



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE
*NASIONALE
SENIOR SERTIFIKAAT***

GRADE/*GRAAD* 11

MATHEMATICS P2/*WISKUNDE V2*

NOVEMBER 2017

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 150

**These marking guidelines consist of 19 pages.
*Hierdie nasienriglyne bestaan uit 19 bladsye.***

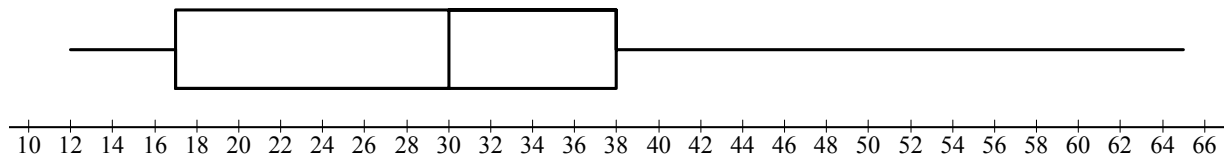
NOTE:

- 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 om waardes/antwoorde te veronderstel om 'n probleem op te los.

QUESTION/VRAAG 1



1.1.1	$\text{min} = 12$ $Q_1 = 17$ $\text{median} / \text{mediaan} = 30$ $Q_3 = 38$ $\text{max} = 65$	\checkmark min + max \checkmark median, Q_1 and/en Q_3 (2)
1.1.2	$IQR = Q_3 - Q_1$ $= 38 - 17$ $= 21$	\checkmark answer/antw (1)
1.1.3	Skewed to the right OR positively skewed <i>Skeef na regs OF positief skeef</i>	\checkmark answer/antw (1)

5	8	10	17	20	29	32	48	50	50	63	y	107
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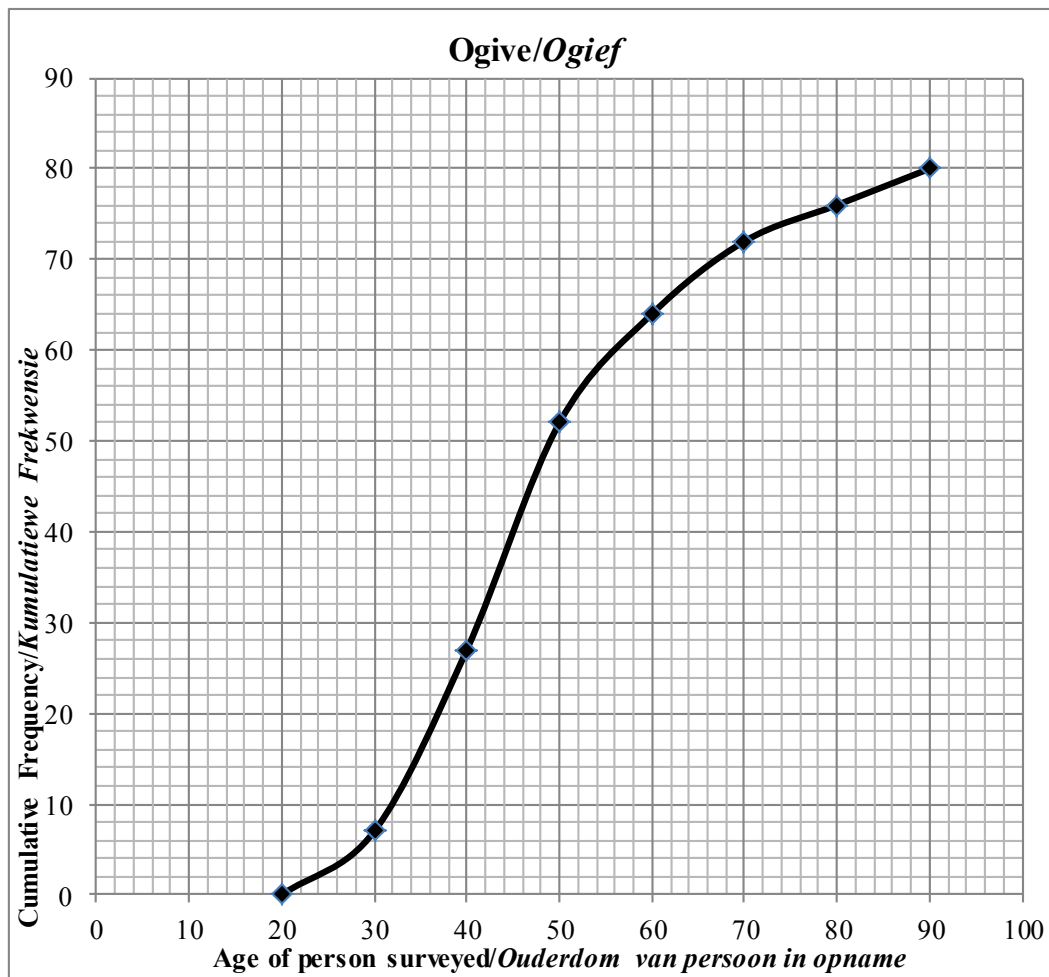
1.2.1	$\text{Mean/Gemiddeld} = \frac{439 + y}{13}$ $41 = \frac{439 + y}{13}$ $439 + y = 533$ $y = 94$	$\checkmark 41 = \frac{439 + y}{13}$ \checkmark answer/antw (2)
1.2.2	$\sigma = 30,94$	\checkmark answer/antw (1)

1.2.3	$41 \times 13 = 533$ $6 \times 18 = 108$ $\frac{533 + 108}{19} = \frac{641}{19} = 33,74$	$\checkmark 108$ $\checkmark 533 + 108 = 641$ $\checkmark \text{ answer/antw}$ (3) [10]
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QUESTION/VRAAG 2

2.1	<p style="text-align: center;">AGE OF PERSON SURVEYED/OUDERDOM VAN PERSOON IN OPNAME</p>	<p style="text-align: center;">FREQUENCY/FREKWENSIE</p>	<p style="text-align: center;">CUMULATIVE FREQUENCY/ KUMULATIEWE FREKWENSIE</p>	$\checkmark 20, 12$ $\checkmark 8, 4$ $\checkmark 52$ $\checkmark 76$ (4)
	$20 < x \leq 30$	7	7	
	$30 < x \leq 40$	20	27	
	$40 < x \leq 50$	25	52	
	$50 < x \leq 60$	12	64	
	$60 < x \leq 70$	8	72	
	$70 < x \leq 80$	4	76	
	$80 < x \leq 90$	4	80	
2.2	$n = 80$			$\checkmark \text{ answ/antw}$ (1)
2.3	$40 < x \leq 50$			$\checkmark \text{ answ/antw}$ (1)

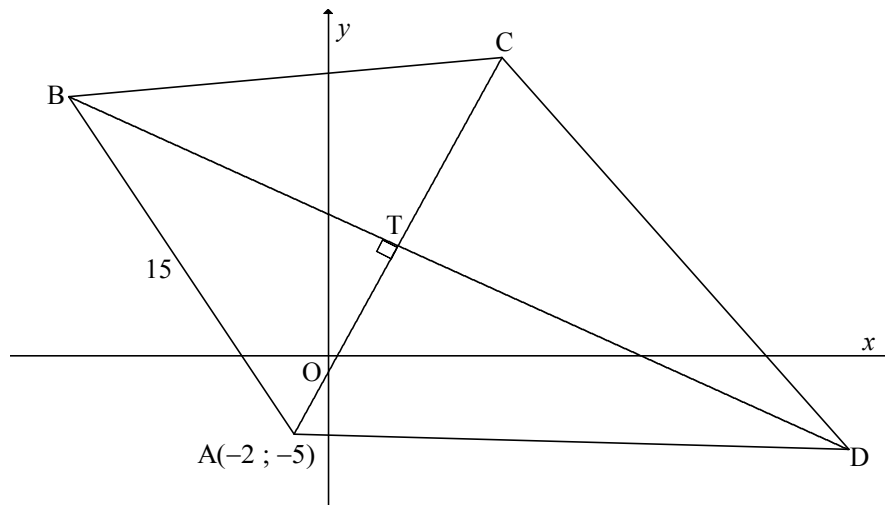
2.4



- ✓ Grounding (20; 0) /Geanker by (20; 0)
- ✓ upper limits/ boonste limiete
- ✓ shape (smooth curve)/ vorm (gladde kurwe) (3)

2.5	$80 - 58 = 22$ $\frac{22}{80} \times 100 = 27,5\%$	Accept/aanvaar: 56 – 59 calls/oproepe	✓ 58 calls/oproepe ✓ 22 ✓ 27,5% (3)
			[12]

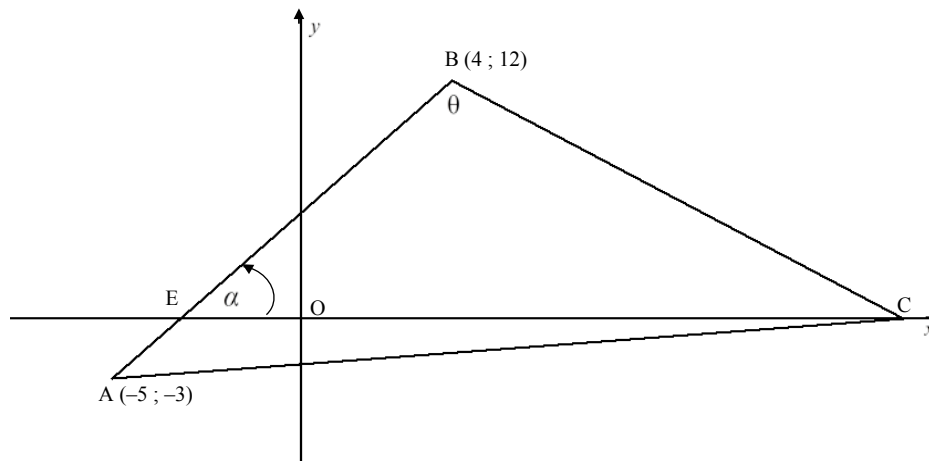
QUESTION/VRAAG 3



3.1	$BD \quad y = -\frac{1}{2}x + 9$ $\therefore m_{BD} = -\frac{1}{2}$ $\therefore m_{AC} = 2$	✓ Standard form/vorm ✓ answ/antw (2)
3.2	$y - y_1 = m(x - x_1)$ $y - (-5) = 2(x - (-2))$ $y = 2x - 1$	✓ subst (-2 ; -5) ✓ answ/antw (2)
3.3	$2x - 1 = -\frac{1}{2}x + 9$ $\frac{5}{2}x = 10$ $x = 4$ $y = 2(4) - 1$ $y = 7$ $T(4 ; 7)$	✓ $2x - 1 = -\frac{1}{2}x + 9$ ✓ $x = 4$ ✓ $y = 7$ (3)

<p>3.4.1</p>	$4 = \frac{-2 + x}{2}$ $8 = -2 + x$ $x = 10$ $7 = \frac{-5 + y}{2}$ $14 = -5 + y$ $y = 19$ <p>C(10 ; 19)</p>	<p>✓ $x = 10$</p> <p>✓ $y = 19$</p> <p>(2)</p>
<p>3.4.2</p>	$AT = \sqrt{(4 - (-2))^2 + (7 - (-5))^2}$ $= \sqrt{180}$ $= 6\sqrt{5}$ $BT^2 + AT^2 = AB^2 \quad (\text{Pythagoras})$ $BT = \sqrt{15^2 - (\sqrt{180})^2}$ $= 3\sqrt{5}$	<p>✓ subst. in distance/afstand form.</p> <p>✓ answer/antw</p> <p>✓ subst. in pyth</p> <p>✓ answer/antw</p> <p>(4)</p>
<p>3.4.3</p>	<p>BC is the diameter/ <i>middel lyn</i> [subt. right / <i>ondersp. reg</i> \angle] or/d [conv. \angle^s in semi - circle/ <i>omgk.</i> \angle^s in <i>halfsirkel</i>]</p> <p>Radius = $\frac{15}{2} = 7,5$ units/ <i>eenh.</i></p>	<p>✓ S</p> <p>✓ answ/antw</p> <p>(2)</p> <p>[15]</p>

QUESTION/VRAAG 4

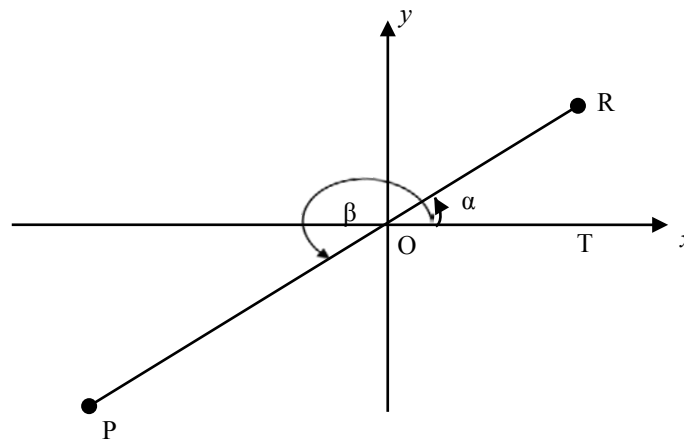


<p>4.1</p>	$m_{AB} = \frac{12 - (-3)}{4 - (-5)} = \frac{5}{3}$ <p>OR/OF</p> $m_{AB} = \frac{-3 - 12}{-5 - 4} = \frac{5}{3}$	<p>✓ subst. in gradient form. ✓ answ/antw (2)</p>
<p>4.2</p>	$y - 12 = \frac{5}{3}(x - 4)$ $0 - 12 = \frac{5}{3}(x - 4)$ $x = -\frac{16}{5}$ $E\left(-\frac{16}{5}; 0\right)$ <p>OR/OF</p> $\frac{0 - 12}{x - 4} = \frac{5}{3}$ $-36 = 5x - 20$ $-16 = 5x$ $x = \frac{-16}{5}$ $E\left(-\frac{16}{5}; 0\right)$	<p>✓ equation/verg. ✓ $y = 0$ ✓ answ/antw (3)</p> <p>✓ equating/verg. ✓ $y = 0$ ✓ answ/antw (3)</p>

4.3	$\tan \alpha = m_{AB}$ $\tan \alpha = \frac{5}{3}$ $\alpha = 59^\circ$	$\checkmark \tan \alpha = \frac{5}{3}$ $\checkmark \alpha = 59^\circ$ (2)
4.4	$76^\circ + 59^\circ = 135^\circ$ [ext \angle of Δ] $\hat{B}\hat{C}X = 135^\circ$ $\tan 135^\circ = m_{BC}$ $m_{BC} = -1 = m_{//}$ $y - (-3) = -1(x - (-5))$ $y = -x - 8$	$\checkmark 135^\circ$ $\checkmark \tan 135^\circ = m_{BC}$ \checkmark answer/antw \checkmark subst $(-3 ; -5)$ \checkmark answer/antw (5) [12]

QUESTION/VRAAG 5

5.1	$\sin(90^\circ - x) \cdot \cos(180^\circ + x) + \tan x \cdot \cos x \cdot \sin(x - 180^\circ)$ $= \cos x \cdot (-\cos x) + \frac{\sin x}{\cos x} \cdot \cos x \cdot (-\sin x)$ $= -\cos^2 x - \sin^2 x$ $= -(\cos^2 x + \sin^2 x)$ $= -1$	$\checkmark \cos x$ $\checkmark -\sin x$ $\checkmark -\cos x$ $\checkmark \frac{\sin x}{\cos x}$ \checkmark common factor/gemene fakt. \checkmark identity/identiteit (6)
5.2	$LHS = \frac{\sin 315^\circ \cdot \tan 210^\circ \cdot \sin 190^\circ}{\cos 100^\circ \cdot \sin 120^\circ}$ $= \frac{(-\sin 45^\circ) \cdot (\tan 30^\circ) \cdot (-\sin 10^\circ)}{(-\sin 10^\circ) \cdot (\sin 60^\circ)}$ $= \frac{-\frac{1}{\sqrt{2}} \cdot \frac{1}{\sqrt{3}}}{\frac{\sqrt{3}}{2}}$ $= -\frac{\sqrt{2}}{3}$	$\checkmark -\sin 45^\circ$ $\checkmark \tan 30^\circ$ $\checkmark -\sin 10^\circ$ $\checkmark -\sin 10^\circ$ $\checkmark \sin 60^\circ$ \checkmark subst. of special angles/inverv. van sp hoeke (6)



<p>5.3.1</p>	<p>$x^2 + y^2 = r^2$ [Pythagoras] $(x)^2 + (3)^2 = 5^2$ $x^2 = 16$ $x = 4$ $R(4 ; 3)$ $\tan \alpha = \frac{3}{4}$</p>	<p>✓ subst in pyth ✓ $x = 4$ ✓ answer/antw (3)</p>
<p>5.3.2</p>	<p>$\sin \beta$ $= \sin (180^\circ + \alpha)$ $= -\sin \alpha$ $= \frac{-3}{5}$</p>	<p>✓ $\beta = 180^\circ + \alpha$ ✓ $-\sin \alpha$ ✓ answer/antw (3)</p>

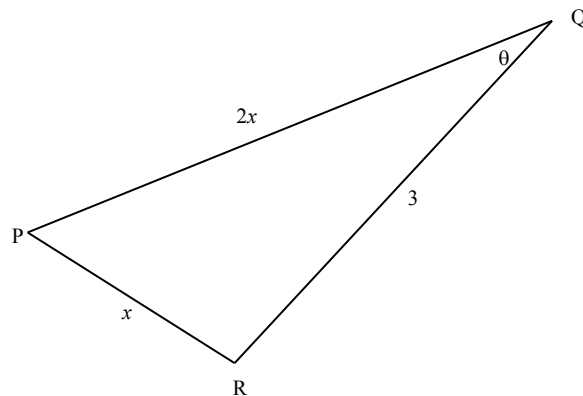
<p>5.3.3</p>	$\frac{y}{10} = \frac{-3}{5}$ $y = -6$ $\therefore x = -8$ $P(-8; -6)$	$\checkmark \frac{y}{10}$ $\checkmark \frac{-3}{5}$ $\checkmark y = -6$ $\checkmark x = -8$ <p style="text-align: right;">(4)</p>
<p>5.4.</p>	$\text{LHS} = \frac{\sin \theta - \tan \theta \cdot \cos^2 \theta}{\cos \theta - (1 - \sin^2 \theta)}$ $= \frac{\sin \theta - \frac{\sin \theta}{\cos \theta} \cdot \cos^2 \theta}{\cos \theta - \cos^2 \theta}$ $= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta(1 - \cos \theta)}$ $= \tan \theta$ $= \text{RHS}$ <p>OR/OF</p> $\text{LHS} = \frac{\sin \theta - \tan \theta \cdot \cos^2 \theta}{\cos \theta - 1 + (1 - \cos^2 \theta)}$ $= \frac{\sin \theta - \frac{\sin \theta}{\cos \theta} \cdot \cos^2 \theta}{\cos \theta - \cos^2 \theta}$ $= \frac{\sin \theta(1 - \cos \theta)}{\cos \theta(1 - \cos \theta)}$ $= \tan \theta$ $= \text{RHS}$	$\checkmark \frac{\sin \theta}{\cos \theta}$ $\checkmark \cos^2 \theta$ $\checkmark \text{common fact/ gemene fakt.}$ $\checkmark \text{common fact/ gemene fakt.}$ <p style="text-align: right;">(4)</p> $\checkmark \frac{\sin \theta}{\cos \theta}$ $\checkmark 1 - \cos^2 \theta$ $\checkmark \text{common fact/ gemene fakt.}$ $\checkmark \text{common fact/ gemene fakt.}$ <p style="text-align: right;">(4)</p> <p style="text-align: right;">[26]</p>

QUESTION/VRAAG 6

6.1	$\sin(x - 30^\circ) = \cos 2x$ $\sin(x - 30^\circ) = \sin(90^\circ - 2x)$ $x - 30^\circ = 90^\circ - 2x + 360^\circ k \quad \text{or} \quad x - 30^\circ = 180^\circ - (90^\circ - 2x) + 360^\circ k$ $3x = 120^\circ + 360^\circ k \qquad \qquad -x = 120^\circ + 360^\circ k$ $x = 40^\circ + 120^\circ k \qquad \qquad \qquad x = -120^\circ + 360^\circ k, k \in Z$ OR/OF $\cos(90^\circ - (x - 30^\circ)) = \cos 2x$ $\cos(120^\circ - x) = \cos 2x$ $120^\circ - x = 2x + 360^\circ k \quad \text{or} \quad 120^\circ - x = -2x + 360^\circ k$ $-3x = -120^\circ + 360^\circ k \qquad \qquad x = -120^\circ + 360^\circ k$ $x = 40^\circ + 120^\circ k, k \in Z$ NOTE/LET WEL: $x = -120^\circ + k \cdot 360^\circ$ is equivalent to/ekwivalent aan $x = 240^\circ + k \cdot 360^\circ$	$\checkmark \sin(90^\circ - 2x)$ $\checkmark x - 30^\circ = 90^\circ - 2x + 360^\circ k$ $\checkmark x = 40^\circ + 120^\circ k$ \checkmark $x - 30^\circ = 180^\circ - (90^\circ - 2x) + 360^\circ k$ $\checkmark x = -120^\circ + 360^\circ k$ (5) $\checkmark \cos(90^\circ - (x - 30^\circ))$ \checkmark $120^\circ - x = 2x + 360^\circ k$ $\checkmark x = 40^\circ + 120^\circ k$ \checkmark $120^\circ - x = -2x + 360^\circ k$ $\checkmark x = 240^\circ + 360^\circ k$ (5)
6.2.1	180°	\checkmark answer/antw (1)
6.2.2	$-1 \leq y \leq 1$ OR/OF $y \in [-1; 1]$	\checkmark values/waardes \checkmark notation/notasie (2) \checkmark values/waardes \checkmark notation/notasie (2)

<p>6.2.3</p>		<p>✓ <i>f</i> x-intercept at/afsnit by 30° ✓ shape of/vorm van <i>f</i> ✓ <i>g</i> x-intercepts at/afsnitte by 45° and/en 135° ✓ shape of/vorm van <i>g</i> ✓ TP at/DP by (90°; -1) (5)</p>
<p>6.2.4</p>	<p>$x = -80^\circ ; x = 40^\circ ; x = 160^\circ$</p>	<p>✓✓✓ one mark per answer/een punt per antw.(3)</p>
		<p>[16]</p>

QUESTION/VRAAG 7



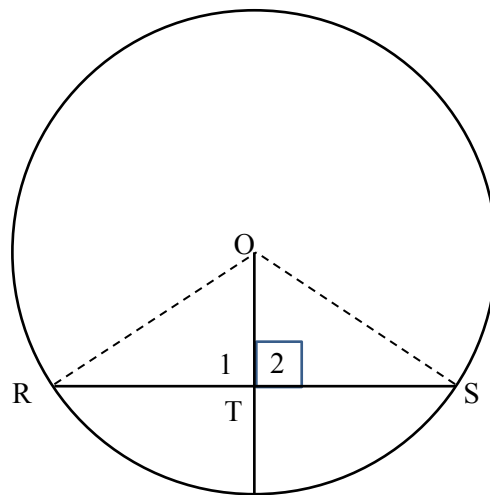
<p>7.1</p>	$x^2 = (2x)^2 + (3)^2 - 2(2x)(3)\cos\theta$ $12x \cos\theta = 3x^2 + 9$ $\cos\theta = \frac{3x^2 + 9}{12x}$ $\cos\theta = \frac{3(x^2 + 3)}{12x}$ $\cos\theta = \frac{x^2 + 3}{4x}$	<p>✓ cos rule ✓ subst ✓ simplify/vereenv (3)</p>
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7.2.1	$\cos \theta = \frac{(2,4)^2 + 3}{4(2,4)}$ $\cos \theta = 0,9125$ $\theta = 24,15^\circ$	✓ subst ✓ $\cos \theta = 0,9125$ ✓ answer/antw. (3)
7.2.2	$\text{Area of/van } \Delta PQR = \frac{1}{2} \times PQ \times QR \times \sin \hat{Q}$ $= \frac{1}{2} \times 4,8 \times 3 \times \sin 24,15$ $= 2,95 \text{ units/eenh}^2$	✓ subst ✓ answer/antw. (2)
7.3	For/vir $x > 0$, $\cos \theta > 0$ $0^\circ < \theta < 90^\circ$ $0 < \frac{x^2 + 3}{4x} < 1$ $x^2 + 3x < 4x$ $x^2 - 4x + 3 < 0$ $(x-1)(x-3) < 0$ $1 < x < 3$	$\checkmark \checkmark 0 < \frac{x^2 + 3}{4x} < 1$ $\checkmark \checkmark 1 < x < 3$ (4)
		[12]

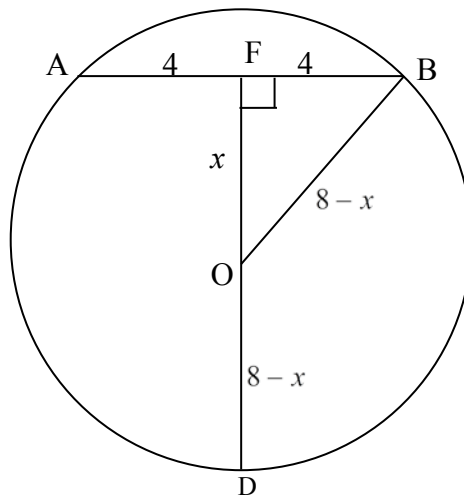
QUESTION 8/VRAAG 8

<p>8.1</p>	$V = \frac{1}{3} Ah$ $640 = \frac{1}{3} \times (16 \times 16) \times h$ $h = 7,5 \text{ cm}$	<p>✓ Area of square/van = (16×16) vierk. ✓ Subst in volume form (2)</p>
<p>8.2</p>	<p>slant height / skuinshoogte = $\sqrt{7,5^2 + 8^2} = 10,9658\dots$</p> <p>Total surface / Totale buite area = $(\text{side} \times \text{side}) + 4 \left(\frac{1}{2} b \times \perp h \right)$</p> $= (16 \times 16) + 4 \left(\frac{1}{2} \times 16 \times 10,9658\dots \right)$ $= 606,9 \text{ cm}^2$	<p>✓ Subst in pyth ✓ answer/antw ✓ Subst in SA/BO form. ✓ answer/antw (4) [6]</p>

QUESTION 9/VRAAG 9

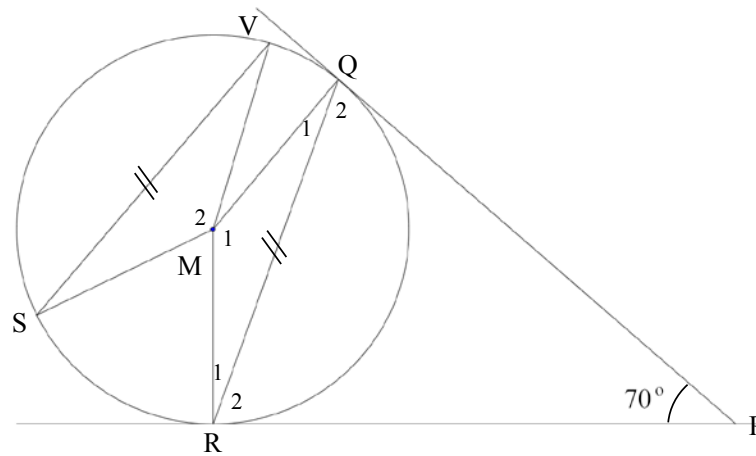


<p>9.1</p>	<p>Construction/Konstr: Draw/trek radii OR and/en OS In $\triangle OTR$ and/ en $\triangle OTS$ $OR = OS$ (radii) $OT = OT$ (common side/ gemene sy) $\hat{T}_1 = \hat{T}_2 = 90^\circ$ (\angle^s on straight line/ op 'n reguit lyn) $\triangle OTR \equiv \triangle OTS$ (90° HS) $\therefore RT = TS$ ($\equiv \Delta^s$)</p>	<p>✓ Constr/Konstr ✓ S (OT is common/gemeen) ✓ S/R ✓ R ✓ S (5)</p>
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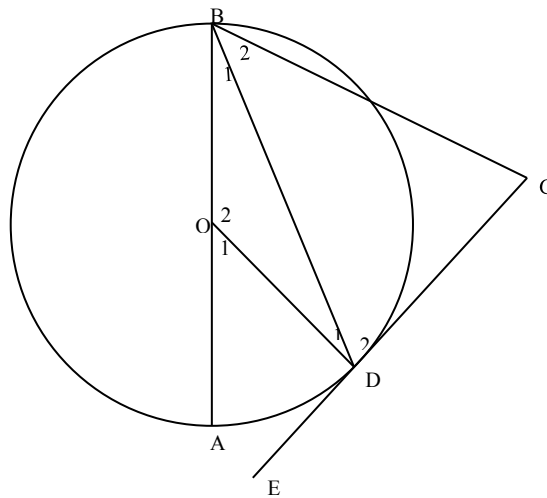
<p>9.2</p>	<p>$AF = FB = 4\text{cm}$ [line from centre \perp to chord/ lyn van mdpt \perp aan koord]</p> <p>$OD = OB = 8 - x$ (radii)</p> <p>$OB^2 = OF^2 + FB^2$ (Pythagoras)</p> <p>$(8 - x)^2 = x^2 + 4^2$</p> <p>$64 - 16x + x^2 = x^2 + 4^2$</p> <p>$48 = 16x$</p> <p>$x = 3$</p> <p>length of/ lengte van radius $= 8 - x$</p> <p>$= 8 - 5$</p> <p>$= 3\text{units} / \text{eenh}$</p>	<p>✓ S/R</p> <p>✓ $8 - x$</p> <p>✓ $(8 - x)^2 = x^2 + 4^2$</p> <p>✓ $x = 3$</p> <p>✓ Answer/antw</p> <p>(5)</p> <p>[10]</p>
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QUESTION/VRAAG 10



<p>10.1</p>	<p>$\hat{Q}_2 = \hat{R}_2$ [tangents from common point/ <i>rk ln e van selfde punt</i>] $\hat{Q}_2 + \hat{R}_2 + 70^\circ = 180^\circ$ [sum $\angle \Delta$] $2\hat{R}_2 = 110^\circ$ $\hat{R}_2 = 55^\circ$</p>	<p>✓ S ✓R ✓ S ✓ $\hat{R}_2 = 55^\circ$</p> <p>(4)</p>
<p>10.2</p>	<p>$\hat{Q}_2 + \hat{Q}_1 = 90^\circ$ [tan/rkl \perp rad] $\hat{Q}_1 = 35^\circ$</p> <p>OR/OF</p> <p>$\hat{R}_1 + \hat{R}_2 = 90^\circ$ [tan/rkl \perp rad] $\hat{R}_1 = 35^\circ$ $\hat{Q}_1 = \hat{R}_1 = 35^\circ$ [OR = OQ]</p>	<p>✓ R ✓ $\hat{Q}_1 = 35^\circ$</p> <p>(2)</p> <p>✓ R ✓ $\hat{Q}_1 = 35^\circ$</p> <p>(2)</p>
<p>10.3</p>	<p>$\hat{O}_1 + \hat{R}_1 + \hat{Q}_1 = 180^\circ$ [sum $\angle \Delta$] $\hat{O}_1 = 180^\circ - 70^\circ = 110^\circ$ $\hat{O}_2 = 110^\circ$ [equal chords subtend = \angle at the centre/ <i>gelyke koorde onrsp. = \angle by mdpt</i>]</p>	<p>✓ $\hat{O}_1 = 110^\circ$ ✓ $\hat{O}_2 = 110^\circ$ ✓ R</p> <p>(3) [9]</p>

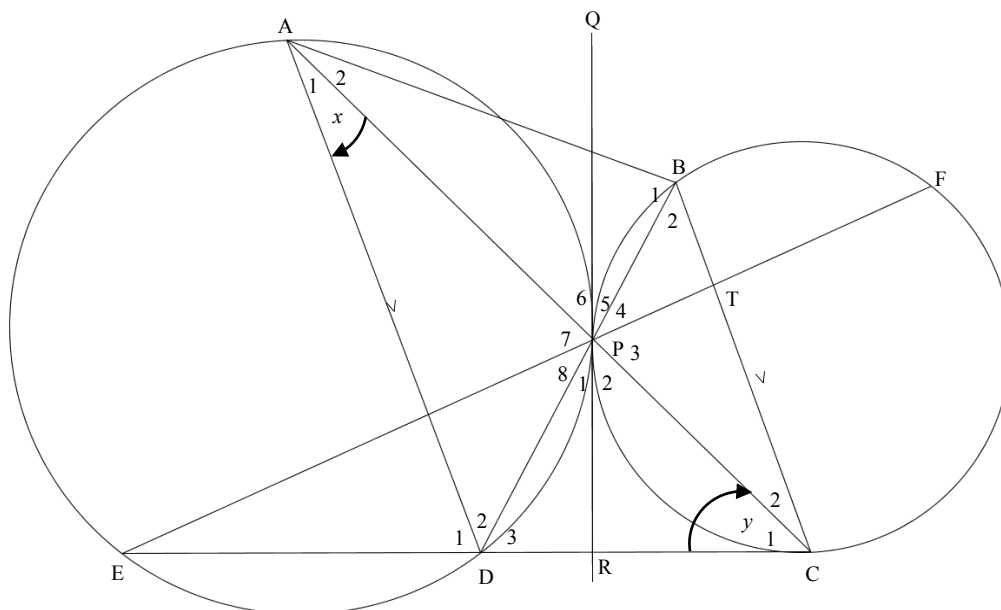
QUESTION/VRAAG 11



<p>11.1</p>	<p>$\hat{B}_1 = \hat{B}_2 = x$ [BD bisect/halveer $\angle \hat{A}BC$] $\hat{A}BC = 2x$ $\hat{O}_1 = 2x$ [\angle at centre = 2 times \angle at circumference/] [midpts $\angle = 2 \times$ omtreks \angle] $\therefore BC \parallel OD$ [corresponding \angle are equal/ooreenk. \angle is gelyk]</p> <p>OR/OF</p> <p>$\hat{B}_1 = \hat{B}_2 = x$ [BD bisect/halveer $\angle \hat{A}BC$] $\hat{D}_1 = x$ [angle opp = sides/\anglee to gelyke sye] $\hat{D}_1 = \hat{B}_2 = x$ $\therefore BC \parallel OD$ [alternate angles are equal/verw \anglee gelyk]</p> <p>OR/OF</p> <p>$\hat{B}_1 = \hat{B}_2 = x$ [BD bisect/halveer $\angle \hat{A}BC$] $\hat{A}BC = 2x$ $\hat{O}_1 = 2x$ [angle at centre = 2 times angle at circumference] [midpts $\angle = 2 \times$ omtreks \angle] $\hat{O}_2 = 180^\circ - 2x$ [\angle on a straight line/\angle op reguit lyn] $\hat{O}_2 + \hat{A}BC = 180^\circ - 2x + 2x = 180^\circ$ $\therefore BC \parallel OD$ [co-int angles are suppl/ko-binne \angle is suppl]</p>	<p>✓ S</p> <p>✓ S ✓ R ✓ R</p> <p>(4)</p> <p>✓ S</p> <p>✓ S ✓ R ✓ R</p> <p>(4)</p> <p>✓ S</p> <p>✓ S ✓ R</p> <p>✓ R</p> <p>(4)</p>
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11.2	$O\hat{D}C = 90^\circ \text{ [tan/rkl } \perp \text{ rad]}$ $\hat{C} = 90^\circ \text{ [co-int / ko-binne } \angle\text{'s OD} \parallel \text{BC]}$ <p>OR/OF</p> $\hat{D}_1 = x$ $\hat{D}_2 = 90^\circ - x \text{ [tan/rkl } \perp \text{ rad]}$ $\hat{C} = 180^\circ - (90^\circ - x) - x \text{ [int } \angle\text{'s of / van } \Delta]$ $= 90^\circ$ <p>OR/OF</p> $E\hat{D}C = 90^\circ \text{ [tan/rkl } \perp \text{ rad]}$ $\hat{C} = 90^\circ \text{ [corresp. / ooreenk. } \angle\text{'s OD} \parallel \text{BC]}$	$\begin{array}{l} \checkmark \text{ S/R} \\ \checkmark \text{ S} \quad \checkmark \text{ R} \end{array} \quad (3)$ $\begin{array}{l} \checkmark \text{ S/R} \\ \checkmark \text{ S} \quad \checkmark \text{ R} \end{array} \quad (3)$ $\begin{array}{l} \checkmark \text{ S/R} \\ \checkmark \text{ S} \quad \checkmark \text{ R} \end{array} \quad (3)$ $[7]$
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QUESTION/VRAAG 12



<p>12.1</p>	<p>$\hat{P}_1 = x$ [tan – ch th/ rkl-kdst] $\hat{C}_2 = x$ [alt/ verw. \angle^s AD \parallel BC] $\hat{E} = x$ [\angle^s in the same segment/ dieselfde segment] $\hat{P}_5 = x$ [vert opp/ reg oorst]</p>	<p>✓ S ✓ R ✓ S ✓ R ✓ S ✓ R ✓ S/R (7)</p>
<p>12.2</p>	<p>$D\hat{C}B = x + y$ $E\hat{D}A = \hat{D}_1 = x + y$ [corresp/ ooreenk. $\angle^s =$, AD \parallel BC] $\therefore E\hat{P}A = x + y$ [\angle^s in the same segment/ dieselfde segment]</p>	<p>✓ S ✓ R ✓ S ✓ R (4)</p>
<p>12.3</p>	<p>$\hat{P}_2 = y$ [tan from a commom point/ rkyne v dieselfde pt] $D\hat{P}T = \hat{P}_1 + \hat{P}_2 + \hat{P}_3$ $= x + y + (x + y)$ $= 2x + 2y$ $\hat{C} = x + y$ $D\hat{P}T + \hat{C} = 180^\circ$ [opp \angle^s of a cyclic quad/ teenoorst. \angle^s van kvhk] $2x + 2y + x + y = 180^\circ$ $3x + 3y = 180^\circ$ $\therefore x + y = 60^\circ$</p>	<p>✓ S/R $\hat{C} = x + y$ ✓ Subst ✓ Answ/antw (4) [15]</p>

TOTAL/TOTAAL: 150