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PREPARATORY EXAMINATIONS
VOORBEREIDENDE EKSAMEN
2018
MARKING GUIDELINES /
NASIENRIGLYNE

MATHEMATICS / WISKUNDE
(PAPER 2 / VRAESTEL 2) (10612)

15 pages / bladsye

GAUTENG DEPARTMENT OF EDUCATION
GAUTENGSE DEPARTEMENT VAN ONDERWYS
PROVINCIAL EXAMINATION / PROVINSIALE EKSAMEN

MATHEMATICS / WISKUNDE
(PAPER 2 / VRAESTEL 2)

MARKING GUIDELINES /
NASIENRIGLYNE

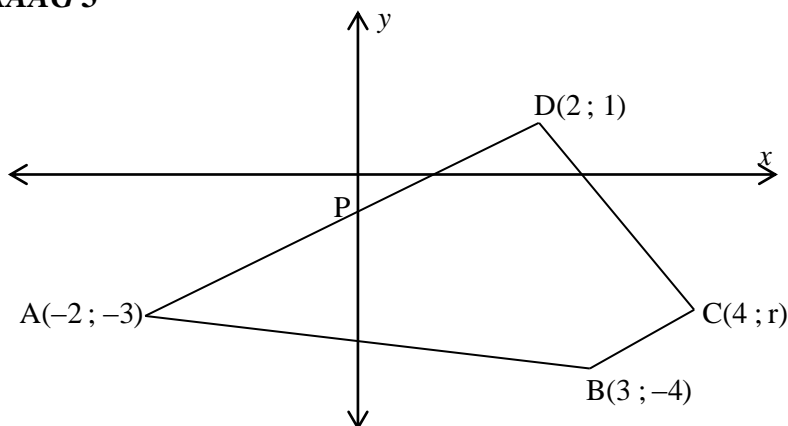
QUESTION / VRAAG 1

1.1	$a = 24$	✓✓ $a = 24$ (2)
1.2	100	✓ 100 (1)
1.3	$50 \leq x < 60$	✓ answer (1)
1.4.1	$\bar{x} = \frac{24 \times 15 + 6 \times 25 + 8 \times 35 + 28 \times 45 + 34 \times 55}{100}$ $= 39,2$	✓ numerator ✓✓ 39,2 Answer only 3/3 (3)
1.4.2	$100 - 34$ $= 66$	✓ 34 ✓ 66 (2)
		[9]

QUESTION / VRAAG 2

2.1	$\sigma = 6,47$	✓ answer (1)
2.2	$\bar{x} = 14,5$ One standard deviation above the mean: $14,5 + 6,47$ $= 20,97$ Therefore a student needed to work for 21 hours	✓ $\bar{x} = 14,5$ ✓ 20,97 ✓ 21 hours (3)
2.3	$y = 454,38 + 131,42x$	✓ $a = 454,38$ ✓ $b = 131,42$ ✓ equation / vergelyking (3)
2.4	Payment when $x = 11,5$ / <i>Betaling wanneer $x = 11,5$</i> $y = 454,38 + 131,42x$ OR / OF $= 454,38 + 131,42(11,5)$ by using the calculator $= R 1965,71$ R 1965,73 2 / 2 marks	✓ subst $x = 11,5$ / vervang $x = 11,5$ ✓ R1965,71 (2)
2.5	(23 ; 2700) The student could have done some of the work incorrectly and needed to redo work without any payment <i>Any logical reason can be accepted</i>	✓ (23 ; 2700) ✓ reason (2)
		[11]

QUESTION / VRAAG 3

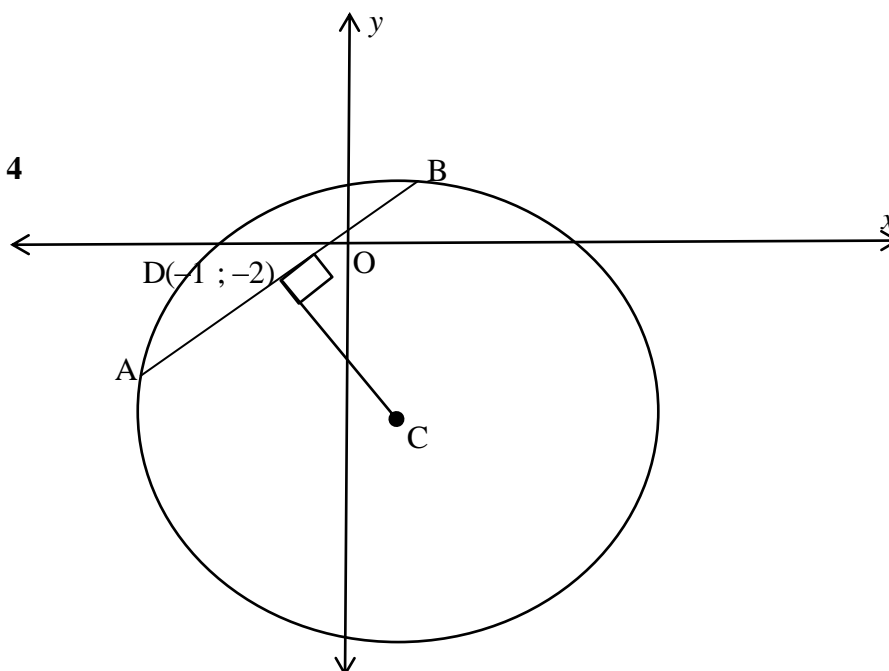


3.1.1	$m_{AD} = \frac{1 - (-3)}{2 - (-2)}$ $= 1$ $m_{AD} = m_{BC} = 1 \quad [AD \parallel BC]$ $1 = \frac{r - (-4)}{4 - 3}$ $1 = \frac{r + 4}{1}$ $r + 4 = 1$ $r = -3$ <p>OR / OF</p> $m_{AD} = m_{BC} \quad [AD \parallel BC]$ $\frac{1 + 3}{2 + 2} = \frac{r + 4}{4 - 3}$ $r + 4 = 1$ $r = -3$	$\checkmark m_{AD} = 1$ $\checkmark \frac{r - (-4)}{4 - 3}$ $\checkmark r + 4 = 1$ \checkmark value of r / waarde van r $\checkmark m_{AD} = 1$ $\checkmark \frac{r - (-4)}{4 - 3}$ $\checkmark r + 4 = 1$ \checkmark value of r / waarde van r (4)
3.1.2	Trapezium / <i>Trapezium</i>	\checkmark answer / antwoord (1)
3.1.3	$P\left(\frac{-2+2}{2}; \frac{-3+1}{2}\right)$ $= P(0; -1)$ <p style="text-align: center;">OR / OF</p> $y - 1 = 1(x - 2)$ $y = x - 1$ $P(0; -1)$	$\checkmark x = 0$ $\checkmark y = -1$ (2)
3.1.4	$m_{PB} = \frac{-1 - (-4)}{0 - 3}$ $= -1$ $m_{AD} \times m_{PB} = 1 \times -1$ $= -1$ $\therefore BP \perp AD$	$\checkmark m_{PB} = -1$ \checkmark product = -1 (2)

3.1.5	<p>AB is a diameter / <i>middel lyn</i> [$\hat{A}PB = 90^\circ$]</p> $AB = \sqrt{26}$ $r = \frac{\sqrt{26}}{2}$ $\therefore r^2 = \frac{26}{4} \text{ or } \frac{13}{2}$ <p>midpoint of AB <i>middelpunt van AB</i> $= \left(\frac{3-2}{2}; \frac{-4-3}{2} \right)$</p> $= \left(\frac{1}{2}; \frac{-7}{2} \right)$ $\therefore \left(x - \frac{1}{2} \right)^2 + \left(y + \frac{7}{2} \right)^2 = \frac{13}{2}$ <p>OR / OF</p> <p>midpoint of AB <i>middelpunt van AB</i> $= \left(\frac{3-2}{2}; \frac{-4-3}{2} \right)$</p> $= \left(\frac{1}{2}; \frac{-7}{2} \right)$ $r^2 = \left(\frac{1}{2} + 2 \right)^2 + \left(-\frac{7}{2} + 3 \right)^2 \text{ or/of } r^2 = \left(0 - \frac{1}{2} \right)^2 + \left(-1 + \frac{7}{2} \right)^2$ $= \frac{25}{4} + \frac{1}{4} \qquad = \frac{1}{4} + \frac{25}{4}$ $= \frac{13}{2} \qquad = \frac{13}{2}$ $\therefore \left(x - \frac{1}{2} \right)^2 + \left(y + \frac{7}{2} \right)^2 = \frac{13}{2}$	$\checkmark r = \frac{\sqrt{26}}{2}$ $\checkmark r^2 = \frac{13}{2}$ $\checkmark \frac{1}{2}$ $\checkmark -\frac{7}{2}$ <p>\checkmark equation / <i>vergelyking</i></p> $\checkmark \frac{1}{2}$ $\checkmark -\frac{7}{2}$ <p>\checkmark substitution into distance formula / <i>vervang in afstandformule</i></p> $\checkmark r^2 = \frac{13}{2}$ <p>\checkmark equation / <i>vergelyking</i></p> <p>(5)</p>
3.1.6	$x^2 + y^2 - 2x \cos \theta - 4y \cos \theta = -2$ $x^2 - 2x \cos \theta + y^2 - 4y \cos \theta = -2$ $(x - \cos \theta)^2 + (y - 2 \cos \theta)^2 = -2 + \cos^2 \theta + 4 \cos^2 \theta$ $r^2 = -2 + \cos^2 \theta + 4 \cos^2 \theta$ $= -2 + 5 \cos^2 \theta$ <p>For any value of θ the maximum of $\cos^2 \theta = 1$</p> $r^2 = -2 + 5$ <p>Maximum value of $r = \sqrt{3}$</p>	$\checkmark (x - \cos \theta)^2 + (y - 2 \cos \theta)^2$ $\checkmark -2 + \cos^2 \theta + 4 \cos^2 \theta$ $\checkmark r^2 = -2 + 5 \cos^2 \theta$ <p>\checkmark max of $\cos^2 \theta = 1$</p> $\checkmark r = \sqrt{3}$ <p>(5)</p>

3.2		
3.2.1	$m_{PQ} = \frac{-2-1}{3+2}$ $= -\frac{3}{5}$ $y-1 = -\frac{3}{5}(x+2) \quad \text{or / of} \quad -2 = -\frac{3}{5}(3) + c$ $5y - 5 = -3x - 6 \quad -2 = -\frac{9}{5} + c$ $3x + 5y + 1 = 0 \quad c = -\frac{1}{5}$ $y = -\frac{3}{5}x - \frac{1}{5}$ $3x + 5y + 1 = 0$	<p>✓ gradient of PQ / gradiënt van PQ</p> <p>✓ sub P, Q and / en m</p> <p>✓ equation / vergelyking (correct form)</p> <p>(3)</p>
3.2.2	$\tan \hat{P}\hat{S}\hat{O} = m_{PQ}$ $= -\frac{3}{5}$ $\hat{P}\hat{S}\hat{O} = 180^\circ - 30,96^\circ$ $= 149,04^\circ$ $\hat{P}\hat{T}\hat{S} = 149,04^\circ - 77,47^\circ \quad [\text{ext } \angle \text{ of } \Delta] /$ $= 71,57^\circ \quad [\text{buite } \angle \text{ van } \Delta]$ $m_{PR} = \tan 71,57^\circ$ $= 3$ $y-1 = 3(x+2) \quad \text{or/of} \quad 1 = 3(-2) + c$ $y = 3x + 7 \quad y = 3x + 7$	<p>✓ $\tan \hat{P}\hat{S}\hat{O} = -\frac{3}{5}$</p> <p>✓ $\hat{P}\hat{S}\hat{O} = 149,04^\circ$</p> <p>✓ $\hat{P}\hat{T}\hat{S} = 71,57^\circ$</p> <p>✓ $m_{PR} = 3$</p> <p>✓ sub P(-2;1) and / en m</p> <p>✓ equation / vergelyking (correct form)</p> <p>(6)</p> <p>[28]</p>

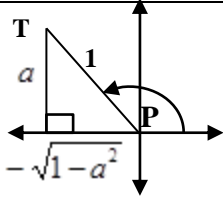
QUESTION / VRAAG 4



4.1	$x^2 + y^2 + 6y - 4x = 12$ $(x - 2)^2 + (y + 3)^2 = 12 + 4 + 9$ $(x - 2)^2 + (y + 3)^2 = 25$ $C(2 ; -3) \quad \text{Answer only 3 / 3}$	$\checkmark (x - 2)^2 + (y + 3)^2$ $\checkmark \checkmark C(2 ; -3)$ <p style="text-align: right;">(3)</p>
4.2	$r = 5$	$\checkmark r = 5$ <p style="text-align: right;">(1)</p>
4.3	$DC^2 = (2 + 1)^2 + (-3 + 2)^2$ $= 9 + 1$ $= 10$ $BC^2 = 25 \quad (\text{radius})$ $DB^2 = BC^2 - DC^2 \quad (\text{Pyth})$ $= 25 - 10$ $= 15$ $DB = \sqrt{15}$ $AB = 2\sqrt{15} \quad \text{or / of } 7,75$	$\checkmark \text{sub into distance formula / vervang in afstandformule}$ $\checkmark DC^2 = 10$ $\checkmark \text{sub into / in Pythagoras}$ $\checkmark DB = \sqrt{15}$ $\checkmark AB = 2\sqrt{15} \quad \text{or / of } 7,75$ <p style="text-align: right;">(5)</p>
4.4	$\text{Area} = \frac{1}{2}(AB)(DC)$ $= \frac{1}{2}(2\sqrt{15})(\sqrt{10})$ $= 5\sqrt{6}/12,25$	$\checkmark \text{area formula / oppervlakteformule}$ $\checkmark \text{substitution / vervanging}$ <p style="text-align: center;">(ca from / van 4.2)</p> $\checkmark \text{answer / antwoord}$ <p style="text-align: right;">(3)</p>

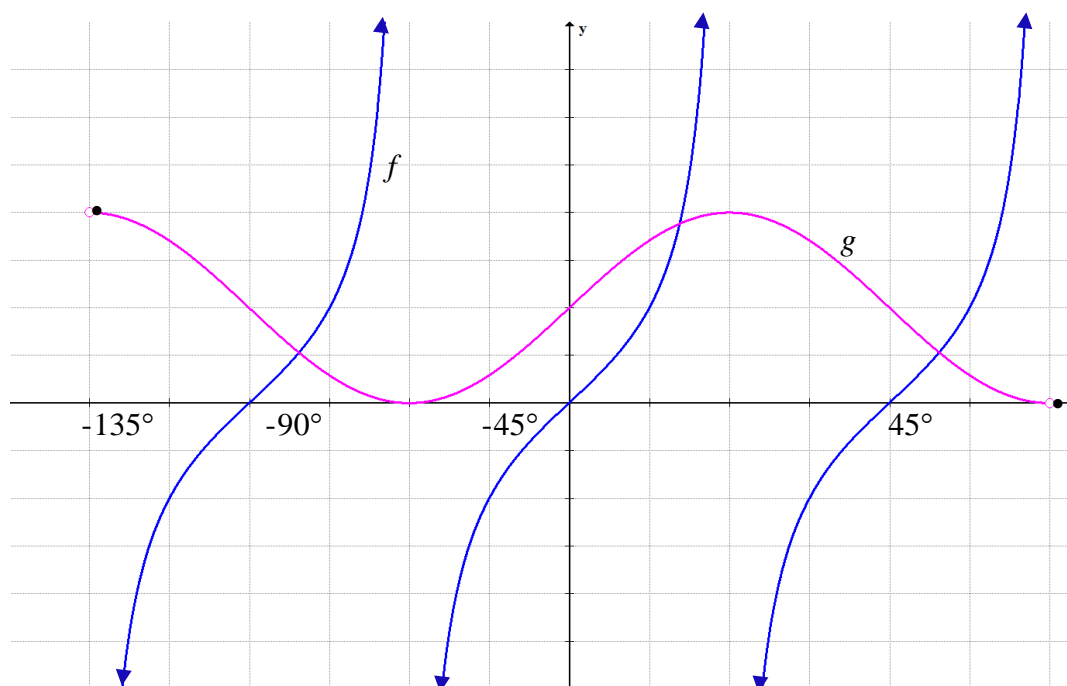
[12]

QUESTION / VRAAG 5

5.1	$\frac{\sin x \sin(90^\circ + y) - \cos x \sin(180^\circ + y)}{\cos x \cos(y - 360^\circ) + \sin(-x) \sin y}$ $= \frac{\sin x \cos y - \cos x (-\sin y)}{\cos x \cos y + (-\sin x) \sin y}$ $= \frac{\sin x \cos y + \cos x \sin y}{\cos x \cos y - \sin x \sin y}$ $= \frac{\sin(x + y)}{\cos(x + y)}$ $= \tan(x + y)$	$\checkmark \cos y$ $\checkmark -\sin y$ $\checkmark \cos y$ $\checkmark -\sin x$ $\checkmark \frac{\sin(x + y)}{\cos(x + y)}$ $\checkmark \tan(x + y)$ <p style="text-align: right;">(6)</p>
5.2.1	$\cos(A + B)$ $= \cos(A - (-B))$ $= \cos A \cos(-B) + \sin(A) \sin(-B)$ $= \cos A \cos B - \sin A \sin B$ $= \text{RHS}$	$\checkmark \cos(A - (-B))$ $\checkmark \text{subst } B \rightarrow -B$ <p style="text-align: right;">(2)</p>
5.2.2 (a)	 $x^2 + y^2 = r^2$ $x^2 = -\sqrt{1 - a^2}$ $T(-\sqrt{1 - a^2}; a)$	\checkmark Pythagoras $\checkmark T(-\sqrt{1 - a^2}; a)$ <p style="text-align: right;">(2)</p> <p style="text-align: right;">Answer only 2/2</p>
5.2.2 (b)	$R(-\sqrt{1 - a^2}; -a)$	$\checkmark \checkmark R(-\sqrt{1 - a^2}; -a)$ <p style="text-align: right;">(2)</p>
5.2.2 (c)	$\cos(P + Q) = \cos P \cos Q - \sin P \sin Q$ $= (-\sqrt{1 - a^2})(-\sqrt{1 - a^2}) - (a)(-a)$ $= 1 - a^2 + a^2$ $= 1$	$\checkmark (-\sqrt{1 - a^2})(-\sqrt{1 - a^2})$ $- (a)(-a)$ $\checkmark 1$ <p style="text-align: right;">(2)</p>
5.2.2 (d)	$\cos 360^\circ = 1$ $\hat{P} + \hat{Q} = 360^\circ ; \hat{P} > 90^\circ ; \hat{Q} > 180^\circ$	\checkmark answer <p style="text-align: right;">(1)</p>

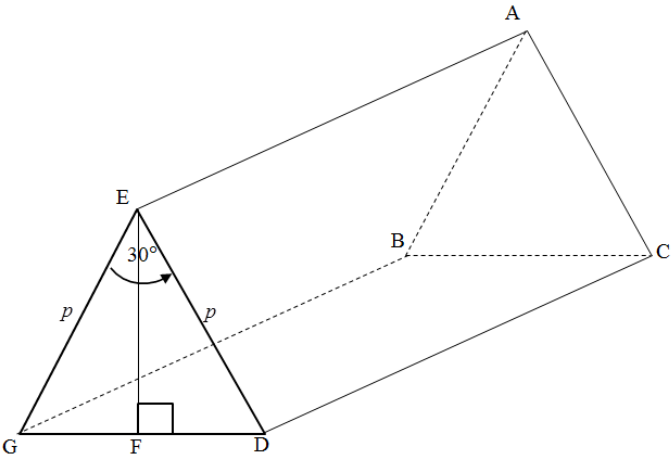
5.3.1	$-1 \leq d \leq 1$ or / of $[-1 ; 1]$	✓✓ answer / antwoord (2)
5.3.2	$\cos \theta = \frac{1}{\cos \theta} + \frac{5}{6}$ $6 \cos^2 \theta = 6 + 5 \cos \theta$ $6 \cos^2 \theta - 5 \cos \theta - 6 = 0$ $(3 \cos \theta + 2)(2 \cos \theta - 3) = 0$ $\cos \theta = -\frac{2}{3} \quad \text{or} \quad \cos \theta = \frac{3}{2} \quad \text{no solution/geen oplossing}$ $\theta = \pm 131,81^\circ + k \cdot 360^\circ ; k \in Z$ <p>OR / OF</p> $\theta = 180^\circ - 48,19^\circ + k \cdot 360^\circ \quad \text{or} \quad \theta = 180^\circ + 48,19^\circ + k \cdot 360^\circ$ $= 131,81^\circ + k \cdot 360^\circ ; k \in Z \quad = 228,19^\circ + k \cdot 360^\circ ; k \in Z$	✓ $6 \cos^2 \theta - 5 \cos \theta - 6 = 0$ ✓ factors / faktore ✓ both solutions ✓ choosing $\cos \theta = -\frac{2}{3}$ ✓ $\theta = 131,81^\circ + k \cdot 360^\circ$ ✓ $\theta = -131,81^\circ + k \cdot 360^\circ$ OR / OF $228,19^\circ + k \cdot 360^\circ$ If $k \in Z$ is omitted then subtract one mark / As $k \in Z$ weggelaat is, trek een punt af (6)
		[23]

QUESTION / VRAAG 6

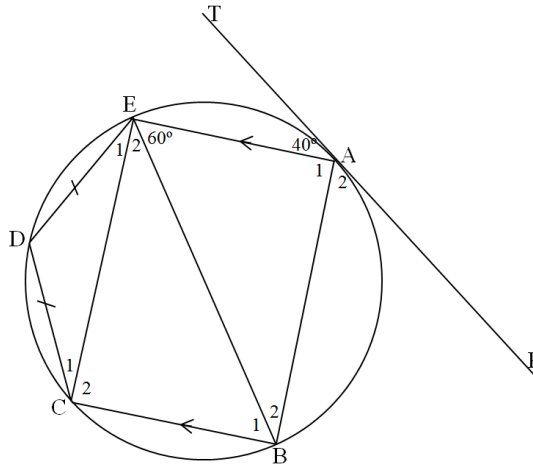


6.1	$x = -45^\circ$	$\checkmark x = -45^\circ$ (has to be an equation $x = ..$) (1)
6.2	$h(x) = \frac{\sin x - 2 \sin^3 x}{2 \sin^2 x \cdot \cos x}$ $= \frac{\sin x(1 - 2 \sin^2 x)}{2 \sin^2 x \cdot \cos x}$ $= \frac{(1 - 2 \sin^2 x)}{2 \sin x \cdot \cos x}$ $= \frac{\cos 2x}{\sin 2x}$ $= \frac{1}{\tan 2x}$ $= \frac{1}{f(x)}$	$\checkmark \sin x(1 - 2 \sin^2 x)$ $\checkmark \cos 2x$ $\checkmark \sin 2x$ $\checkmark \frac{1}{f(x)}$ (4)
6.3	$p(x) = 1 + \sin 2(x + 45^\circ)$ $= 1 + \sin(2x + 90^\circ)$ $= 1 + \cos 2x$ <p style="text-align: right;">Answer only 3/3</p>	$\checkmark 1 + \sin 2(x + 45^\circ)$ $\checkmark \sin(2x + 90^\circ)$ $\checkmark 1 + \cos 2x$ (3)
6.4	$(\tan 2x) \cdot (-1 - \sin 2x) \leq 0$ $(\tan 2x) \cdot (1 + \sin 2x) \geq 0$ $-90^\circ \leq x < -45^\circ \text{ or } [-90^\circ ; -45^\circ)$	$\checkmark (\tan 2x) \cdot (1 + \sin 2x) \geq 0$ $\checkmark -90^\circ \leq x$ $\checkmark x < -45^\circ$ (3)
		[11]

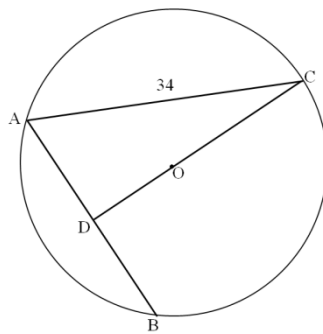
QUESTION / VRAAG 7

7.1	 <p> $GD^2 = EG^2 + ED^2 - 2EG \cdot ED \cos \hat{G}ED$ $= p^2 + p^2 - 2p \cdot p \cos 30^\circ$ $= 2p^2 - 2p^2 \left(\frac{\sqrt{3}}{2} \right)$ $= 2p^2 - \sqrt{3}p^2$ $= p^2(2 - \sqrt{3})$ </p>	<p> ✓ correct substitution in cos-rule / korrekte vervanging in cos-reël ✓ $\frac{\sqrt{3}}{2}$ ✓ simplification / vereenvoudiging $2p^2 - \sqrt{3}p^2$ </p> <p style="text-align: right;">(3)</p>
7.2	<p>In $\triangle CDG$</p> $\frac{CD}{GD} = \tan \hat{C}GD$ $CD = GD \cdot \tan 60^\circ$ $= \sqrt{p^2(2 - \sqrt{3})} \cdot \sqrt{3}$ $= \sqrt{p^2(2 - \sqrt{3})} \cdot 3$ $= p\sqrt{6 - 3\sqrt{3}}$	<p> ✓ $\frac{CD}{GD} = \tan \hat{C}GD$ ✓ $\sqrt{p^2(2 - \sqrt{3})}$ ✓ $\sqrt{3}$ </p> <p style="text-align: right;">(3)</p>
[6]		

QUESTION / VRAAG 8

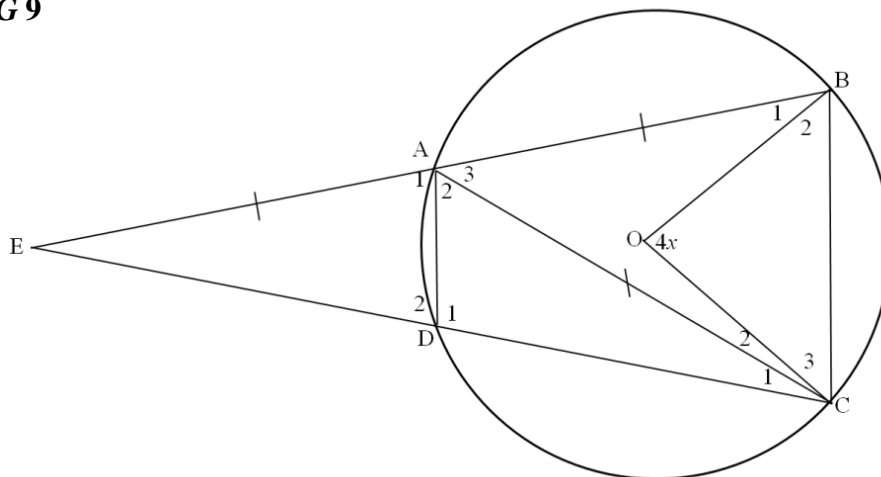


8.1	EABC EBCD	✓ EABC ✓ EBCD (2)
8.2.1	$\hat{B}_2 = 40^\circ$ [tan chord theorem / \angle tussen raaklyn en koord]	✓S✓R (2)
8.2.2	$\hat{B}_1 = 60^\circ$ [alt \angle^s ; $AE \parallel BC$] / verw. binne \angle^e ; $AE \parallel BC$	✓S ✓R (2)
8.2.3	$\hat{D} = 120^\circ$ [opp \angle^s of a cyclic quad / teenoorst. \angle^e van kvh]	✓S✓R (2)
8.2.4	$\hat{E}_1 = \hat{C}_1$ [\angle^s oppequal sides / \angle^e teenoor gelyke sye] $\hat{E}_1 = 30^\circ$ [sum of \angle^s of a Δ / som \angle^e van Δ / \angle^e van Δ]	✓S ✓S ✓R (3)



8.3	AD = 20 $\hat{ADC} = 90^\circ$ $\sin \hat{C} = \frac{20}{34}$ $\sin \hat{C} = 0,588$ $\hat{C} = 36,03^\circ$ Accept 36°	[line from centre to midpoint of chord / midpt. O ; midpt. koord OF lyn van midpt O na midpt van koord] ✓AD = 20 ✓ R ✓ $\sin \hat{C} = \frac{20}{34}$ ✓ $\hat{C} = 36^\circ$ (4)
		[15]

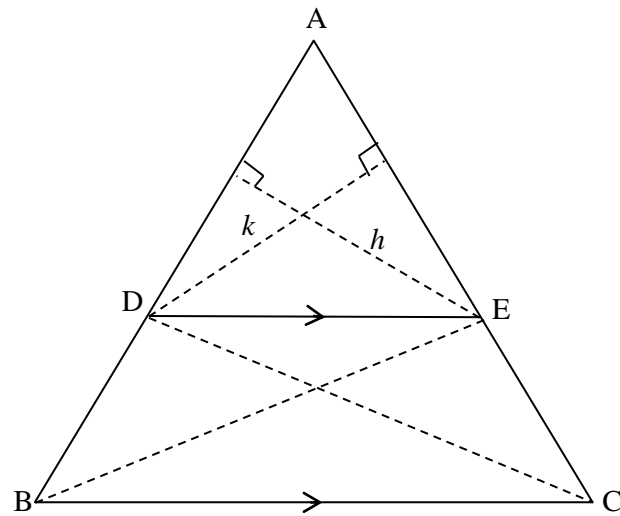
QUESTION / VRAAG 9



9.1	<p>In $\triangle OBC$</p> <p>$\hat{B}_2 = \hat{C}_3$ (\angle's opposite equal radii / \angle^e teenoor gelyke radii)</p> <p>$\hat{B}_2 = 90^\circ - 2x$ (sum of \angle's of a \triangle // som \angle^e van \triangle / \angle^e van \triangle)</p>	<p>✓ S / R</p> <p>✓</p> <p>$\hat{B}_2 = 90^\circ - 2x$</p> <p>(2)</p>
9.2	<p>$\hat{A}_3 = 2x$ (\angle at centre = $2 \times \angle$ at circumference midpts $\angle = 2 \times$ omtreks \angle)</p> <p>$\hat{A}_3 = \hat{C}_1 + \hat{E}$ (ext. \angle of a \triangle / buite \angle van \triangle)</p> <p>but/maar $AB = AC = AE$ (given / gegee)</p> <p>$\hat{C}_1 = \hat{E}$ (\angle's opp equal sides / \angle^e teenoor gelyke sye)</p> <p>$\therefore \hat{E} = x$</p>	<p>✓ S ✓ R</p> <p>✓ S</p> <p>✓ S</p> <p>✓ $\hat{E} = x$</p> <p>(5)</p>
9.3	<p>$\hat{B}_1 + \hat{B}_2 = \hat{C}_2 + \hat{C}_3$ (\angle's opp equal sides / \angle^e teenoor gelyke sye)</p> <p>$\hat{B}_1 = \hat{C}_2 = 180^\circ - (2x + 90^\circ - 2x + 90^\circ - 2x)$ (sum of \angle's of a \triangle / som \angle^e van \triangle / \angle^e van \triangle)</p> <p>$\therefore \hat{C}_2 = x$</p>	<p>✓ S</p> <p>✓ S</p> <p>✓ S (3)</p>
9.4	<p>$\hat{A}_1 = \hat{C}$ (ext. \angle of a cyclic quadrilateral / buite \angle van koordevier hoek)</p> <p>$= 90^\circ - 2x + x + x$</p> <p>$\hat{A}_1 = 90^\circ$</p> <p>ED is a diameter of circle AED (line subtends $90^\circ \angle$ / converse of \angle in a semi circle)</p> <p>ED is 'n middellyn van sirkel AED (lyn onderspan $90^\circ \angle$ of omgekeerde van \angle in halwe sirkel)</p>	<p>✓ S ✓ R</p> <p>✓ $\hat{A}_1 = 90^\circ$</p> <p>✓ R</p> <p>(4)</p>

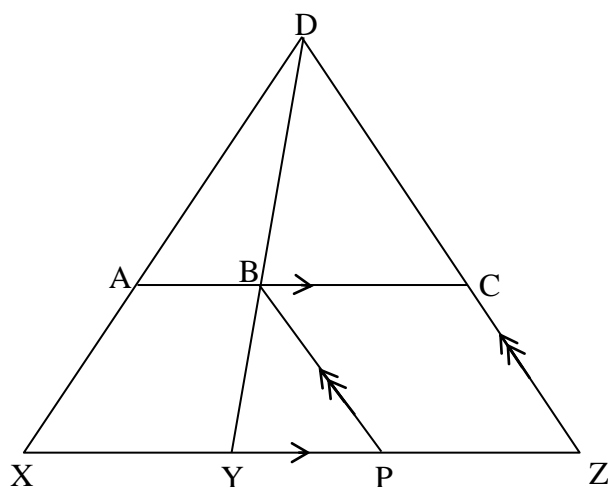
[14]

QUESTION / VRAAG 10



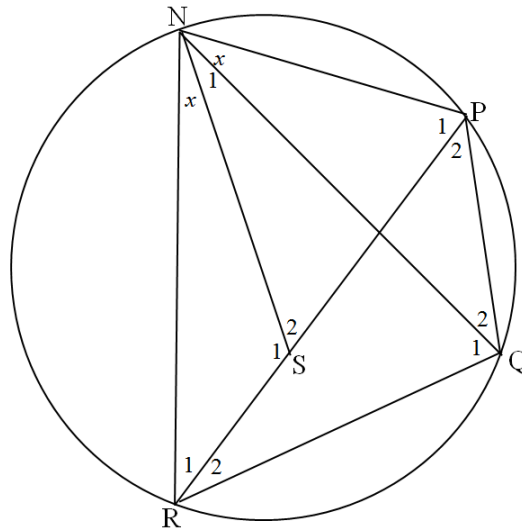
10.1	<p>Construction: In $\triangle ADE$, draw height h relative to base AD and height k relative to base AE. Join BE and DC to create $\triangle BDE$ and $\triangle CED$. /</p> <p><i>Konstruksie: In $\triangle ADE$, trek hoogte h relatief tot basis AD en die hoogte k relatief tot basis AE. Verbind BE en DC om $\triangle BDE$ en $\triangle CED$ te vorm.</i></p> <p>Proof: / <i>Bewys:</i></p> $\frac{\text{Area } \triangle ADE}{\text{Area } \triangle BED} = \frac{\frac{1}{2} AD \cdot h}{\frac{1}{2} BD \cdot h} = \frac{AD}{DB}$ $\frac{\text{Area } \triangle ADE}{\text{Area } \triangle CED} = \frac{\frac{1}{2} AE \cdot k}{\frac{1}{2} CE \cdot k} = \frac{AE}{EC}$ <p>but Area of $\triangle BED$ = Area of / <i>van</i> $\triangle CED$ [same base, same height / <i>dies. basis; dies. hoogte</i>]</p> $\therefore \frac{\text{Area } \triangle ADE}{\text{Area } \triangle BED} = \frac{\text{Area } \triangle ADE}{\text{Area } \triangle CED}$ $\therefore \frac{AD}{DB} = \frac{AE}{EC}$	<p>✓ construction / <i>konstruksie</i></p> <p>✓ S</p> <p>✓ S</p> <p>✓ S ✓ R</p> <p>✓ S</p> <p>(6)</p>
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10.2



10.2	<p>In $\triangle DXY$: $\frac{DA}{DX} = \frac{DB}{DY}$</p> <p>In $\triangle DYZ$: $\frac{ZP}{ZY} = \frac{DB}{DY}$</p> <p>$\frac{DA}{DX} = \frac{ZP}{ZY}$ $ZP = BC$</p> <p>$\frac{BC}{YZ} = \frac{DA}{DX}$</p>	<p>[line \parallel to one side of \triangle or prop.theorem ; $AB \parallel XY$ / <i>lyn \parallel een sy van \triangle of ewer. stelling ; $AB \parallel XY$]</i></p> <p>[line \parallel to one side of \triangle or prop.theorem ; $BC \parallel YZ$ / <i>lyn \parallel een sy van \triangle of ewer. stelling ; $BC \parallel YZ$]</i></p> <p>[opp. sides of a parm / <i>teenoorst sye van \parallel^m]</i></p>	<p>\checkmark S \checkmark R</p> <p>\checkmark S</p> <p>\checkmark S</p> <p>\checkmark S / R</p> <p>(5) [11]</p>
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QUESTION / VRAAG 11



<p>11.1</p>	<p>In $\triangle NSR$ and $\triangle NPQ$ $\hat{R}\hat{N}S = \hat{P}\hat{N}Q$ [given /gegee] $\hat{R}_1 = \hat{Q}_2$ [\angle^s in the same segment <i>omtr \angle^e in dies sirkel segm]</i> $\hat{S}_1 = \hat{N}\hat{P}Q$ [sum of \angle^s in a \triangle <i>som \angle^e van \triangle / \angle^e van \triangle]</i></p> <p>$\therefore \triangle NRS \parallel \triangle NQP$ [\angle, \angle, \angle]</p>	<p>\checkmark S \checkmark S / R \checkmark R (3)</p>
<p>11.2</p>	<p>In $\triangle NQR$ and $\triangle NPS$ $\hat{R}\hat{N}Q = \hat{P}\hat{N}S$ [$\hat{R}\hat{N}S = \hat{P}\hat{N}Q$] $\hat{Q}_1 = \hat{P}_1$ [\angle^s in the same segment / <i>omtr \angle^e in dies sirkel segm]</i> $\hat{R} = \hat{S}_2$ [sum of \angle^s in a \triangle / <i>som \angle^e van \triangle / \angle^e van \triangle]</i></p> <p>$\therefore \triangle NQR \parallel \triangle NPS$ [\angle, \angle, \angle]</p>	<p>\checkmark S \checkmark S \checkmark R (3)</p>
<p>11.3</p>	<p>$\frac{QR}{PS} = \frac{NQ}{NP}$ [$\triangle NQR \parallel \triangle NPS$] $QR \cdot NP = PS \cdot NQ$ $\frac{NR}{NQ} = \frac{SR}{PQ}$ [$\triangle NRS \parallel \triangle NQP$] $NR \cdot PQ = NQ \cdot SR$ $NR \cdot PQ + QR \cdot NP = NQ \cdot SR + PS \cdot NQ$ $= NQ(SR + PS)$ $\therefore NR \cdot PQ + NR \cdot QR = NQ \cdot PR$</p>	<p>\checkmark S / R \checkmark S / R \checkmark S \checkmark S (4) [10]</p>

TOTAL / TOTAAL [150]