</math> / <i>Binne <math>\angle</math>e <math>\Delta</math></i>; <math>BC \parallel AE</math>)</p> <p><math>\hat{A}_2 = 70^\circ</math> (alt. <math>\angle</math>s / <i>verw. <math>\angle</math>e</i>; <math>BC \parallel AE</math>)</p> <p><math>\therefore \hat{D} = 110^\circ</math> <math>\left( \begin{array}{l} \text{opp } \angle\text{s of cyclic quad /} \\ \text{teenoorst } \angle\text{e van kdvk} \end{array} \right)</math></p>	<p>✓ <b>ST</b>      <b>A</b></p> <p>✓ <b>ST</b>      <b>CA</b> ✓ <b>RE</b>      <b>A</b></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>✓ <b>ST</b>      <b>A</b></p> <p>✓ <b>ST</b>      <b>CA</b> ✓ <b>RE</b>      <b>A</b> (3)</p>

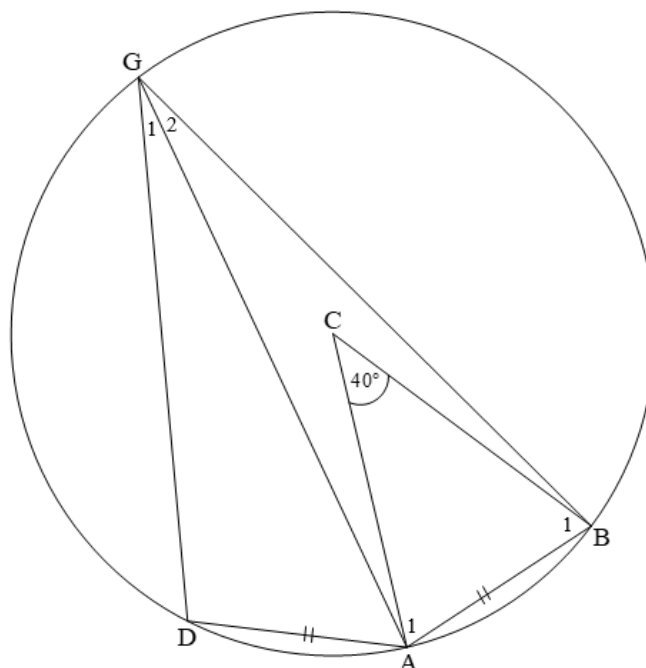
7.2



7.2.1	equal./gelyk. <b>OR / OF</b> the same./dieselfde.	✓ <b>ST</b>	<b>A</b> (1)
7.2.2 (a)	$\angle$ s in the same segment/ $\angle$ e in dieselfde segment <b>OR / OF</b> $\angle$ s subt. by same arc/chord./ $\angle$ e onderspan deur dieselfde boog/koord.	✓ <b>RE</b> <b>OR / OF</b> ✓ <b>RE</b>	<b>A</b> <b>A</b> (1)
7.2.2 (b)	Vertical opposite $\angle$ s / regoorstaande $\angle$ e	✓ <b>ST</b>	<b>A</b> (1)
7.2.2 (c)	$\angle$ , $\angle$ , $\angle$ <b>OR / OF</b> A, A, A / H, H, H <b>OR / OF</b> Equiangular triangles/Gelykhoekige driehoeke	✓ <b>RE</b> <b>OR / OF</b> ✓ <b>RE</b>	<b>A</b> <b>A</b> (1)
			<b>[8]</b>

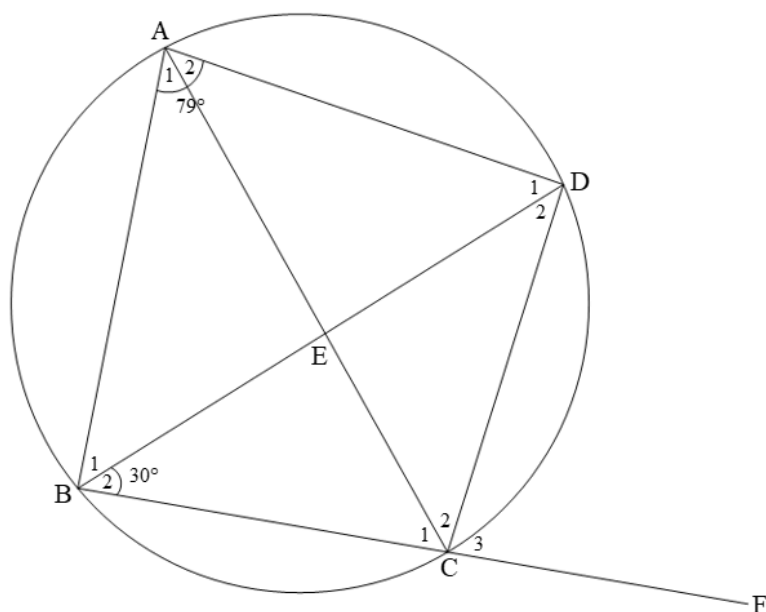
**QUESTION/VRAAG 8**

8.1



8.1.1	$\hat{G}_1 = \hat{G}_2$	✓ ST	<b>A</b> (1)
8.1.2	$\hat{G}_2 = 20^\circ \left( \begin{array}{l} \angle \text{ at centre} = 2 \times \angle \text{ at circ. /} \\ \text{Mdpt. } \angle = 2 \times \text{omtreks } \angle \end{array} \right)$	✓ ST ✓ RE	<b>A</b> <b>A</b> (2)
8.1.3	$\angle$ s opp = sides / $\angle$ e teenoor gelyke sye	✓ RE	<b>A</b> (1)
8.1.4	$\hat{A}_1 + \hat{B}_1 + \hat{ACB} = 180^\circ \quad (\text{Int. } \angle \text{s } \Delta / \text{Binne } \angle \text{e } \Delta)$ $\hat{A}_1 = \frac{180^\circ - 40^\circ}{2}$ $\hat{A}_1 = 70^\circ$ <b>OR / OF</b> $(\angle \text{s opp.} = \text{sides} / \angle \text{e teenoor} = \text{sye})$	✓ RE  ✓ 70°	<b>A</b> <b>A</b> (2)
8.1.5	$\hat{DAC} + 70^\circ + 40^\circ = 180^\circ \quad \left( \begin{array}{l} \text{opp. } \angle \text{s cyclic quad /} \\ \text{teenoorst. } \angle \text{e kdvh} \end{array} \right)$ $\therefore \hat{DAC} = 70^\circ$	✓ ST ✓ RE  ✓ ST	<b>CA</b> <b>A</b> <b>CA</b> (3)
8.2.1	exterior / buite	✓ ST <b>ACCEPT/AANVAAR:</b> outside/buitekant	<b>A</b> (1)
8.2.2	interior / binne	✓ ST <b>ACCEPT/AANVAAR:</b> inside/binnekant	<b>A</b> (1)

8.3

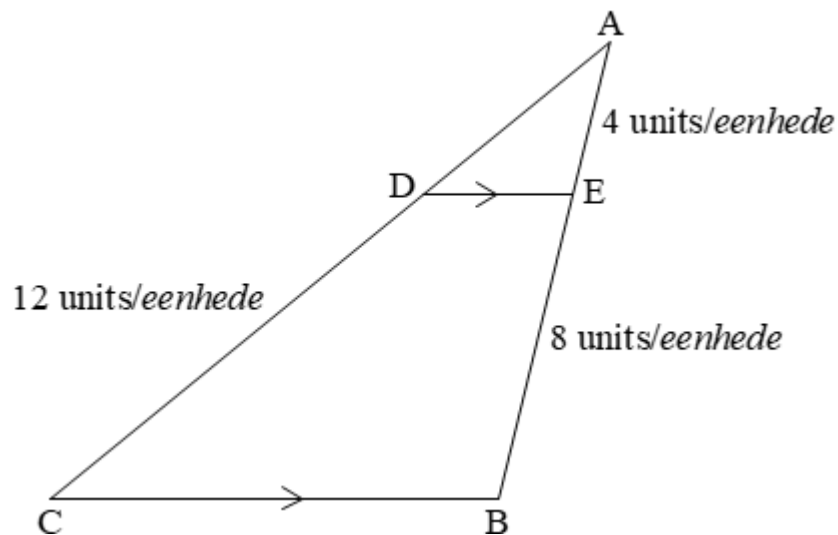


8.3.1(a)	$\hat{C}_3 = 79^\circ$ (Ext. $\angle$ cyclic. quad / <i>Buite <math>\angle</math> kdvh.</i> )	✓ ST ✓ RE	A A (2)
8.3.1(b)	$\hat{D}_2 = 49^\circ$ (Ext. $\angle \Delta$ / <i>Buite <math>\angle \Delta</math></i> ) <b>OR / OF</b> $\hat{BCD} = 101^\circ$ ( $\angle$ s on str. line / <i><math>\angle</math> op reguitlyn</i> ) $\hat{D}_2 = 49^\circ$ (Int. $\angle$ s $\Delta$ / <i>Binne <math>\angle</math> e <math>\Delta</math></i> ) <b>OR / OF</b> $\hat{B}_2 = \hat{A}_2 = 30^\circ$ ( $\angle$ s in same segm./ <i><math>\angle</math> e in dies. segm.</i> ) $\therefore \hat{A}_1 = 49^\circ$ $\hat{A}_1 = \hat{D}_2 = 49^\circ$ ( $\angle$ s in same segm./ <i><math>\angle</math> e in dies. segm.</i> )	✓ ST ✓ RE  <b>OR / OF</b> ✓ ST  ✓ ST <b>OR / OF</b> ✓ ST	CA A  CA  CA  CA (2)
8.3.1(c)	$\hat{D}_1 = 180^\circ - 79^\circ - 49^\circ$ (Co - int. $\angle$ s suppl. ; $AB \parallel CD$ ) $\hat{D}_1 = 52^\circ$ ( <i>Ko - Binne <math>\angle</math> e sup pl.; <math>AB \parallel CD</math></i> ) <b>OR / OF</b> $\hat{B}_1 = 49^\circ$ (alt. $\angle$ 's =; <i>verw. <math>\angle</math>'e =</i> ; $AB \parallel CD$ ) $\therefore \hat{D}_1 = 52^\circ$ (Int. $\angle$ 's $\Delta$ / <i>Binne <math>\angle</math>'e <math>\Delta</math></i> )	✓ ST ✓ RE ✓ ST  <b>OR / OF</b> ✓ ST ✓ RE ✓ ST	CA A CA  CA A CA (3)

8.3.2	$\hat{C}_1 = \hat{D}_1 = 52^\circ \quad \left( \begin{array}{l} \angle s \text{ in same segment / } \\ \angle e \text{ in dies. segment} \end{array} \right)$ $\hat{C}_2 = 49^\circ \quad \left( \begin{array}{l} \angle s \text{ on str. line / } \\ \angle e \text{ op reguitlyn} \end{array} \right)$ $\hat{D}_2 = \hat{C}_2 = 49^\circ \quad \left( \begin{array}{l} \text{sides opp.} = \angle s / \\ \text{syeteenoor} = \angle e \end{array} \right)$ CE = DE <p style="text-align: center;"><b>OR / OF</b></p> $\hat{C}_2 = \hat{B}_1 = 49^\circ \quad \left( \begin{array}{l} \angle s \text{ in same segment / } \\ \angle e \text{ in dies. segment} \end{array} \right)$ $\hat{D}_2 = \hat{C}_2 = 49^\circ \quad \left( \begin{array}{l} \text{sides opp.} = \angle s / \\ \text{syeteenoor} = \angle e \end{array} \right)$ CE = DE	<div> <div>✓ <b>ST</b></div> <div>✓ <b>RE</b></div> <div><b>CA</b></div> <div><b>A</b></div> </div> <div> <div>✓ <b>ST</b></div> <div>✓ <b>RE</b></div> <div><b>CA</b></div> <div><b>A</b></div> </div> <p style="text-align: center;"><b>OR / OF</b></p> <div> <div>✓ <b>ST</b></div> <div>✓ <b>RE</b></div> <div><b>CA</b></div> <div><b>A</b></div> </div> <div> <div>✓ <b>ST</b></div> <div>✓ <b>RE</b></div> <div><b>CA</b></div> <div><b>A</b></div> </div> <div>(4)</div>
		[22]

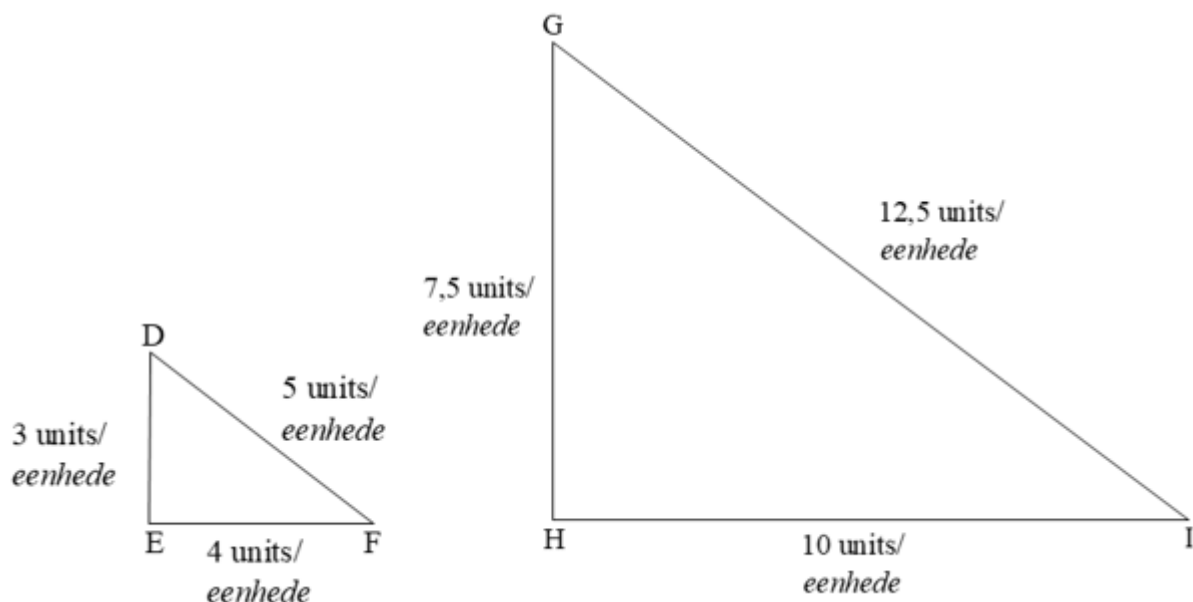
**QUESTION/VRAAG 9**

9.1



9.1.1	$\frac{AD}{CD} = \frac{AE}{BE} \quad (\text{Prop. Theorem / Eweredigheid; } \mathbf{DE \parallel BC})$	✓ <b>ST</b> ✓ <b>RE</b>	<b>A</b> <b>A</b> (2)
9.1.2	$\frac{AD}{CD} = \frac{AE}{BE}$ $\frac{AD}{12} = \frac{4}{8}$ $AD = \frac{4}{8} \times 12$ $= 6 \text{ units / eenhede}$	✓ <b>SF</b>    ✓ 6 <b>AO: Full marks/</b> <b>Volpunte</b>	<b>CA</b>    <b>CA</b> (2)

9.2



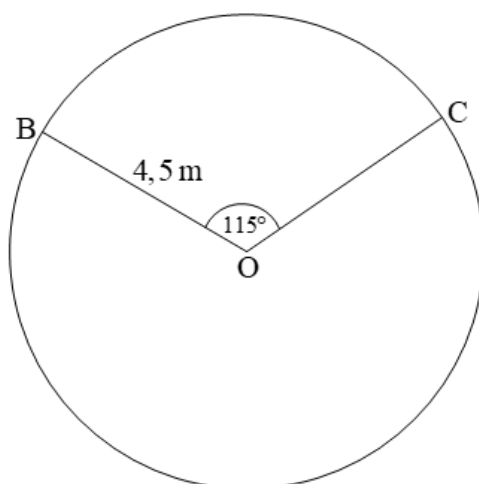
	$\frac{DE}{GH} = \frac{3}{7,5} = \frac{2}{5} = 0,4$ <b>OR / OF</b> $\frac{GH}{DE} = \frac{7,5}{3} = \frac{5}{2} = 2,5$	✓ Ratio/verhouding <b>A</b>
	$\frac{EF}{HI} = \frac{4}{10} = \frac{2}{5} = 0,4$ <b>OR / OF</b> $\frac{HI}{EF} = \frac{10}{4} = \frac{5}{2} = 2,5$	✓ Ratio/verhouding <b>A</b>
	$\frac{DF}{GI} = \frac{5}{12,5} = \frac{2}{5} = 0,4$ <b>OR / OF</b> $\frac{GI}{DF} = \frac{12,5}{5} = \frac{5}{2} = 2,5$	✓ Ratio/verhouding <b>A</b>
	$\therefore \triangle DEF \parallel \triangle GHI$ (Sides in prop. / Sye in verhouding)	✓ <b>RE</b> <b>A</b>
	<b>OR / OF</b>	<b>OR / OF</b>
	$\hat{E} = 90^\circ$ Conv. Pyth. / Omg. Pyth.	✓ Conv. Pyth. / Omg. Pyth. <b>A</b>
	$\hat{H} = 90^\circ$ Conv. Pyth. / Omg. Pyth.	
	$\tan \hat{F} = \frac{3}{4}$ $\tan \hat{I} = \frac{3}{4}$	✓ Any trig ratio/ Enige trig verhouding <b>A</b>
	$\hat{F} = 36,87^\circ$ $\hat{I} = 36,87^\circ$	
	$\hat{E} = \hat{H}$ (Proven / Bewys)	✓ <b>ST</b> <b>A</b>
	$\hat{F} = \hat{I}$ (Proven / Bewys)	✓ <b>RE</b> <b>A</b>
	$\triangle DEF \parallel \triangle GHI$ ( $\angle$ ; $\angle$ ; $\angle$ )	<b>(4)</b>
		<b>[8]</b>





10.1.3	$4h^2 - 4dh + x^2 = 0$ $4h^2 - 4(620)h + (130)^2 = 0$ $4h^2 - 2480h + 16900 = 0$ $h = \frac{2480 \pm \sqrt{5880000}}{8}$ $h \approx 613,11 \text{ mm or / of } h \approx 6,89 \text{ mm}$ $\therefore \text{ minor / klein } h \approx 6,89 \text{ mm}$  <p style="text-align: center;"><b>OR / OF</b></p> $AC = BC = 65 \left( \begin{array}{l} \text{Line from centre of circle, perp. to chord} \\ \text{Lyn mdpt. sirkel, loodreg op koord} \end{array} \right)$ $CD^2 = 310^2 - 65^2$ $CD = 303,11 \text{ mm}$ $h = 310 - 303,11$ $h = 6,89 \text{ mm}$	✓ <b>F</b> <b>A</b> ✓ <b>SF</b> <b>A</b>  ✓ <b>S</b> <b>CA</b>  ✓ both vertical heights/ <i>beide vertikale hoogtes</i> <b>CA</b> ✓ minor height / <i>klein hoogte</i> <b>CA</b>  <p style="text-align: center;"><b>OR / OF</b></p> ✓ $BC = 65$ <b>A</b>  ✓ <b>M</b> <b>A</b> ✓ Length/ <i>lengte</i> <b>CA</b> CD <b>A</b> ✓ <b>M</b> <b>A</b> ✓ minor height / <i>klein hoogte</i> <b>CA</b> <b>NPU</b> <b>NPR</b> (5)
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10.2

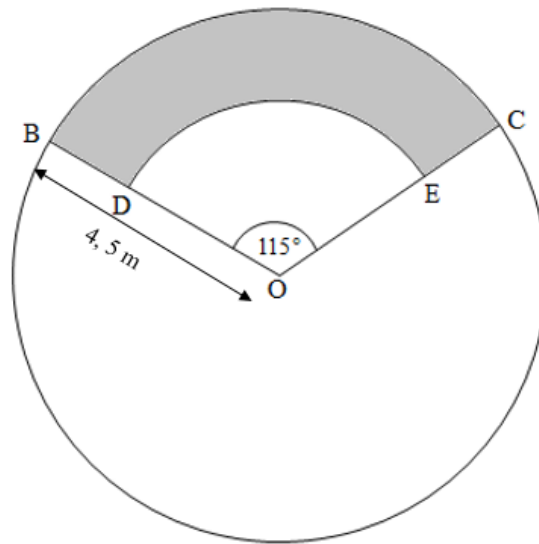


10.2.1	$\hat{BOC} = 115^\circ \times \frac{\pi}{180^\circ}$ $= \frac{23}{36}\pi \approx 2,01 \text{ rad}$	$\checkmark \frac{23}{36}\pi \text{ or/of } 2,01 \quad \mathbf{A}$ <p style="text-align: right;">(1)</p> <p><b>NPU</b> <b>NPR</b></p>
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10.2.2	$\text{Area} = \frac{r^2 \theta}{2}$ $= \frac{(4,5)^2 \left( \frac{23}{36} \pi \right)}{2} \quad \text{OR / OF} \quad \frac{(4,5)^2 (2,01)}{2}$ $= \frac{207}{32} \pi \approx 20,32 \text{ m}^2 \quad \approx 20,35 \text{ m}^2$ <p style="text-align: center;"><b>OR/OF</b></p> $\text{Area} = \frac{115^\circ}{360^\circ} \times \pi r^2$ $= \frac{115^\circ}{360^\circ} \times \pi (4,5)^2$ $= \frac{207}{32} \pi \approx 20,32 \text{ m}^2$ <p style="text-align: center;"><b>OR/OF</b></p> $s = r \theta$ $= 4,5 \left( \frac{23}{36} \pi \right) \quad \text{OR / OF} \quad = 4,5 (2,01)$ $= \frac{23}{8} \pi \approx 9,03 \text{ m} \quad \approx 9,05 \text{ m}$ $\text{Area} = \frac{r s}{2}$ $= \frac{4,5 \left( \frac{23}{8} \pi \right)}{2} \quad \text{OR / OF} \quad \frac{4,5 (9,05)}{2}$ $= \frac{207}{32} \pi \approx 20,32 \text{ m}^2 \quad \approx 20,36 \text{ m}^2$	<p>✓ <b>F</b>                      <b>A</b></p> <p>✓ <b>SF</b>                      <b>CA</b></p> <p>✓ area/oppervlak                      <b>CA</b></p> <p style="text-align: center;"><b>OR/OF</b></p> <p>✓ <b>F</b>                      <b>A</b></p> <p>✓ <b>SF</b>                      <b>A</b></p> <p>✓ area/oppervlak                      <b>CA</b></p> <p style="text-align: center;"><b>OR/OF</b></p> <p>✓ arc length/booglengte                      <b>CA</b></p> <p>✓ <b>F</b>                      <b>A</b></p> <p>✓ area/oppervlak                      <b>CA</b></p> <p><b>NPR</b></p> <p><b>NPU</b></p> <p style="text-align: right;">(3)</p>
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10.2.3

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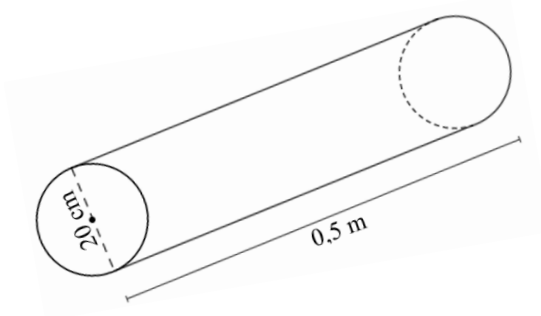


	$DO = \frac{3}{5} \times 4,5 = 2,7 \text{ m}$ $A_{DOE} = \frac{(2,7)^2 \left( \frac{23}{36} \pi \right)}{2} \quad \text{OR / OF} \quad A_{DOE} = \frac{115^\circ}{360^\circ} \times \pi (2,7)^2$ $= \frac{1863}{800} \pi \approx 7,32 \text{ m}^2$ $A_{\text{shaded/}} = \frac{207}{32} \pi - \frac{1863}{800} \pi$ $= \frac{207}{50} \pi \approx 13,01 \text{ m}^2$ <p><math>\therefore</math> Seedlings needed / Saailinge benodig</p> $= 13 \times 4$ $= 52$ <p style="text-align: center;"><b>OR/OF</b></p>	<p>✓ ratio/verhouding <b>A</b></p> <p>✓ length of/<u>lengte</u> van DO <b>CA</b></p> <p>✓ Area of/<i>Oppv. van</i> DOE <b>CA</b></p> <p>✓ Area of the shaded part/<i>Oppv. van geskakeerde gedeelte</i> <b>CA</b></p> <p>✓ Number of seedlings/<i>Aantal saailinge</i> <b>CA</b></p> <p style="text-align: center;"><b>OR/OF</b></p>
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	$DO = \frac{3}{5} \times 4,5 = 2,7 \text{ m}$ $s_{DE} = r \theta$ $= 2,7 \left( \frac{23}{36} \pi \right)$ $= \frac{69}{40} \pi \approx 5,42 \text{ m}$ $\text{Area}_{DOE} = \frac{r s}{2}$ $= \frac{2,7 \left( \frac{69}{40} \pi \right)}{2}$ $= \frac{1863}{800} \pi \approx 7,32 \text{ m}^2$ $A_{\text{shaded/}}^{\text{geskakeer}} = \frac{207}{32} \pi - \frac{1863}{800} \pi$ $= \frac{207}{50} \pi \approx 13,01 \text{ m}^2$ <p><math>\therefore</math> Seedlings needed / Saailinge benodig</p> $= 13 \times 4$ $= 52$	<p>✓ ratio/verhouding <b>A</b></p> <p>✓ length of/<u>lengte</u> van DO <b>CA</b></p> <p>✓ Area of/<i>Oppv. van</i> DOE <b>CA</b></p> <p>✓ Area of the shaded part/ <i>Oppv. van</i> <i>geskakeerde</i> gedeelte <b>CA</b></p> <p>✓ Number of seedlings/<i>Aantal</i> <i>saailinge</i> <b>CA</b></p> <p><b>NPU</b> <b>NPR</b></p> <p>(5)</p>
		<b>[20]</b>

**QUESTION/VRAAG 11**

11.1			
11.1.1	30 cm	✓ 30 cm	<b>A</b> (1)
11.1.2	$y = 50 + 20 = 70 \text{ cm}$	✓ value of/waarde van $y$	<b>A</b> (1)
11.1.3	$A_T = a \left( \frac{o_1 + o_n}{2} + o_2 + o_3 + \dots + o_{n-1} \right)$ $7200 = 30 \left( \frac{x + 2x}{2} + 70 + 50 + 60 \right)$ $240 = 1,5x + 180$ $\therefore x = 40 \text{ cm}$ <p style="text-align: center;"><b>OR / OF</b></p> $A_T = a (m_1 + m_2 + m_3 + \dots + m_n)$ $7200 = 30 \left( \frac{x + 70}{2} + \frac{70 + 50}{2} + \frac{50 + 60}{2} + \frac{60 + 2x}{2} \right)$ $240 = 1,5x + 180$ $\therefore x = 40 \text{ cm}$		
	✓ <b>F</b>	<b>A</b>	
	✓ <b>SF</b>	<b>CA</b>	
	✓ <b>S</b>	<b>CA</b>	
	✓ value of /waarde van $x$	<b>CA</b>	
	<b>OR / OF</b>		
	✓ <b>F</b>	<b>A</b>	
	✓ <b>SF</b>	<b>CA</b>	
	✓ <b>S</b>	<b>CA</b>	
	✓ value of /waarde van $x$	<b>CA</b>	(4)

11.2		
11.2.1	$0,5 \text{ m} \times 100 = 50 \text{ cm}$	✓ 50 cm <b>A</b> (1)
11.2.2	$r = 40 \div 2 = 20 \text{ mm}$ $\therefore r = 20 \div 10 = 2 \text{ cm}$  <b>OR / OF</b> $d = 40 \div 10 = 4 \text{ cm}$ $\therefore r = 4 \div 2 = 2 \text{ cm}$	✓ <b>M</b> $40 \div 2$ <b>A</b> ✓ $r$ value in/waarde in cm <b>CA</b>  <b>OR / OF</b> ✓ <b>M</b> <b>A</b> ✓ $r$ value/waarde in cm <b>CA</b> <b>AO: Full marks/Volpunte</b> (2)
11.2.3	TSA of Cylindrical rod / Buite-oppervlakte van silindriese staaf: $= 2\pi r^2 + 2\pi rh$ $= 2\pi(10)^2 + 2\pi(10)(50)$ $= 1200\pi \approx 3769,91 \text{ cm}^2$	✓ <b>SF</b> <b>CA</b> ✓ total surface area/totale buite-oppervlakte <b>CA</b> (2)

11.2.4	<p>Volume of one steel ball bearing/<i>van een staal bal</i></p> $= \frac{4}{3} \pi (2)^3$ $= \frac{32}{3} \pi \approx 33,51 \text{ cm}^3$ <p>Volume of Cylindrical rod/<i>van silindriese staaf</i></p> $= \pi (10)^2 (50)$ $= 5000 \pi \approx 15707,96 \text{ cm}^3$ <p>Volume Recovered / <i>Herwin</i></p> $= 5000\pi - 18\% \times 5000\pi \quad \text{OR / OF}$ $= 82\% \times 5000\pi$ $= 4100 \pi$ $\approx 12880,53 \text{ cm}^3$ $\therefore \frac{4100 \pi}{\frac{32}{3} \pi} \qquad \therefore \frac{32}{3} \pi \times 400$ $= 384,375 \quad \text{OR / OF} \qquad = \frac{12800}{3} \pi$ $\approx 384 \qquad = 13404,13 \text{ cm}^3$ <p><math>\therefore</math> More than 400 balls can <b>NOT</b> be made / <i>Meer as 400 balle kan NIE gemaak word NIE.</i></p>	<p>✓ <b>SF</b> <b>CA</b></p> <p>✓ Vol. of ball bearing/<i>Vol. van staal koellaër</i> <b>CA</b></p> <p>✓ Vol. of cyl. rod/<i>Vol. van sil.staaf</i> <b>CA</b></p> <p>✓ <b>M</b> <b>A</b></p> <p>✓ Vol. recovered/<i>herwin</i> <b>CA</b></p> <p>✓ conclusion/<i>gevolgtrekking</i> <b>CA</b> (6)</p>
		<b>[17]</b>

**TOTAL/TOTAAL: 150**