



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE
NASIONALE
SENIOR SERTIFIKAAT**

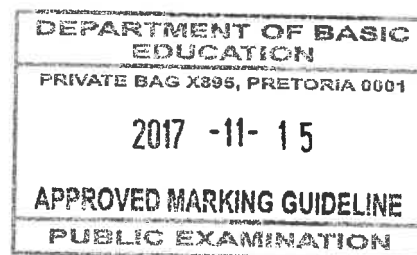
GRADE/GRAAD 11

MATHEMATICS P2/WISKUNDE V2

NOVEMBER 2017

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 150



**These marking guidelines consist of 20 pages.
Hierdie nasienriglyne bestaan uit 20 bladsye.**

Grovender
15/11/2017

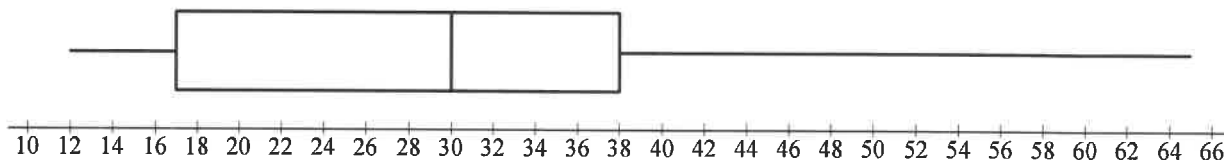
NOTE:

- 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

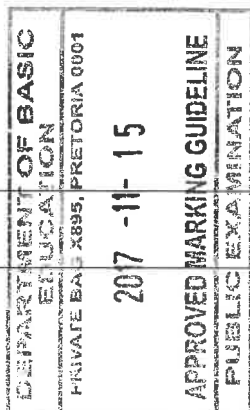


1.1.1	$\text{min} = 12$ $Q_1 = 17$ $Q_2 = \text{median} / \text{mediaan} = 30$ $Q_3 = 38$ $\text{max} = 65$	✓ min + max ✓ median, Q_1 and/en Q_3 (2)
1.1.2	$IQR = Q_3 - Q_1$ $= 38 - 17$ $= 21$	✓ answer/antw (1)
1.1.3	Skewed to the right OR positively skewed <i>Skeef na regs OF positief skeef</i>	✓ answer/antw (1)

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

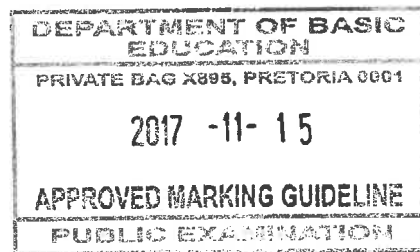
4



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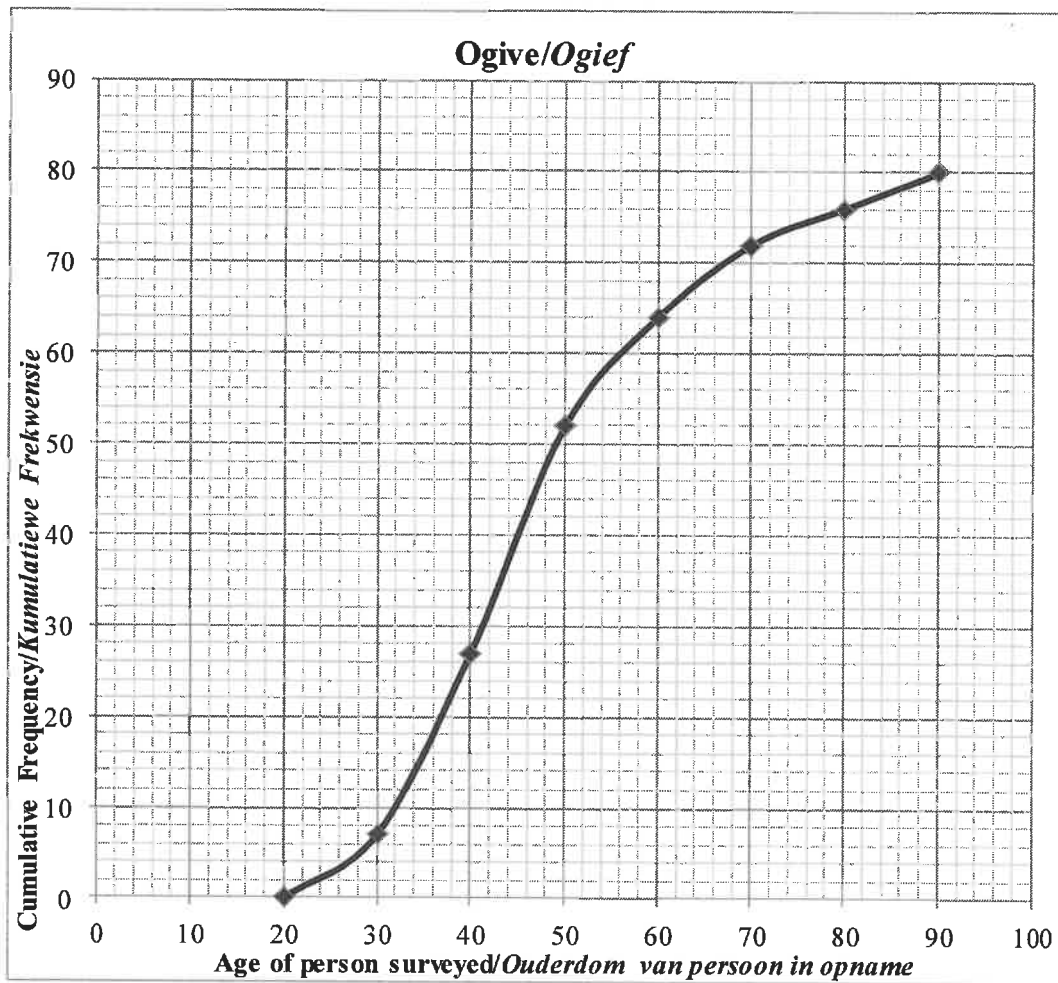
QUESTION/VRAAG 2

2.1	AGE OF PERSON SURVEYED/OUDERDOM VAN PERSOON IN OPNAME	FREQUENCY/FREKWENSIE	CUMULATIVE FREQUENCY/KUMULATIEWE FREKWENSIE	✓ 20, 12 ✓ 8, 4 ✓ 52 ✓ 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	$n = 80$			✓ answ/antw (1)
2.3	$40 < x \leq 50$			✓ answ/antw (1)



✍

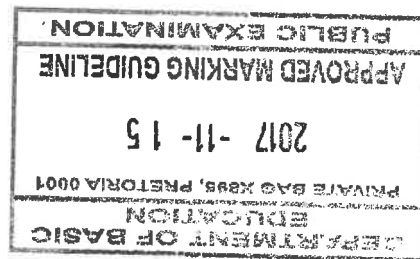
2.4



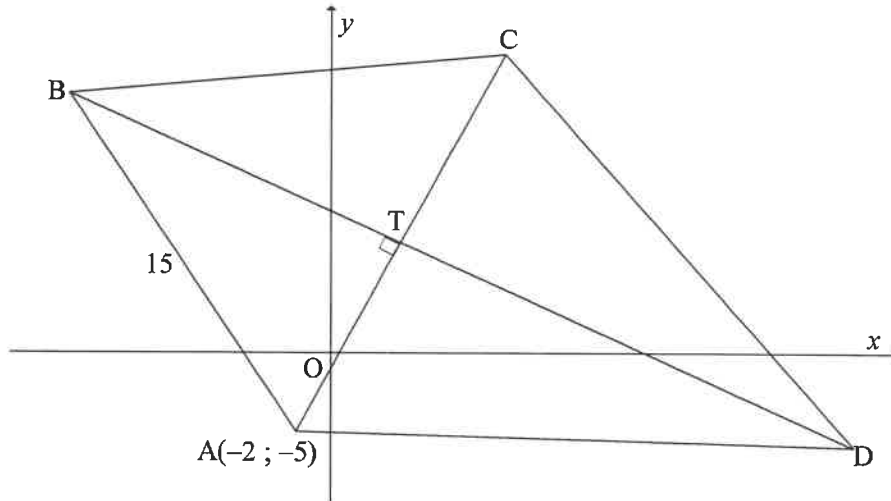
- ✓ Grounding (20; 0)
/Geanker by (20; 0)
 - ✓ upper limits/
boonste limiete
 - ✓ shape
(smooth curve)/
vorm
(gladde kurwe)
- (3)

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]

CH

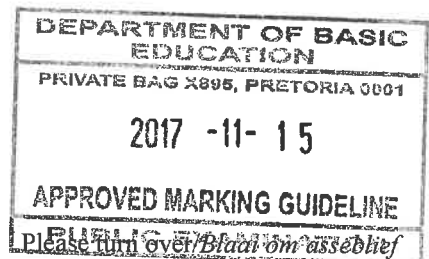


QUESTION/VRAAG 3

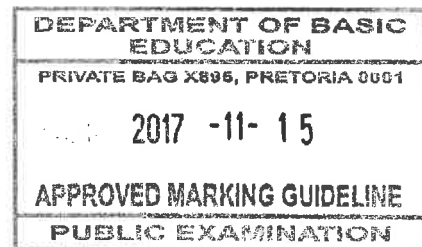


<p>3.1</p>	<p>$BD \quad y = -\frac{1}{2}x + 9$ $\therefore m_{BD} = -\frac{1}{2}$ $\therefore m_{AC} = 2$</p>	<p>✓ Standard form/vorm ✓ answ/antw (2)</p>
<p>3.2</p>	<p>$y - y_1 = m(x - x_1)$ $y - (-5) = 2(x - (-2))$ $y = 2x - 1$</p>	<p>✓ subst (-2 ; -5) ✓ answ/antw (2)</p>
<p>3.3</p>	<p>$2x - 1 = -\frac{1}{2}x + 9$ OR / OF $\frac{5}{2}x = 10$ $x = 4$ $y = 2(4) - 1$ $y = 7$ $T(4 ; 7)$</p>	<p>✓ $2x - 1 = -\frac{1}{2}x + 9$ ✓ $x = 4$ ✓ $y = 7$ (3) OR/OF ✓ $2(2x - 1) + x = 18$ ✓ $x = 4$ ✓ $y = 7$ (3)</p>

4

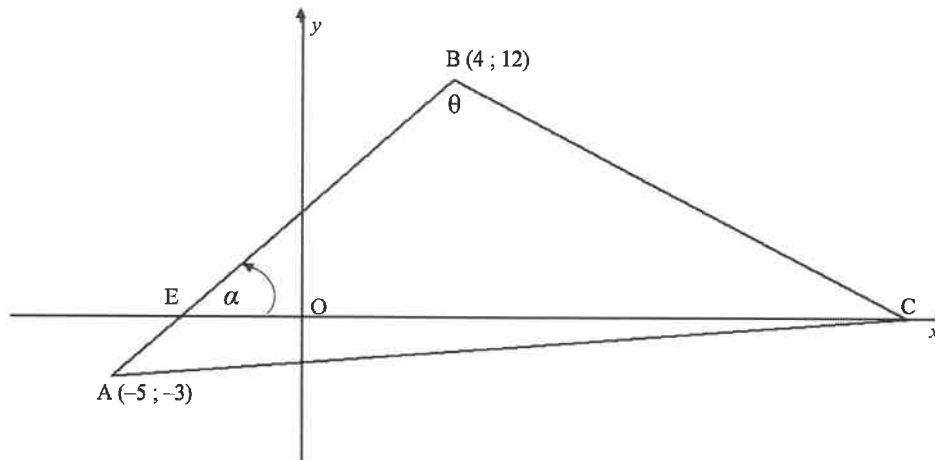


<p>3.4.1</p>	$4 = \frac{-2+x}{2}$ $8 = -2+x$ $x = 10$ $7 = \frac{-5+y}{2}$ $14 = -5+y$ $y = 19$ <p>C(10 ; 19)</p>	<p>✓ $x = 10$</p> <p>✓ $y = 19$</p> <p>(2)</p>
<p>3.4.2</p>	$AT = \sqrt{(4 - (-2))^2 + (7 - (-5))^2}$ $= \sqrt{180}$ $= 6\sqrt{5} = 13,42$ $BT^2 + AT^2 = AB^2 \quad (\text{Pythagoras})$ $BT = \sqrt{15^2 - (\sqrt{180})^2}$ $= \sqrt{45}$ $= 3\sqrt{5} = 6,71$	<p>✓ subst. in distance/afstand form.</p> <p>✓ answer/antw in any form</p> <p>✓ subst. in pyth</p> <p>✓ answer/antw</p> <p>(4)</p>
<p>3.4.3</p>	<p>BC is the diameter/ <i>middellyn</i> [subt. right / <i>ondersp. reg</i> \angle] or/o [conv. \angle^s in semi - circle/ <i>omgk. \angle^s in halfsirkel</i>]</p> $\text{Radius} = \frac{15}{2} = 7,5 \text{ units/ eenh.}$	<p>✓✓ answ/antw</p> <p>(2)</p> <p>[15]</p>

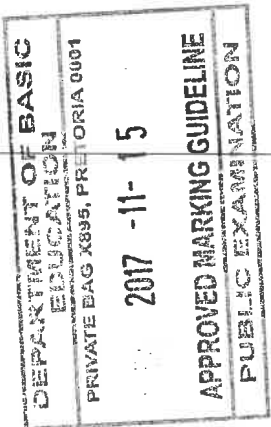


GH

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. ✓ $y = 0$</p> <p>✓ answ/antw (3)</p>

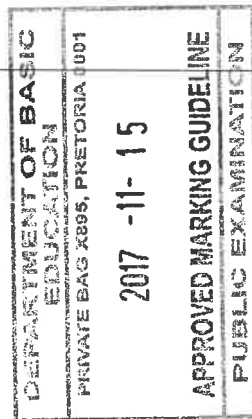


Handwritten mark

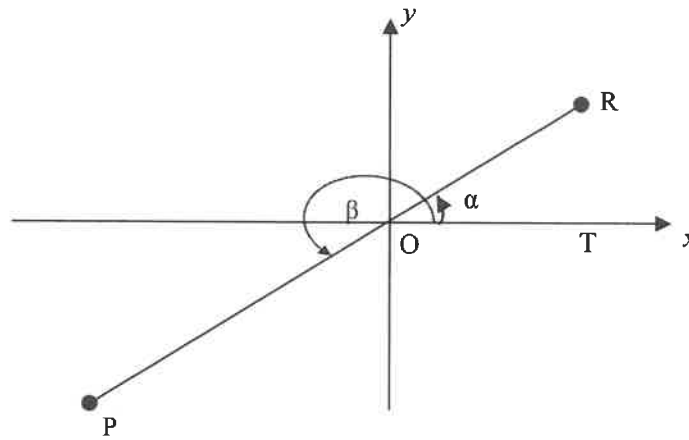
<p>4.3</p>	$\tan \alpha = m_{AB}$ $\tan \alpha = \frac{5}{3}$ $\alpha = 59^\circ$ <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>NOTE/LET WEL:</p> <p>Penalty 1 mark for incorrect rounding</p> <p><i>Penalising 1 punt vir verkeerde afronding</i></p> </div>	$\checkmark \tan \alpha = \frac{5}{3}$ $\checkmark \alpha = 59^\circ$ <p style="text-align: right;">(2)</p>
<p>4.4</p>	$\hat{BCX} = 76^\circ + 59^\circ = 135^\circ \text{ [ext } \angle \text{ of } \Delta]$ $\tan 135^\circ = m_{BC}$ $m_{BC} = -1 = m_{II}$ $y - (-3) = -1(x - (-5))$ $y = -x - 8$	$\checkmark 135^\circ$ $\checkmark \tan 135^\circ = m_{BC}$ $\checkmark \text{ answer/antw}$ $\checkmark \text{ subst } (-3 ; -5)$ $\checkmark \text{ answer/antw}$ <p style="text-align: right;">(5) [12]</p>

QUESTION/VRAAG 5

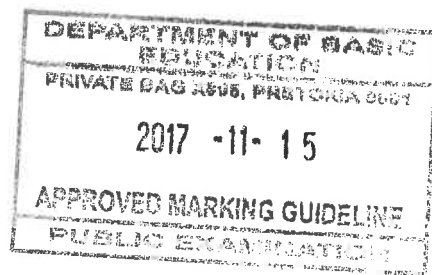
<p>5.1</p>	$\sin(90^\circ - x) \cdot \cos(180^\circ + x) + \tan x \cdot \cos x \cdot \sin(x - 180^\circ)$ $= \cos x \cdot (-\cos x) + \frac{\sin x}{\cos x} \cdot \cos x \cdot (-\sin x)$ $= -\cos^2 x - \sin^2 x$ $= -(\cos^2 x + \sin^2 x)$ $= -1$	$\checkmark \cos x$ $\checkmark -\cos x$ $\checkmark \frac{\sin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



4



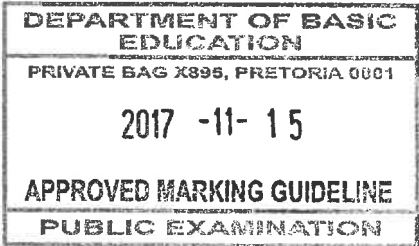
<p>5.3.1</p>	<p>$x^2 + y^2 = r^2$ [Pythagoras] $(x)^2 + (3)^2 = 5^2$ $x^2 = 16$ $x = 4$ $\tan \alpha = \frac{3}{4}$</p>	<p>✓ subst in pyth ✓ $x = 4$ ✓ answer/antw (3)</p>
<p>5.3.2</p>	<p>$\sin \beta$ $= \sin(180^\circ + \alpha)$ $= -\sin \alpha$ $= \frac{-3}{5}$</p>	<p>✓ $\beta = 180^\circ + \alpha$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



CF

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

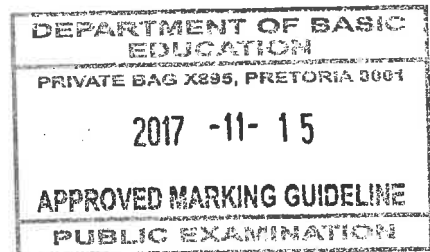
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QUESTION/VRAAG 6

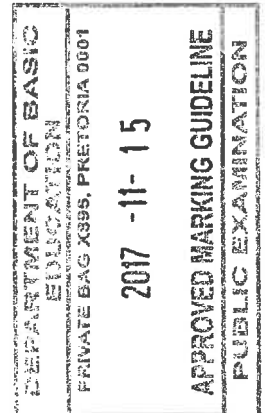
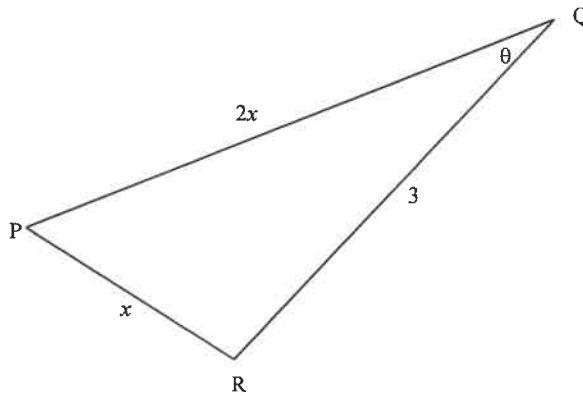
<p>6.1</p>	<p> $\sin(x - 30^\circ) = \cos 2x$ $\sin(x - 30^\circ) = \sin(90^\circ - 2x)$ $x - 30^\circ = 90^\circ - 2x + 360^\circ k$ or $x - 30^\circ = 180^\circ - (90^\circ - 2x) + 360^\circ k$ $3x = 120^\circ + 360^\circ k$ $-x = 120^\circ + 360^\circ k$ $x = 40^\circ + 120^\circ k$ $x = -120^\circ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

GT



<p>6.2.3</p>		<p>f</p> <ul style="list-style-type: none"> ✓ x- intercept at/afsnit by 30° ✓ shape of/vorm van f ✓ TP /DP <p>g</p> <ul style="list-style-type: none"> ✓ shape of/vorm van g ✓ TP /DP <p>(5)</p>
<p>6.2.4</p>	<p>$x = -80^\circ ; x = 40^\circ ; x = 160^\circ$</p>	<ul style="list-style-type: none"> ✓✓✓ one mark per answer/een punt per antw.(3) <p>[16]</p>

QUESTION/VRAAG 7

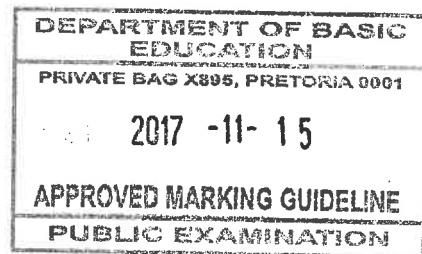


<p>7.1</p>	$x^2 = (2x)^2 + (3)^2 - 2(2x)(3)\cos\theta$ $12x\cos\theta = 3x^2 + 9$ $\cos\theta = \frac{3x^2 + 9}{12x}$ $\cos\theta = \frac{3(x^2 + 3)}{12x}$ $\cos\theta = \frac{x^2 + 3}{4x}$	<ul style="list-style-type: none"> ✓ cos rule ✓ subst ✓ simplify/vereenv <p>(3)</p>
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✱

<p>7.2.1</p>	$\cos \theta = \frac{(2,4)^2 + 3}{4(2,4)}$ $\cos \theta = \frac{73}{80} = 0,9125$ $\theta = 24,15^\circ$	<p>✓ subst</p> <p>✓ $\cos \theta = 0,9125$ $= \frac{73}{80}$</p> <p>✓ answer/antw. (3)</p>
<p>7.2.2</p>	<p>Area of/van $\Delta PQR = \frac{1}{2} \times PQ \times QR \times \sin \hat{Q}$</p> $= \frac{1}{2} \times 4,8 \times 3 \times \sin 24,15$ $= 2,95 \text{ units/eenh}^2$	<p>✓ subst</p> <p>✓ answer/antw. (2)</p>
<p>7.3</p>	<p>$2x + x > 3$ and $x + 3 > 2x$ $x > 1$ and $x < 3$</p> <p>OR/OF</p> <p>For/vir $x > 0$, $\cos \theta > 0$ $0^\circ < \theta < 90^\circ$ $0 < \frac{x^2 + 3}{4x} < 1$ $x^2 + 3x < 4x$ $x^2 - 4x + 3 < 0$ $(x - 1)(x - 3) < 0$ $1 < x < 3$</p>	<p>✓✓ $2x + x > 3$ and $x + 3 > 2x$</p> <p>✓✓ $x > 1$ and $x < 3$</p> <p>✓✓ $0 < \frac{x^2 + 3}{4x} < 1$</p> <p>✓✓ $1 < x < 3$ (4)</p>
		<p>[12]</p>

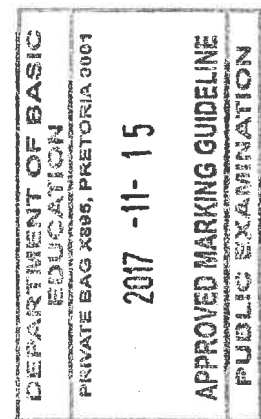
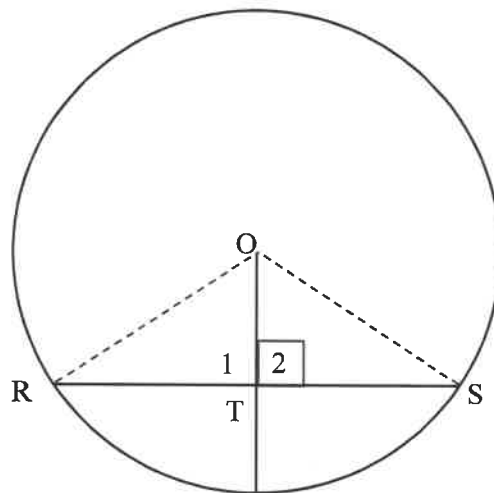
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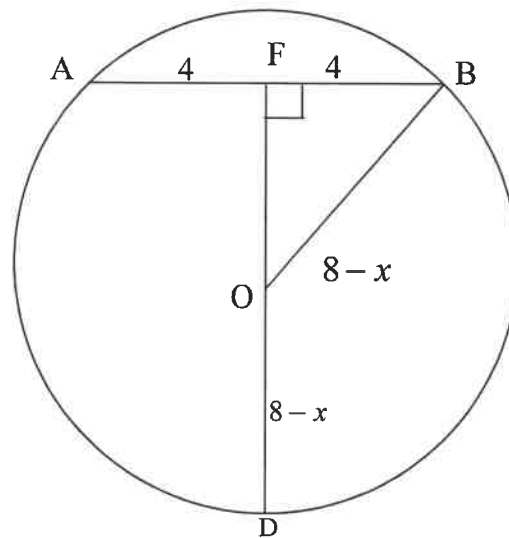
QUESTION 8/VRAAG 8

<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/<i>van</i> = (16×16) <i>vierk.</i> ✓ Subst in volume form (2)</p>
<p>8.2</p>	<p>slant height / <i>skuinshoogte</i> = $s = \sqrt{7,5^2 + 8^2} = 10,9658\dots$</p> <p>Total surface / <i>Totale buite area</i> = $(\text{side} \times \text{side}) + 4\left(\frac{1}{2}b \times s\right)$</p> $= (16 \times 16) + 4\left(\frac{1}{2} \times 16 \times 10,9658\dots\right)$ $= 606,91\text{cm}^2$	<p>✓ Subst in pyth ✓ answer/<i>antw</i> ✓ Subst in SA/ <i>BO</i> form. ✓ answer/<i>antw</i> (4) [6]</p>

QUESTION 9/VRAAG 9



<p>9.1</p>	<p>Construction/<i>Konstr</i>: Draw/<i>trek</i> radii OR and/<i>en</i> OS In $\triangle OTR$ and/<i>en</i> $\triangle OTS$ $OR = OS$ (radii) $OT = OT$ (common side/<i>gemene sy</i>) $\hat{T}_1 = \hat{T}_2 = 90^\circ$ (\angle^s on straight line/<i>op 'n reguit lyn</i>) $\triangle OTR \equiv \triangle OTS$ (90° HS) $\therefore RT = TS$</p>	<p>✓ <i>Constr/Konstr</i> ✓ S (OT is common/<i>gemeen</i>) ✓ S/R ✓ R ✓ S (5)</p>
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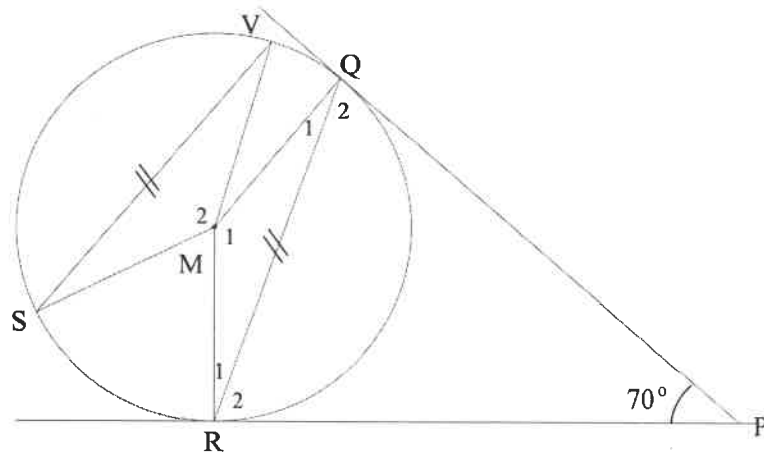
9.2	$AF = FB = 4\text{cm}$ [line from centre \perp to chord/ lyn van mdpt \perp aan koord] $OD = OB = 8 - x$ (radii) $OB^2 = OF^2 + FB^2$ (Pythagoras) $(8 - x)^2 = x^2 + 4^2$ $64 - 16x + x^2 = x^2 + 4^2$ $48 = 16x$ $x = 3$ length of/ lengte van radius $= 8 - x$ $= 8 - 3$ $= 5 \text{ units / eenh}$	\checkmark S/R \checkmark $8 - x$ $\checkmark (8 - x)^2 = x^2 + 4^2$ $\checkmark x = 3$ \checkmark Answer/antw <div style="text-align: right;">(5) [10]</div>
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 2017 -11- 15

 APPROVED MARKING GUIDELINE
 PUBLIC EXAMINATION

QUESTION/VRAAG 10

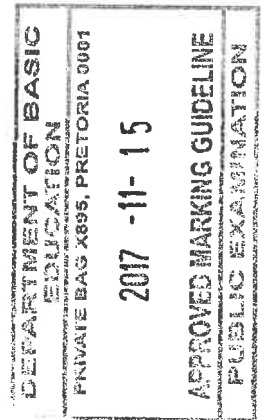
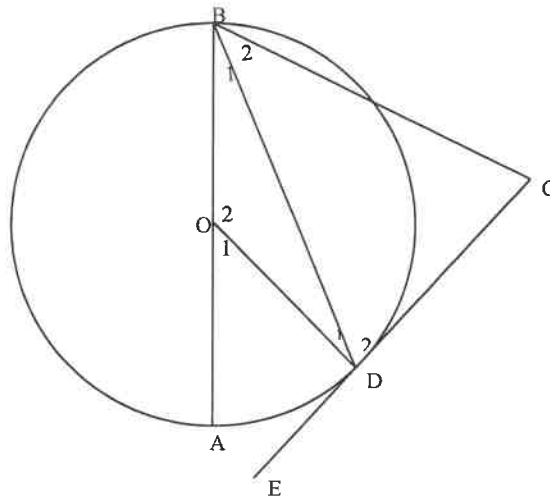


DEPARTMENT OF BASIC EDUCATION
 PRIVATE BAG X895, PRETORIA 0001
2017 -11- 15
 APPROVED MARKING GUIDELINE
 PUBLIC EXAMINATION

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



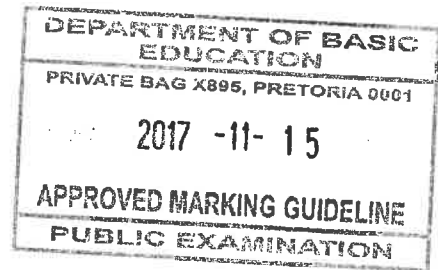
QUESTION/VRAAG 11



<p>11.1</p>	<p>$\hat{B}_1 = \hat{B}_2 = x$ [BD bisect/halveer $\angle \hat{A}\hat{B}\hat{C}$] $\hat{A}\hat{B}\hat{C} = 2x$ $\hat{O}_1 = 2x$ [\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 $\angle \hat{A}\hat{B}\hat{C}$] $\hat{D}_1 = x$ [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 $\angle \hat{A}\hat{B}\hat{C}$] $\hat{A}\hat{B}\hat{C} = 2x$ $\hat{O}_1 = 2x$ [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] $\hat{O}_2 + \hat{A}\hat{B}\hat{C} = 180^\circ - 2x + 2x = 180^\circ$ $\therefore BC \parallel OD$ [co-int angles are suppl/ko-binne \angle is suppl]</p>	<p>✓ S ✓ S ✓ R ✓ R (4)</p> <p>OR/OF ✓ S ✓ S ✓ R ✓ R (4)</p> <p>OR/OF ✓ S ✓ S ✓ R ✓ R (4)</p>
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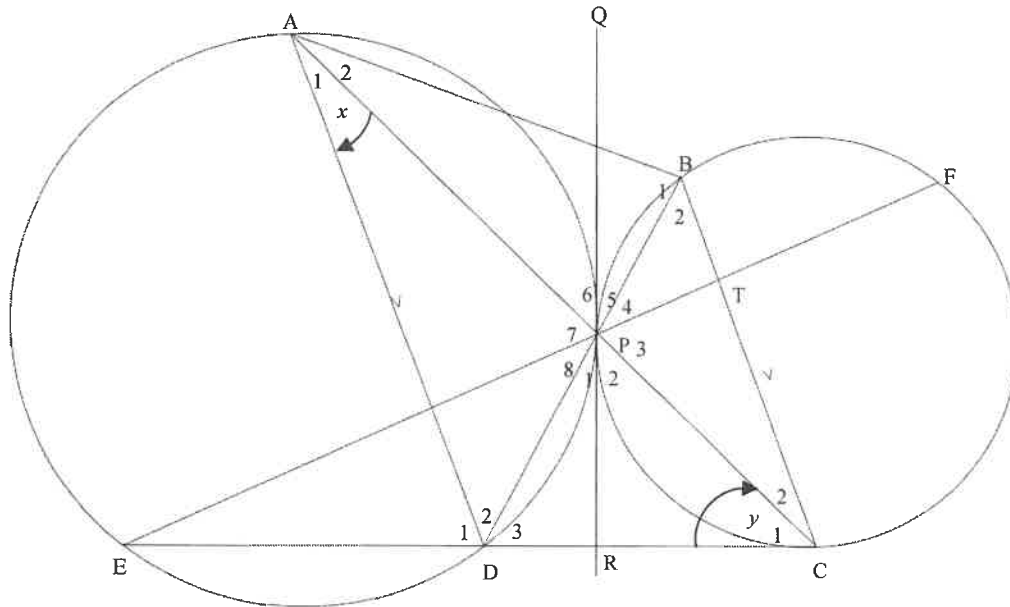
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<p>11.2</p>	<p>$O\hat{D}C = 90^\circ$ [tan/rkl \perp rad] $\hat{C} = 90^\circ$ [co – int / ko-binne \angle's OD \parallel BC]</p> <p>OR/OF</p> <p>$\hat{D}_1 = x$ $\hat{D}_2 = 90^\circ - x$ [tan/rkl \perp rad] $\hat{C} = 180^\circ - (90^\circ - x) - x$ [int \angle's of / van Δ] $= 90^\circ$</p> <p>OR/OF</p> <p>$E\hat{D}O = 90^\circ$ [tan/rkl \perp rad] $\hat{C} = 90^\circ$ [corresp. / ooreenk. \angle's OD \parallel BC]</p>	<p>✓ S/R ✓ S ✓ R (3)</p> <p>OR/OF</p> <p>✓ S/R ✓ S ✓ R (3)</p> <p>✓ S/R ✓ S ✓ R (3)</p> <p>[7]</p>
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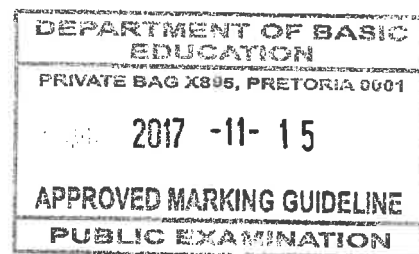


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QUESTION/VRAAG 12



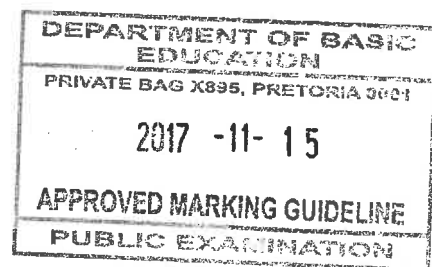
<p>12.1</p>	<p>$\hat{P}_1 = \hat{A}_1 = x$ [tan – ch th/ rkl-kdst] $\hat{C}_2 = \hat{A}_1 = x$ [alt / verw. \angle^s AD \parallel BC] $\hat{E} = x$ [\angle^s in the same segment / dieselfde segment] $\hat{P}_5 = \hat{P}_1 = x$ [vert opp/ reg oorst]</p>	<p>✓ S ✓ R ✓ S ✓ R ✓ S ✓ R ✓ S/R (7)</p>
<p>12.2</p>	<p>$\hat{P}_7 = \hat{E} + \hat{C}_1$ [ext \angle of Δ] $= x + y$ OR/OF $D\hat{C}B = x + y$ $\hat{D}_1 = D\hat{C}B = x + y$ [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 (4) ✓ S ✓ R ✓ S ✓ R (4)</p>



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<p>12.3</p>	<p>$\hat{P}_2 = y$ [tan from a commom point/ <i>rklyne v dieselfde p</i></p> <p>$D\hat{P}T = \hat{P}_1 + \hat{P}_2 + \hat{P}_3$</p> <p>$= x + y + (x + y)$</p> <p>$= 2x + 2y$</p> <p>$\hat{C} = x + y$</p> <p>$D\hat{P}T + \hat{C} = 180^\circ$ [opp \angle^s of a cyclic quad/ <i>teenoorst. \angle^s van kv</i></p> <p>$2x + 2y + x + y = 180^\circ$</p> <p>$3x + 3y = 180^\circ$</p> <p>$\therefore x + y = 60$ [ext \angle of cyclic quad DCTP]</p> <p>OR / OF</p> <p>$\hat{P}_8 = \hat{C}_1 + \hat{C}_2 = x + y$ [ext \angle of cyclic quad DCTP]</p> <p>$\hat{P}_1 + \hat{P}_2 + \hat{P}_7 + \hat{P}_8 = 180^\circ$ [\angle's on a straight line]</p> <p>$x + y + x + y + x + y = 180^\circ$</p> <p>$3x + 3y = 180^\circ$</p> <p>$3(x + y) = 180^\circ$</p> <p>$x + y = 60^\circ$</p>	<p>✓ S/R</p> <p>✓ $\hat{C} = x + y$</p> <p>✓ S/R</p> <p>✓ Answ/antw</p> <p>(4)</p> <p>✓ S ✓ R</p> <p>✓ S / R</p> <p>✓ Answ/antw</p> <p>(4)</p> <p>[15]</p>
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TOTAL/TOTAAL: 150



CF