



**GAUTENG PROVINCE**  
EDUCATION  
REPUBLIC OF SOUTH AFRICA

**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**

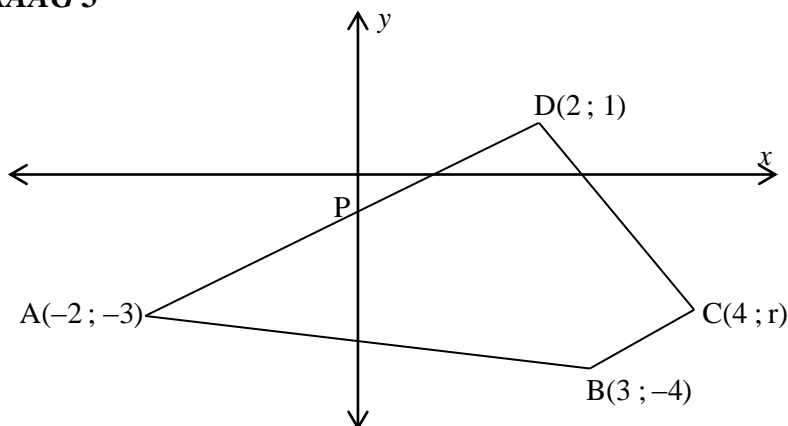
**QUESTION / VRAAG 1**

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)
		<b>[9]</b>

**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 <b>21</b> 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 <math>x = 11,5</math></i> $y = 454,38 + 131,42x$ <b>OR / OF</b> $= 454,38 + 131,42(11,5)$ 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)
		<b>[11]</b>

## QUESTION / VRAAG 3

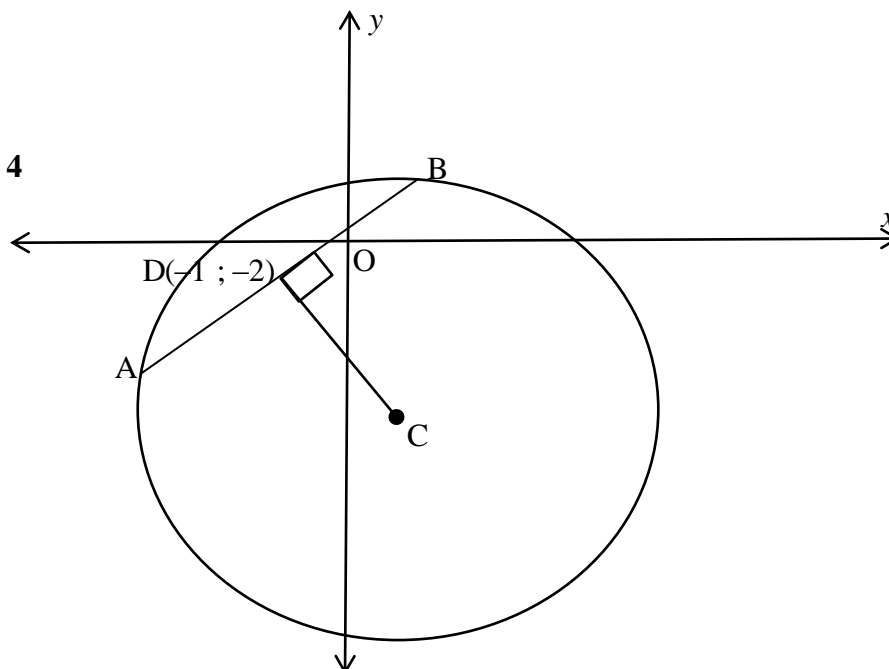


3.1.1	$m_{AD} = \frac{1 - (-3)}{2 - (-2)}$ $= 1$ $m_{AD} = m_{BC} = 1 \quad [AD \parallel BC]$ $1 = \frac{r - (-4)}{4 - 3}$ $1 = \frac{r + 4}{1}$ $r + 4 = 1$ $r = -3$ <p><b>OR / OF</b></p> $m_{AD} = m_{BC} \quad [AD \parallel BC]$ $\frac{1 + 3}{2 + 2} = \frac{r + 4}{4 - 3}$ $r + 4 = 1$ $r = -3$	$\checkmark m_{AD} = 1$  $\checkmark \frac{r - (-4)}{4 - 3}$  $\checkmark r + 4 = 1$  $\checkmark$ 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;"><b>OR / OF</b></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> [<math>\hat{A}PB = 90^\circ</math>]</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> <math>= \left( \frac{3-2}{2}; \frac{-4-3}{2} \right)</math></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><b>OR / OF</b></p> <p>midpoint of AB <i>middelpunt van AB</i> <math>= \left( \frac{3-2}{2}; \frac{-4-3}{2} \right)</math></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><math>\checkmark</math> equation / <i>vergelyking</i></p> $\checkmark \frac{1}{2}$ $\checkmark -\frac{7}{2}$ <p><math>\checkmark</math> substitution into distance formula / <i>vervang in afstandformule</i></p> $\checkmark r^2 = \frac{13}{2}$ <p><math>\checkmark</math> 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 <math>\theta</math> the maximum of <math>\cos^2 \theta = 1</math></p> $r^2 = -2 + 5$ <p>Maximum value of <math>r = \sqrt{3}</math></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><math>\checkmark</math> max of <math>\cos^2 \theta = 1</math></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>✓ <math>\tan \hat{P}\hat{S}\hat{O} = -\frac{3}{5}</math></p> <p>✓ <math>\hat{P}\hat{S}\hat{O} = 149,04^\circ</math></p> <p>✓ <math>\hat{P}\hat{T}\hat{S} = 71,57^\circ</math></p> <p>✓ <math>m_{PR} = 3</math></p> <p>✓ sub P(-2;1) and / en m</p> <p>✓ equation / vergelyking (correct form)</p> <p>(6)</p> <p>[28]</p>

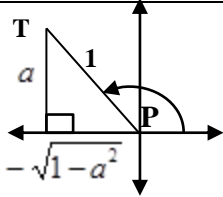
## QUESTION / VRAAG 4



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

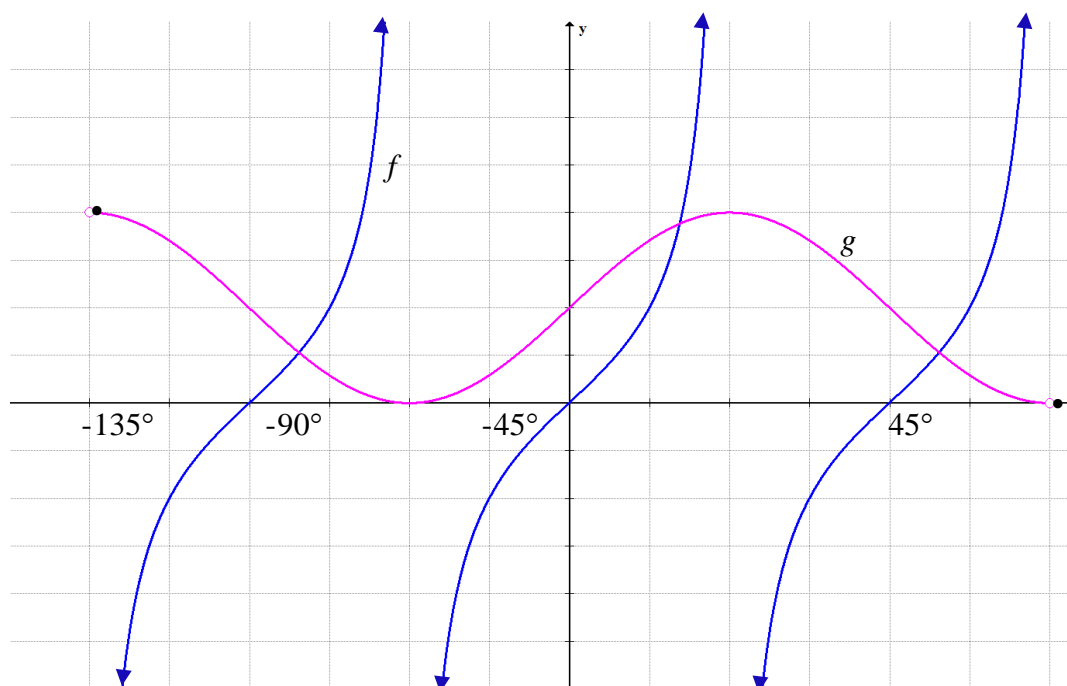
## QUESTION / VRAAG 5

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)	 $x^2 + y^2 = r^2$ $x^2 = -\sqrt{1 - a^2}$ $T(-\sqrt{1 - a^2}; a)$	$\checkmark \text{Pythagoras}$ $\checkmark T(-\sqrt{1 - a^2}; a)$ <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)	$\cos 360^\circ = 1$ $\hat{P} + \hat{Q} = 360^\circ ; \hat{P} > 90^\circ ; \hat{Q} > 180^\circ$	$\checkmark \text{answer}$ <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><b>OR / OF</b></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 $\cos \theta = -\frac{2}{3}$ ✓ $\theta = 131,81^\circ + k \cdot 360^\circ$ ✓ $\theta = -131,81^\circ + k \cdot 360^\circ$ <b>OR / OF</b> $228,19^\circ + k \cdot 360^\circ$ If $k \in Z$ is omitted then subtract one mark / As $k \in Z$ weggelaat is, trek een punt af (6)
		<b>[23]</b>

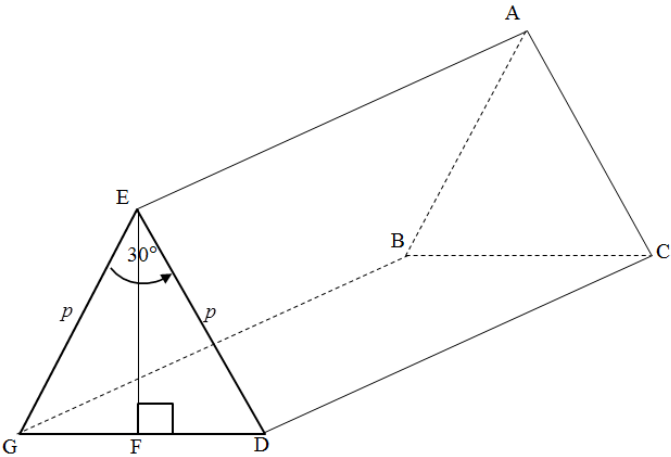


## QUESTION / VRAAG 6

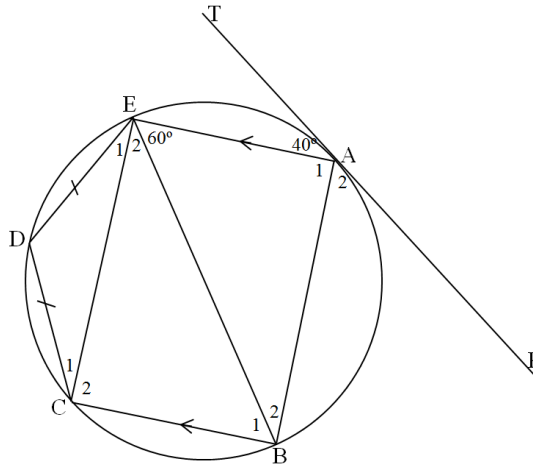


6.1	$x = -45^\circ$	$\checkmark x = -45^\circ$ (has to be an equation $x = ..$ ) (1)
6.2	$h(x) = \frac{\sin x - 2 \sin^3 x}{2 \sin^2 x \cdot \cos x}$ $= \frac{\sin x(1 - 2 \sin^2 x)}{2 \sin^2 x \cdot \cos x}$ $= \frac{(1 - 2 \sin^2 x)}{2 \sin x \cdot \cos x}$ $= \frac{\cos 2x}{\sin 2x}$ $= \frac{1}{\tan 2x}$ $= \frac{1}{f(x)}$	$\checkmark \sin x(1 - 2 \sin^2 x)$  $\checkmark \cos 2x$ $\checkmark \sin 2x$  $\checkmark \frac{1}{f(x)}$ (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)
		<b>[11]</b>

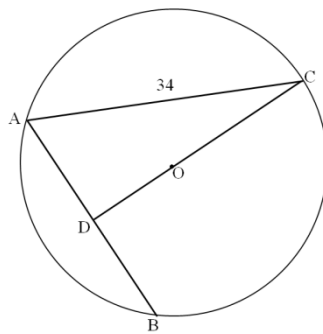
## QUESTION / VRAAG 7

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

QUESTION / VRAAG 8

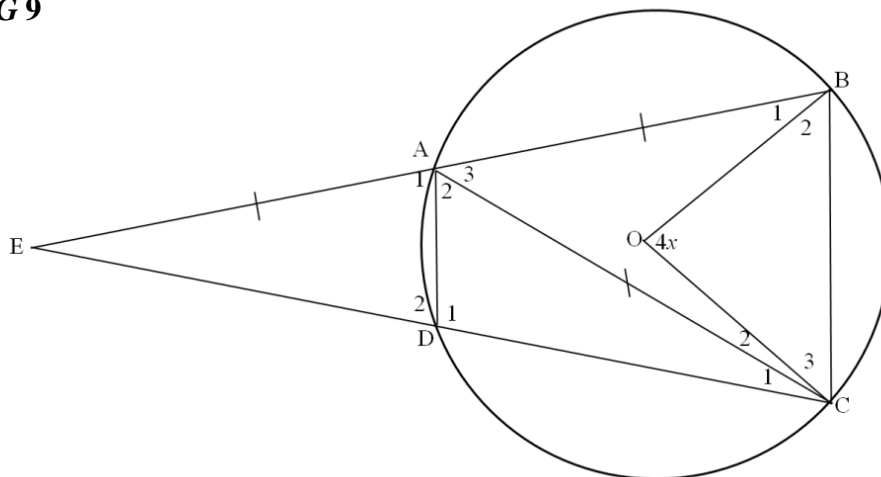


8.1	EABC EBCD	✓ EABC ✓ EBCD (2)
8.2.1	$\hat{B}_2 = 40^\circ$ [tan chord theorem / $\angle$ tussen raaklyn en koord]	✓ S ✓ R (2)
8.2.2	$\hat{B}_1 = 60^\circ$ [alt $\angle^s$ ; $AE \parallel BC$ ] / verw. binne $\angle^e$ ; $AE \parallel BC$	✓ S ✓ R (2)
8.2.3	$\hat{D} = 120^\circ$ [opp $\angle^s$ of a 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 $\Delta$ / som $\angle^e$ van $\Delta$ / $\angle^e$ van $\Delta$ ]	✓ S ✓ S ✓ R (3)



8.3	AD = 20 $\hat{ADC} = 90^\circ$ $\sin \hat{C} = \frac{20}{34}$ $\sin \hat{C} = 0,588$ $\hat{C} = 36,03^\circ$ <b>Accept 36°</b> [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]

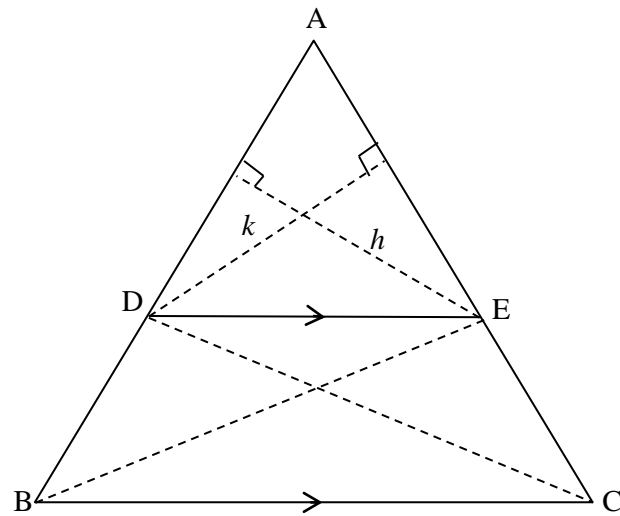
## QUESTION / VRAAG 9



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

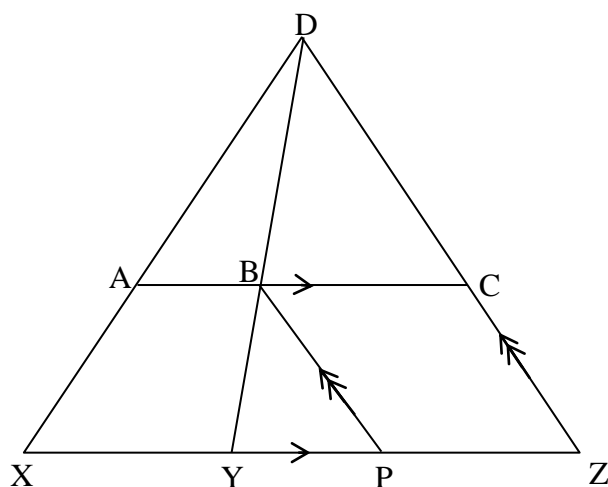
[14]

## QUESTION / VRAAG 10



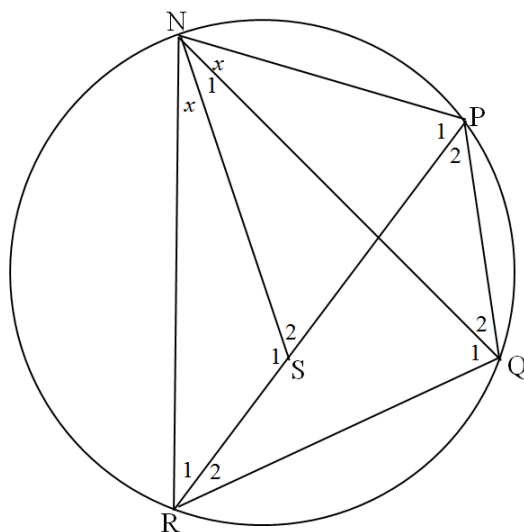
10.1	<p>Construction: In <math>\triangle ADE</math>, draw height <math>h</math> relative to base <math>AD</math> and height <math>k</math> relative to base <math>AE</math>. Join <math>BE</math> and <math>DC</math> to create <math>\triangle BDE</math> and <math>\triangle CED</math>. /</p> <p><i>Konstruksie: In <math>\triangle ADE</math>, trek hoogte <math>h</math> relatief tot basis <math>AD</math> en die hoogte <math>k</math> relatief tot basis <math>AE</math>. Verbind <math>BE</math> en <math>DC</math> om <math>\triangle BDE</math> en <math>\triangle CED</math> 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 <math>\triangle BED</math> = Area of <math>\triangle CED</math> [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 <math>\triangle DXY</math>: <math>\frac{DA}{DX} = \frac{DB}{DY}</math></p> <p>In <math>\triangle DYZ</math>: <math>\frac{ZP}{ZY} = \frac{DB}{DY}</math></p> <p><math>\frac{DA}{DX} = \frac{ZP}{ZY}</math>  <math>ZP = BC</math></p> <p><math>\frac{BC}{YZ} = \frac{DA}{DX}</math></p>	<p>[line <math>\parallel</math> to one side of <math>\triangle</math> or  prop.theorem ; <math>AB \parallel XY</math> /  <i>lyn <math>\parallel</math> een sy van <math>\triangle</math> of  ewer. stelling ; <math>AB \parallel XY</math>]</i></p> <p>[line <math>\parallel</math> to one side of <math>\triangle</math> or  prop.theorem ; <math>BC \parallel YZ</math> /  <i>lyn <math>\parallel</math> een sy van <math>\triangle</math> of  ewer. stelling ; <math>BC \parallel YZ</math>]</i></p> <p>[opp. sides of a parm /  <i>teenoorst sye van <math>\parallel^m</math> ]</i></p>	<p><math>\checkmark</math> S <math>\checkmark</math> R</p> <p><math>\checkmark</math> S</p> <p><math>\checkmark</math> S</p> <p><math>\checkmark</math> S / R</p> <p>(5)  <b>[11]</b></p>
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## QUESTION / VRAAG 11



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

TOTAL / TOTAAL [150]