



Province of the
EASTERN CAPE
EDUCATION

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NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2025

MATHEMATICS P2

MARKS: 150

TIME: 3 hours



This question paper consists of 16 pages, including an information sheet
and an answer book of 23 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 10 questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. An information sheet with formulae is included at the end of the question paper.
9. Write neatly and legibly.

QUESTION 1

The following data represent the prize allocation (in R 1 000) for the top ten male finishers in the 2025 20 km Marathon, listed in descending order from 10th place to the first place. Note that the prize money for 6th place and 3rd place were not disclosed.

The mean prize across the available data is R21 770.

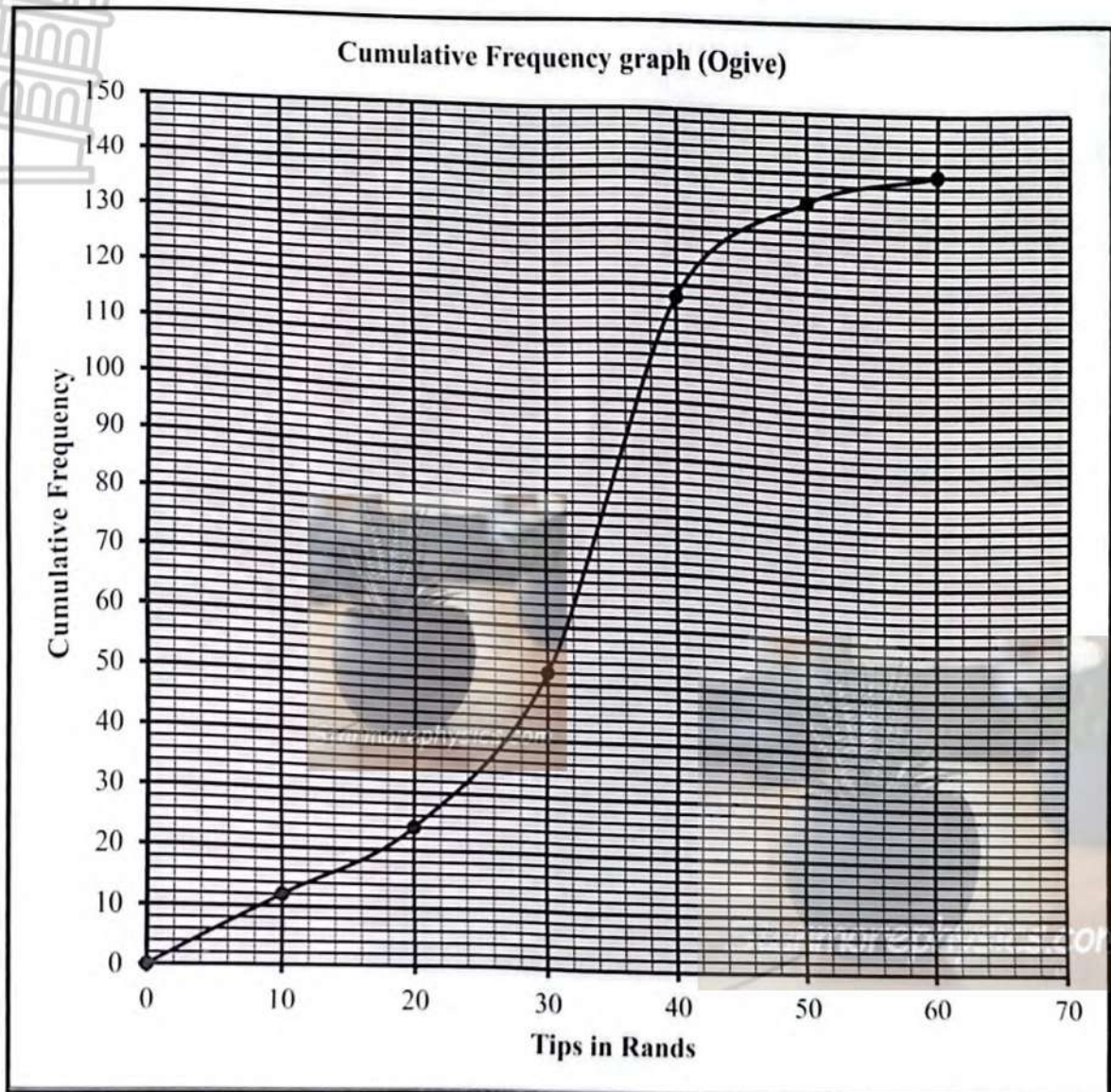
Prizes	3 600	4 500	5 400	6 200	x	12 300	15 800	y	43 800	87 500
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- 1.1 Calculate the value of x if the median (Q_2) of the data is 9 700. (2)
 - 1.2 Calculate the value of y . (3)
 - 1.3 Identify any outlier. (1)
 - 1.4 Determine the standard deviation of the prize money. (2)
 - 1.5 An amount of R200 is added to each of the top 10 participants. How will this adjustment affect the mean, the median and the standard deviation of the data? (3)
- [11]**



QUESTION 2

The cumulative frequency graph presents data from a survey conducted in a certain restaurant, detailing the distribution of tips earned by employees during their shift.

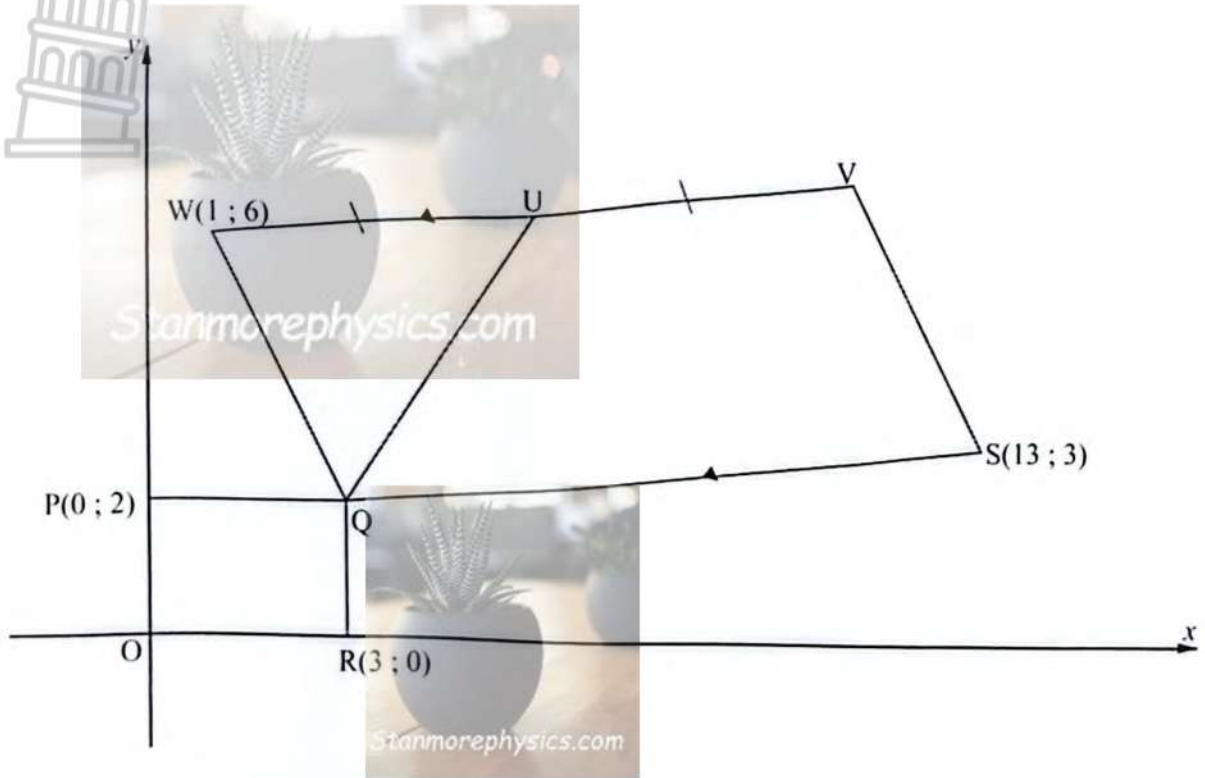


- 2.1 How many employees participated in the survey? (1)
- 2.2 Write down the modal class of the data. (1)
- 2.3 Determine how many employees earned R24 or less from the cumulative frequency graph. (2)
- 2.4 Determine the number of employees that earned $R20 \leq x \leq R40$. (2)
- 2.5 Determine the 25th percentile and the upper quartile of the data. (2)
- 2.6 Calculate the interquartile range of the data. (2)

[10]

QUESTION 3

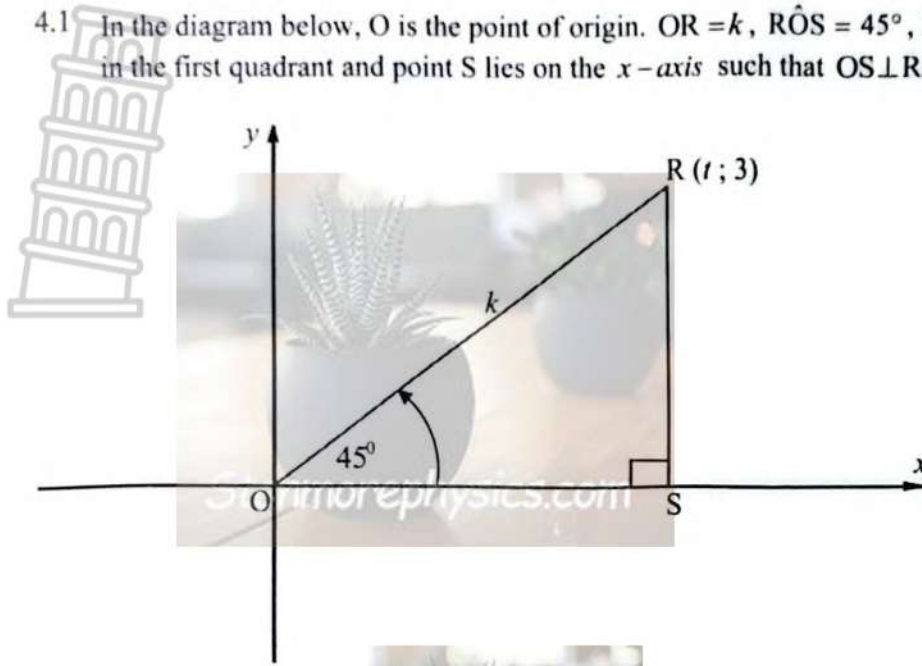
In the diagram, $W(1; 6)$, V , S and Q are the vertices of a quadrilateral $WVSQ$. $P(0; 2)$ is the point where line PQ intersects the y -axis and $R(3; 0)$ is the point where line QR intersects the x -axis. $WV \parallel QS$ and $WU = UV$. $PQRO$ is a rectangle.



- 3.1 Write down the coordinates of Q . (1)
 - 3.2 Calculate the gradient of QS . (2)
 - 3.3 Determine the equation of WV . (3)
 - 3.4 If it is further given that the equation of QU is $y = \frac{3}{2}x - \frac{5}{2}$, show that the coordinates of V are $(11; 7)$. (5)
 - 3.5 Prove that $WVSQ$ is a parallelogram. (4)
 - 3.6 Determine the length of WV . Leave your answer in surd form. (2)
 - 3.7 Calculate the size of \hat{WUQ} . (4)
 - 3.8 Determine the ratio: $\frac{\text{Area of } PQRO}{\text{Area of } \triangle QUW}$ (6)
- [27]

QUESTION 4

4.1 In the diagram below, O is the point of origin. $OR = k$, $\hat{ROS} = 45^\circ$, $R(t; 3)$ is a point in the first quadrant and point S lies on the x -axis such that $OS \perp RS$.



Without using a calculator, calculate the value(s) of the following:

4.1.1 t (2)

4.1.2 k (2)

4.2 Given: $8\cos^2 \alpha - 2 = 0$

4.2.1 Determine the value of $\cos \alpha$ where $\cos \alpha > 0$ and $0^\circ < \alpha < 180^\circ$ (2)

4.2.2 Hence, or otherwise, use a diagram to determine the value of $4[\tan^2 \alpha - \cos^2 \alpha]$ (3)

4.3 Given:
$$\frac{\cos x \cdot \tan x}{2[\sin x \cdot \cos(x - 90^\circ) + \cos x \cdot \cos(-x)]}$$

4.3.1 Simplify the above expression to a single trigonometric ratio of x . (6)

4.3.2 Hence, or otherwise, write down the period of the expression in QUESTION 4.3 (1)

4.4 Simplify:
$$\frac{\cos 42^\circ \sin 48^\circ - \tan^2(-45^\circ)}{\cos^2 132^\circ}$$
 without using a calculator. (5)

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4.5 Given the identity: $\tan \beta - \sin \beta \cdot \cos \beta = \tan \beta \cdot \sin^2 \beta$

4.5.1 Prove the above identity. (3)

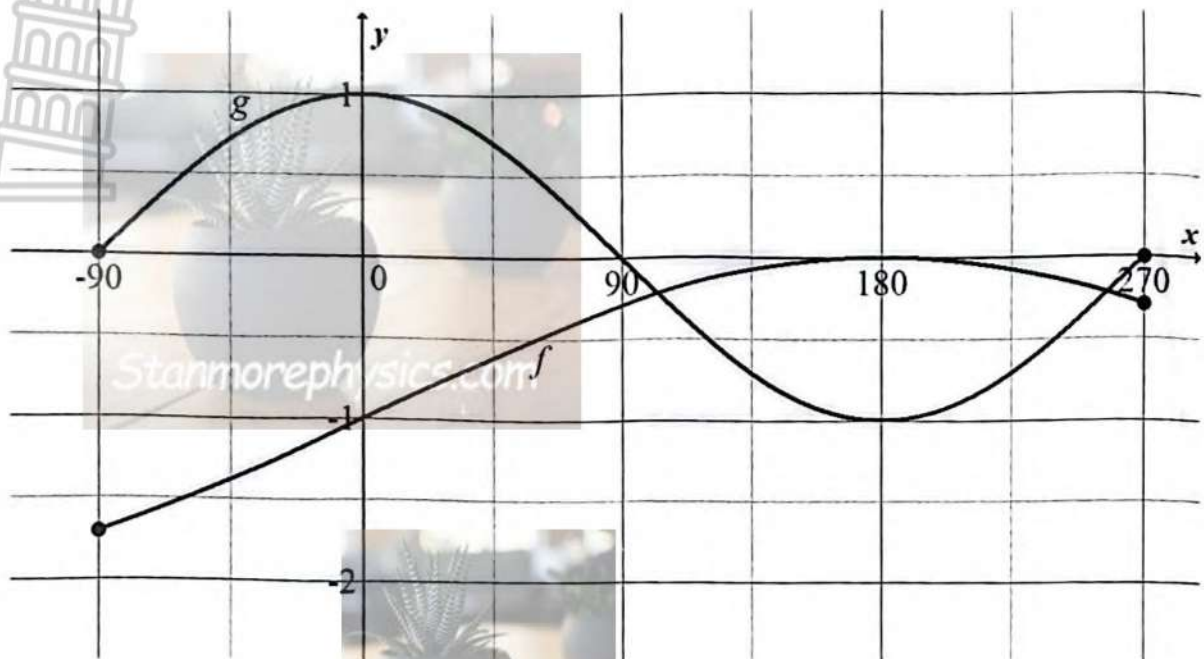
4.5.2 For which value(s) of β will the identity in QUESTION 4.5 be undefined in the interval $\beta \in [-180^\circ; 180^\circ]$? (2)

4.6 Determine the general solution of: $3 \sin \theta = -2 \cos^2 \theta$ (6)
[32]



QUESTION 5

Given: $f(x) = a \sin\left(\frac{x}{2}\right) - 1$ and $g(x) = \cos x + q$, $x \in [-90^\circ; 270^\circ]$



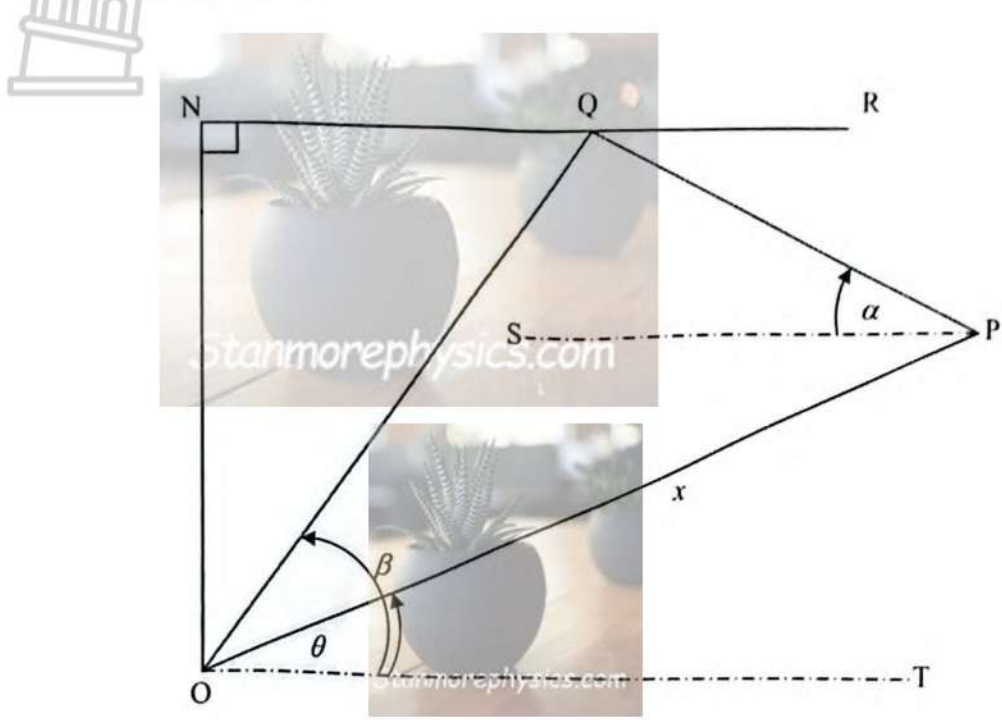
Use the graphs to answer the following questions where $x \in [-90^\circ; 270^\circ]$:

- 5.1 Determine the values of a and q (2)
 - 5.2 Write down the range of f (2)
 - 5.3 Write down the amplitude of g (1)
 - 5.4 Write down the value(s) of x where $f(x) - g(x) = -2$ (1)
 - 5.5 For which values of x is $f(x)g(x) \leq 0$? (2)
 - 5.6 The graph of h is obtained by shifting the graph of g by 90° to the left. Determine the equation of h in its simplest form. (2)
- [10]**

QUESTION 6

A man standing on a horizontal plane at point O observes two helicopters positioned at points P and Q. The lines of sight from point O to each helicopter form angles of elevation θ and β with the horizontal plane. Additionally, a second man located in the helicopter at point P observes the helicopter at point Q, and his line of sight forms an angle of elevation α with the horizontal plane at P, measured along line PQ.

$ON \perp NR$ and $OP = x$.



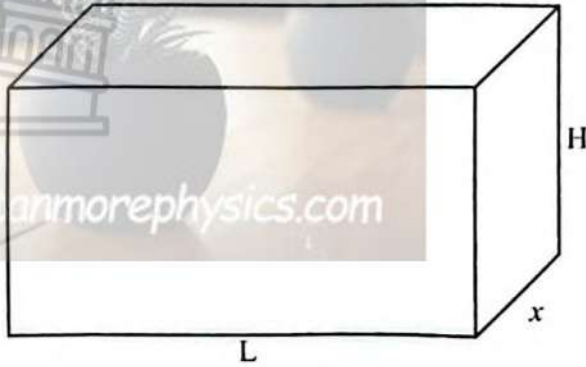
6.1 Show that: $\hat{OQP} = 180^\circ - (\beta + \alpha)$ (2)

6.2 Show that $OQ = \frac{x \cdot \sin(\alpha + \theta)}{\sin(\beta + \alpha)}$ (3)

6.3 Determine the value of x if $\theta = 15^\circ$, $\beta = 60^\circ$, $\alpha = 30^\circ$ and $OQ = 5\sqrt{2}$ (2)
[7]

QUESTION 7

A closed rectangular box has a length(L) that is twice its width(W), and its height(H) is 3 cm more than its width. The surface area of the box is 784 cm^2 . The length of the width is $x \text{ cm}$.



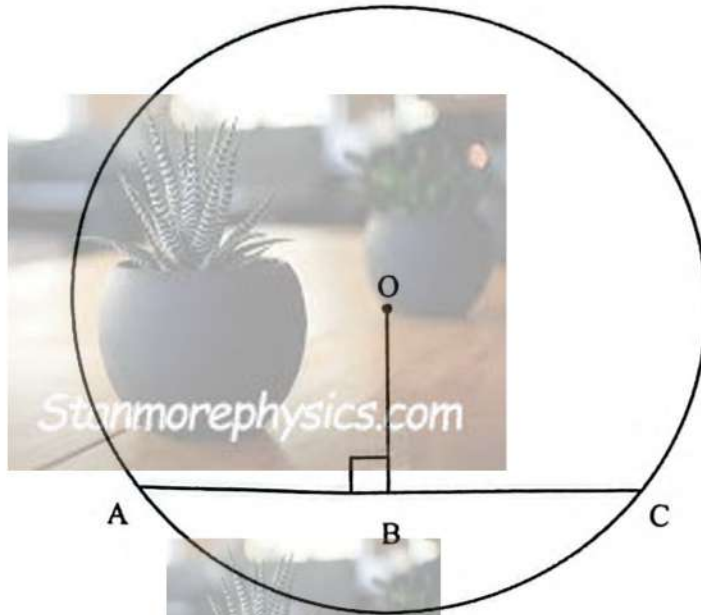
$P = 2l + 2b$ $A = l \times b$ $V = lbh$ $SA = 2lb + 2lh + 2bh$

- 7.1 Write the down length(L) and height(H) of the box in terms of x . (2)
- 7.2 Write an expression for the total surface area of the rectangular box in terms of x . (3)
- 7.3 Hence or otherwise, determine the value of x . (4)
- 7.4 Calculate the volume of the box. (2)

[11]

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QUESTION 8

8.1 In the diagram below, O is the centre of the circle. AC is a chord. OB is drawn perpendicular to the chord.

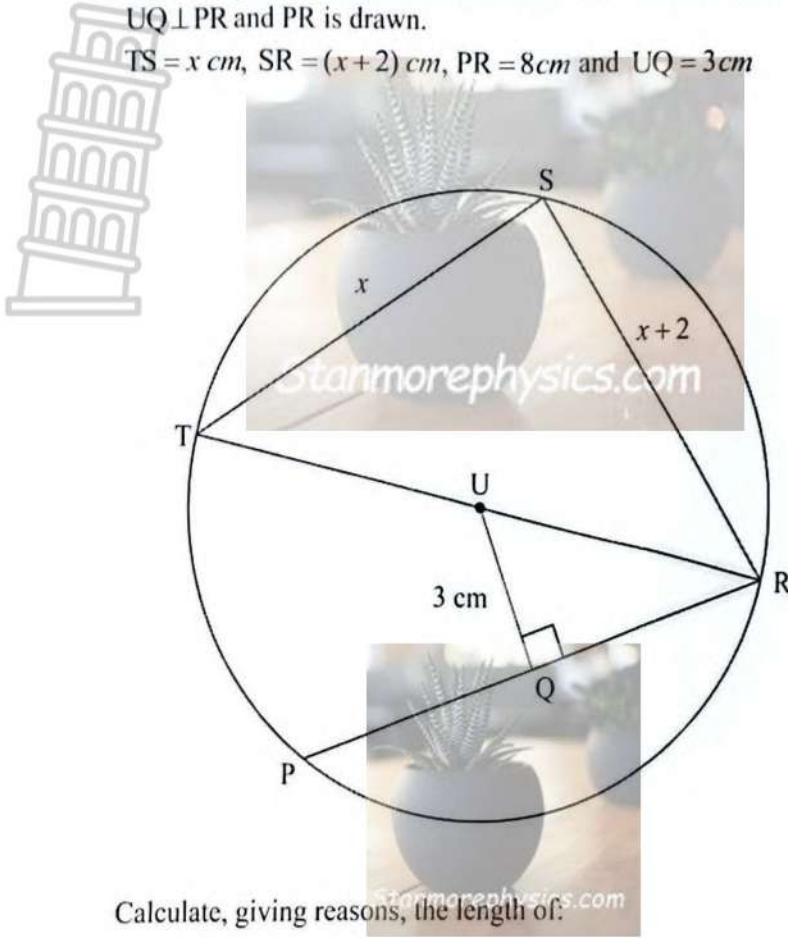


Use the diagram above to prove the theorem which states that the line drawn from the centre of a circle perpendicular to a chord bisects the chord, that is, prove that $AB = BC$.

(5)

8.2 In the diagram, TR is the diameter of the circle that passes through centre U. P, R, S and T are points on the circumference of the circle. UQ is a line from centre such that $UQ \perp PR$ and PR is drawn.

$TS = x \text{ cm}$, $SR = (x + 2) \text{ cm}$, $PR = 8 \text{ cm}$ and $UQ = 3 \text{ cm}$



Calculate, giving reasons, the length of:

8.2.1 UR

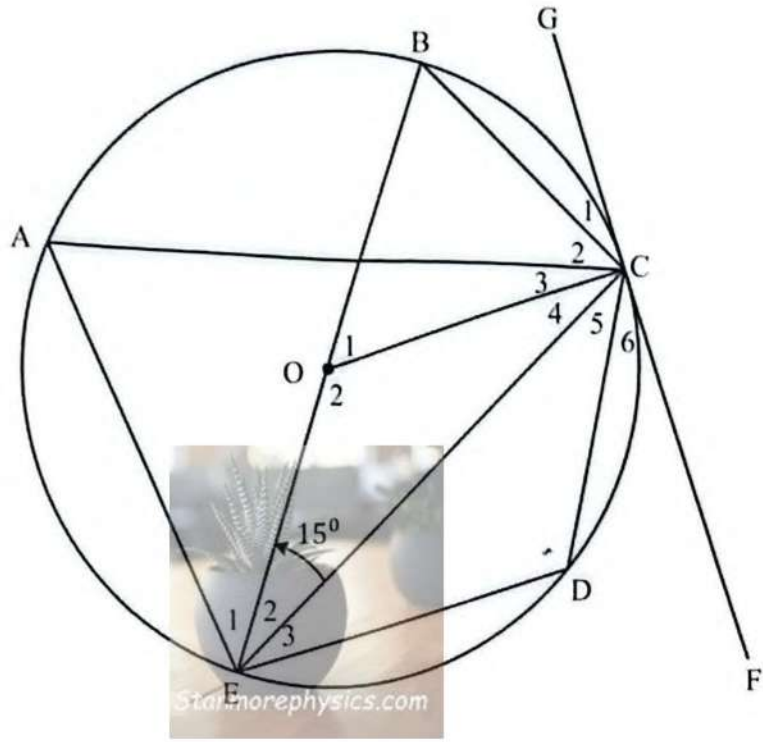
(4)

8.2.2 TS

(6)
[15]

QUESTION 9

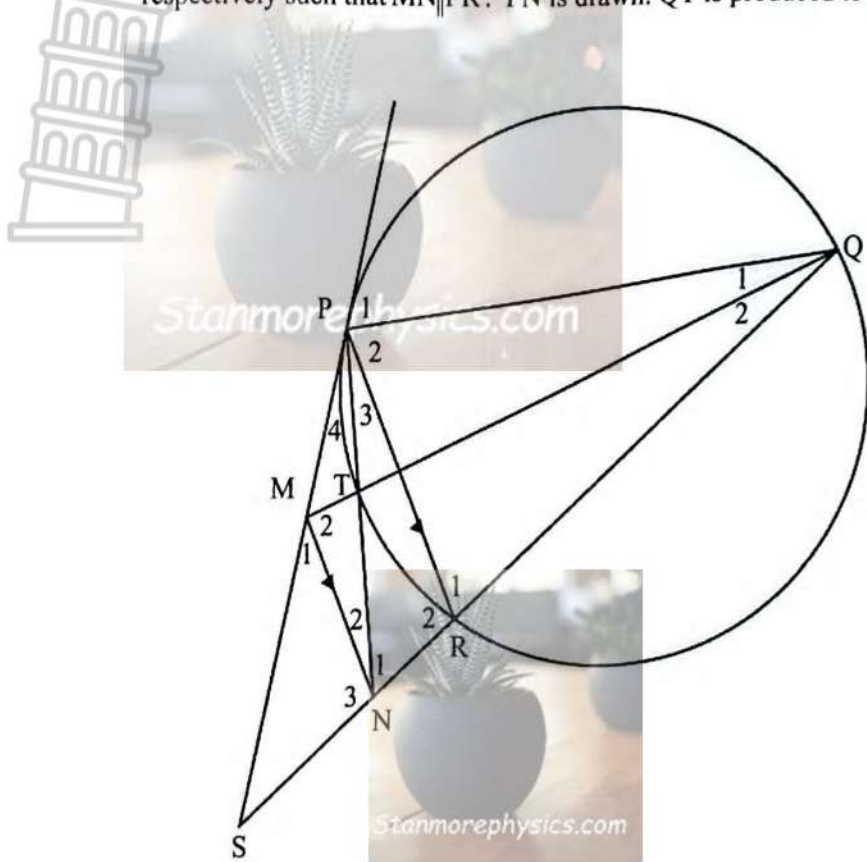
9.1 In the diagram below, O is the centre of the circle. ACDE and BCDE are cyclic quadrilaterals. GCF is a tangent to the circle at point C. Chord CE and line OC are drawn. $\hat{E}_2 = 15^\circ$.



Determine the size of the following angles below, giving reasons:

- 9.1.1 \hat{O}_1 (2)
- 9.1.2 \hat{A} (2)
- 9.1.3 \hat{D} (2)
- 9.1.4 $\hat{E}CF$ (2)
- 9.1.5 $\hat{O}CG$ (2)

9.2 In the diagram below, P, Q, R and T are points on the circumference of the circle. PS is a tangent to the circle at P. Chord QR is produced to S. M and N are points on PS and RP respectively such that $MN \parallel PR$. PN is drawn. QT is produced to M.



9.2.1 Name TWO other angles each equal to \hat{P}_1 (4)

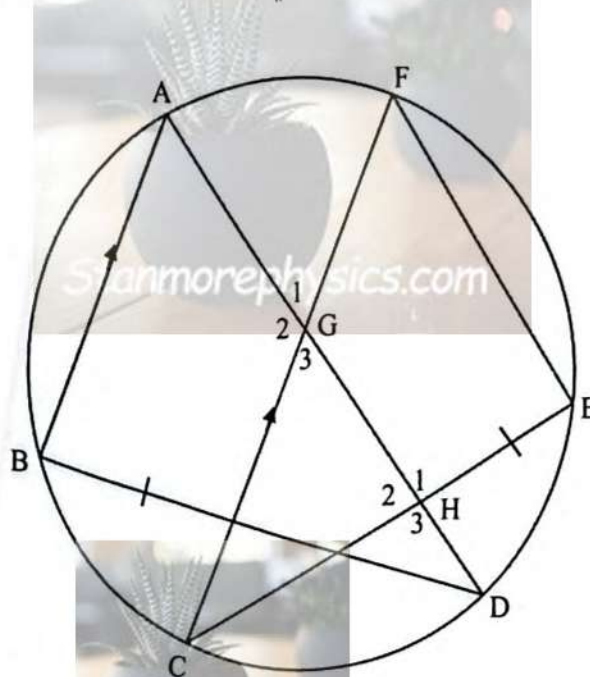
9.2.2 Prove that MNQP is a cyclic quadrilateral. (4)

9.2.3 Prove that PN bisects $\hat{S}PR$ (4)

[22]

QUESTION 10

In the diagram below, A, B, C, D, E and F are points on the circumference of the circle. AD intersect CF at point G and CE at point H. $AB \parallel FC$ and $CE = BD$.

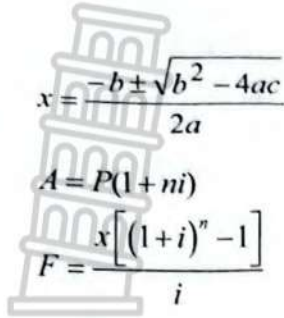


Prove that $AD \parallel FE$

[5]

TOTAL: 150

INFORMATION SHEET: MATHEMATICS



$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + i)^n$$

$$F = \frac{x[(1+i)^n - 1]}{i}$$

$$A = P(1 - i)^n$$

$$P = \frac{x[1 - (1+i)^{-n}]}{i}$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$T_n = a + (n - 1)d$$

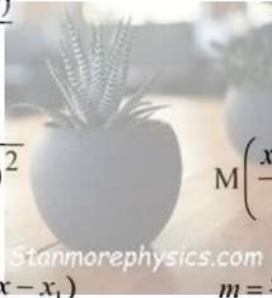
$$S_n = \frac{n}{2}(2a + (n - 1)d)$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1}; \quad r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; \quad -1 < r < 1$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \quad y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{area } \triangle ABC = \frac{1}{2} ab \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2\sin \alpha \cos \alpha$$

$$\bar{x} = \frac{\sum x}{n}$$

$$\sigma^2 = \frac{\sum (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$



**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 11

NOVEMBER 2025

**MATHEMATICS P2/WISKUNDE V2
MARKING GUIDELINE/NASIENRIGLYN**

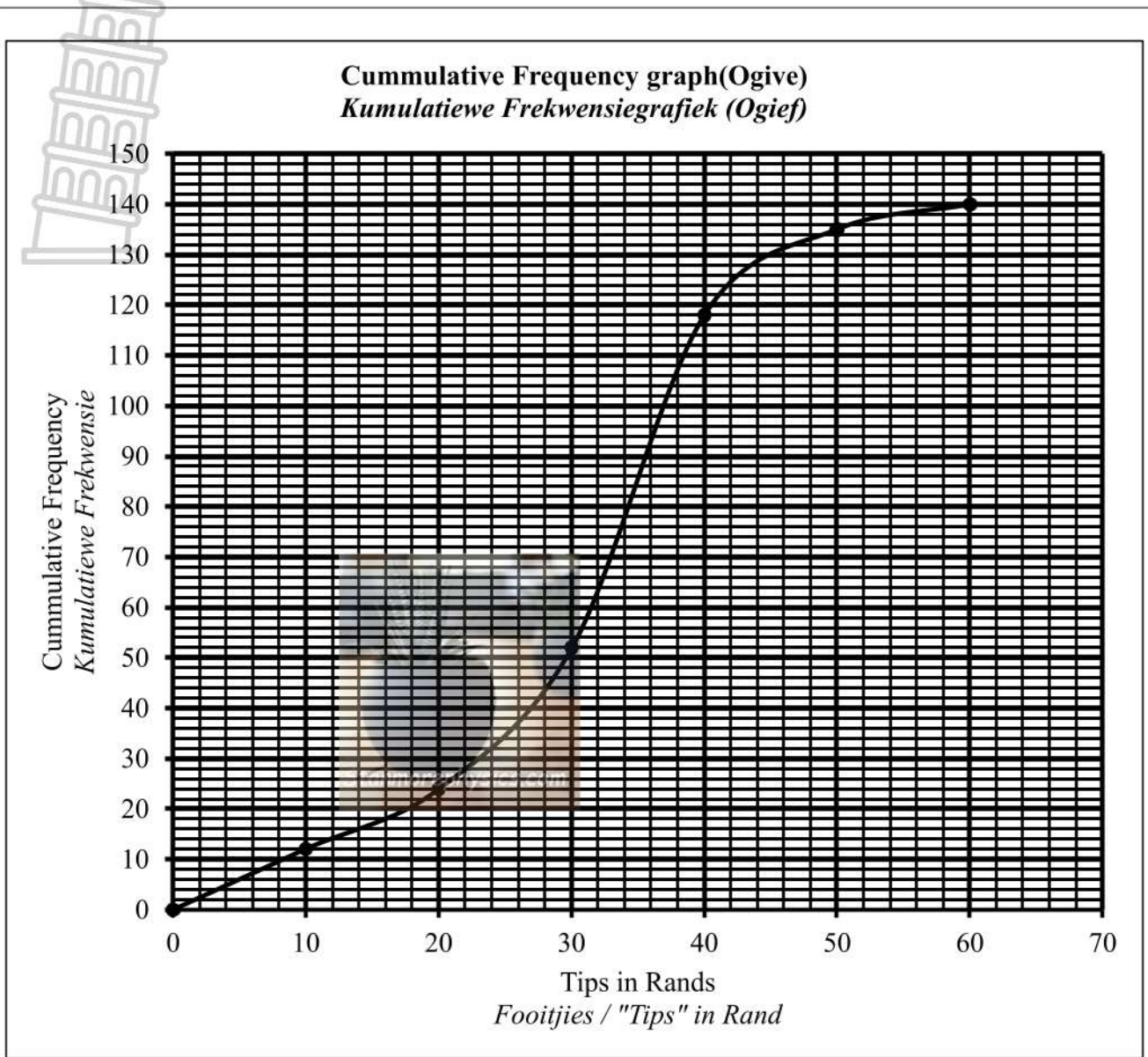
MARKS/PUNTE: 150

This marking guideline consists of 16 pages./
Hierdie nasienriglyn bestaan uit 16 bladsye.

QUESTION 1/VRAAG 1

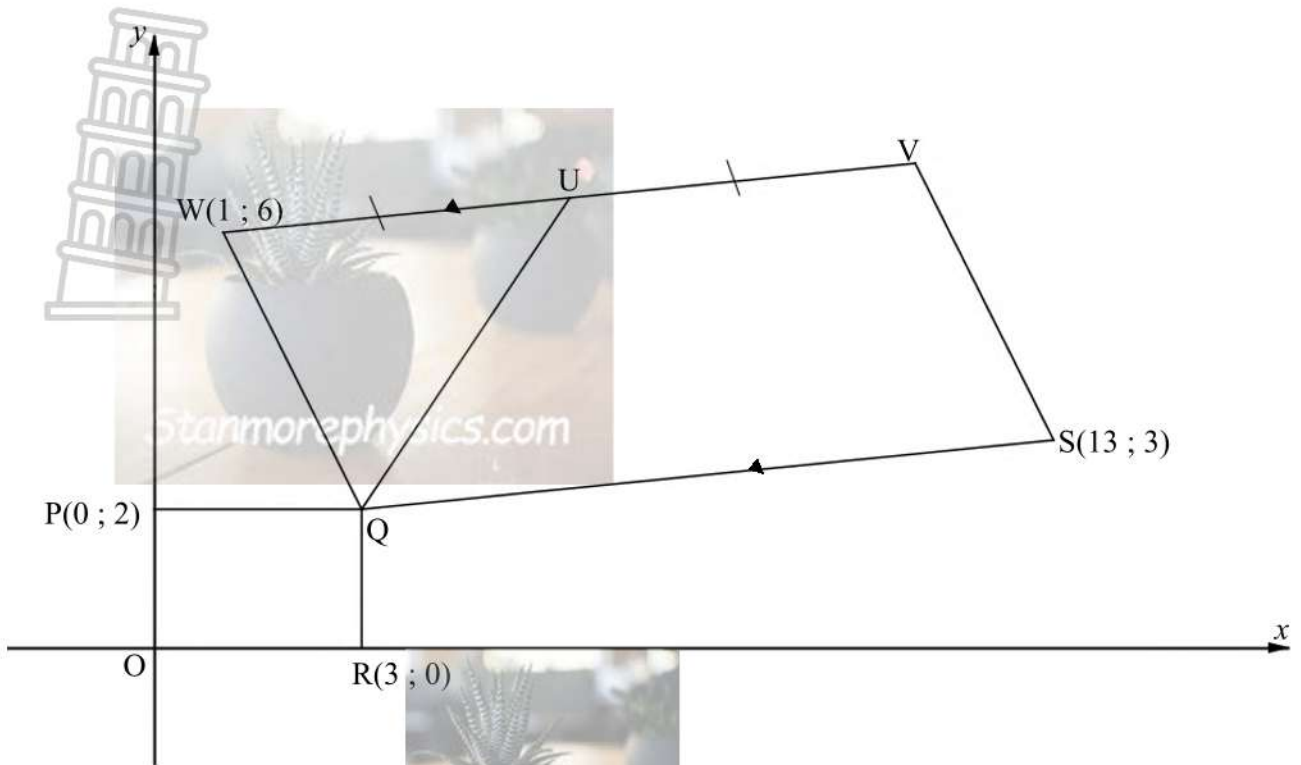
Data Set/Datastel:										
Prizes/Pryse	3 600	4 500	5 400	6 200	x	12 300	15 800	y	43 800	87 500
1.1	$\frac{x + 12300}{2} = 9700$ $x = 7100$					✓ method/metode ✓ answer/antwoord				(2)
1.2	$\frac{y + 186200}{10} = 21770$ $y = 31500$					✓ correct equation korrekte vergelyking ✓ $y + 186200$ ✓ answer/antwoord				(3)
1.3	outlier/uitskieter = 87 500					✓ answer/antwoord				(1)
1.4	$\delta = 25258,19$					✓✓ answer/antwoord				(2)
1.5	Mean will increase by R200 Gemiddelde sal vermeerder met R200 Median will increase by R200 Mediaan sal vermeerder met R200 Standard deviation will remain the same Standaardafwyking sal dieselfde bly					✓ increase by R200 vermeerder met R200 ✓ increase by R200 vermeerder met R200 ✓ remain the same bly dieselfde				(3)
										[11]

QUESTION 2/VRAAG 2

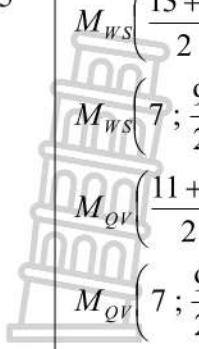

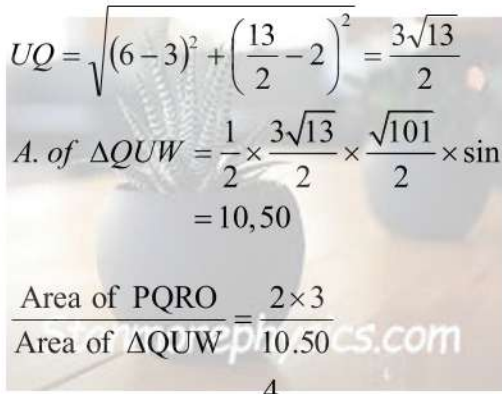


2.1	140 employees/werknemers	✓ answer/antwoord	(1)
2.2	$30 < x \leq 40$	✓ answer/antwoord	(1)
2.3	Reading from the graph / lees vanaf grafiek 32 employees/werknemers	✓ Reading/lees ✓ answer/antwoord	(2)
2.4	$118 - 24 = 94$	✓ $118 - 24$ ✓ answer/antwoord	(2)
2.5	25 th percentile is at 35 = R25 25 ^{ste} persentiel is by 35 = R25 75 th percentile is at 105 = R38 75 ^{ste} persentiel is by 105 = R38	✓ Q_1 ✓ Q_3	(2)
2.6	$IQR/IKW = Q_3 - Q_1 = R38 - R25 = R13$	✓ method/metode ✓ answer/antwoord	(2)
			[10]

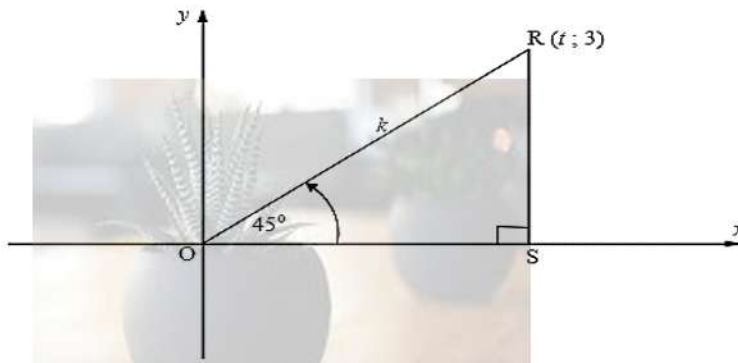
QUESTION 3/VRAAG 3



3.1	$Q(3; 2)$	✓ answer/antwoord	(1)
3.2	$m_{QS} = \frac{3-2}{13-3}$ $= \frac{1}{10}$	✓ correct substitution korrekte vervanging ✓ answer/antwoord	(2)
3.3	$m_{VW} = m_{QS} = \frac{1}{10}$ $6 = \frac{1}{10}(1) + c$ $c = \frac{59}{10}$ $y = \frac{1}{10}x + \frac{59}{10}$ <p style="text-align: center;">OR/OF</p> $y - 6 = \frac{1}{10}(x - 1)$ $y = \frac{1}{10}x + \frac{59}{10}$	✓ gradient of VW gradiënt van VW ✓ substitution/vervanging ✓ answer/antwoord	(3)
3.4	$\frac{3}{2}x - \frac{5}{2} = \frac{1}{10}x + \frac{59}{10}$ $\frac{7}{5}x = \frac{42}{5}$ $x_U = 6$ $y_U = \frac{3}{2}(6) - \frac{5}{2} = \frac{13}{2}$ $6 = \frac{1+x_V}{2}; \frac{13}{2} = \frac{6+y_V}{2}$ $11 = x_V; 5 = y_V$	✓ equating equations gelykstel van vergelykings ✓ simplification vereenvoudiging ✓ x-value / x-waarde ✓ y-value / y-waarde ✓ method/metode	(5)

<p>3.5</p>	 $M_{WS} \left(\frac{13+1}{2}; \frac{3+6}{2} \right)$ $M_{WS} \left(7; \frac{9}{2} \right)$ $M_{QV} \left(\frac{11+3}{2}; \frac{7+2}{2} \right)$ $M_{QV} \left(7; \frac{9}{2} \right)$ <p>∴ WVSQ is a parm (Diag. bisect each other.)</p> <p>WVSQ is 'n ^m (Hoeklyne halveer mekaar)</p>	<ul style="list-style-type: none"> ✓ correct substitution <i>korrekte vervanging</i> ✓ coordinates of midpt of WS <i>koördinate van midpt van WS</i> ✓ coordinates of midpt of QV <i>koördinate van midpt van QV</i> ✓ reason/<i>rede</i> 	<p>(4)</p>
<p>3.6</p>	$WV = \sqrt{(1-11)^2 + (6-7)^2}$ $= \sqrt{101}$	<ul style="list-style-type: none"> ✓ correct substitution <i>korrekte vervanging</i> ✓ answer/<i>antwoord</i> 	<p>(2)</p>
<p>3.7</p>	<p>Let inclination of WV to be θ and QU be α <i>Laat inklinasie van WV, θ wees en van QU, α wees</i></p> $\tan \theta = m_{WV} = \frac{1}{10}$ $\theta = 5,71^\circ$ $\tan \alpha = m_{QU} = \frac{3}{2}$ $\alpha = 56,31^\circ$ <p>∴ $\hat{WUQ} = \hat{UQS} = 50,6^\circ$ [alt \angles, $WV \parallel QS$] [verv. \anglee, $WV \parallel QS$]</p> 	<ul style="list-style-type: none"> ✓ $\tan \theta = m_{WV}$ ✓ size of θ / <i>grootte van θ</i> ✓ size of α / <i>grootte van α</i> ✓ answer/<i>antwoord</i> 	<p>(4)</p>
<p>3.8</p>	$WU = \frac{\sqrt{101}}{2}$ $UQ = \sqrt{(6-3)^2 + \left(\frac{13}{2}-2\right)^2} = \frac{3\sqrt{13}}{2}$ $A. \text{ of } \Delta QUW = \frac{1}{2} \times \frac{3\sqrt{13}}{2} \times \frac{\sqrt{101}}{2} \times \sin(50,60^\circ)$ $= 10,50$ $\frac{\text{Area of PQRO}}{\text{Area of } \Delta QUW} = \frac{2 \times 3}{10,50}$ $= \frac{4}{7}$ 	<ul style="list-style-type: none"> ✓ WU ✓ UQ ✓ correct subst. in to Area rule <i>korrekte verv. in oppervl. reël</i> ✓ A. of Δ. / <i>Oppervl. van Δ</i> ✓ correct subst. in A. of rect. <i>korrekte verv. in Opp. van regh</i> ✓ answer/<i>antwoord</i> 	<p>(6)</p>
			<p>[27]</p>

QUESTION 4 / VRAAG 4



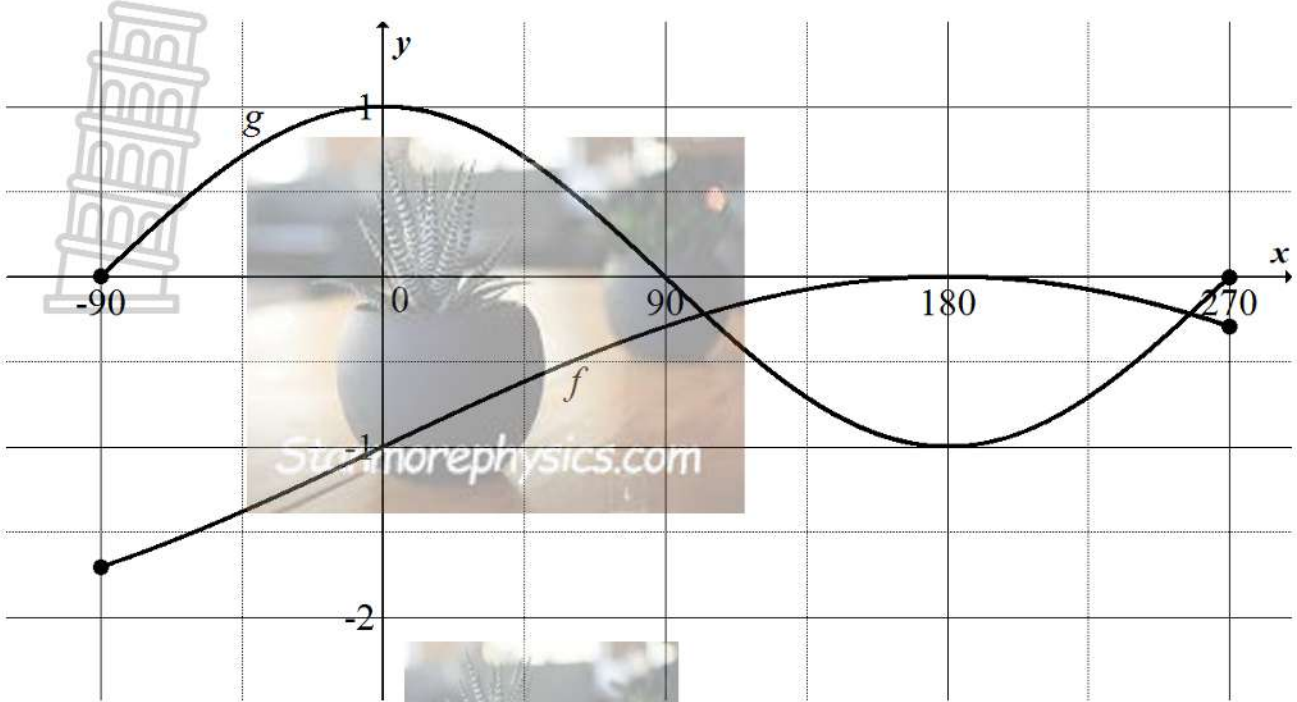
4.1.1	$\tan 45^\circ = \frac{3}{t}$ $t = 3$	✓ correct trig ratio korrekte trig. verhouding ✓ t-value/waarde	(2)
4.1.2	$\sin 45^\circ = \frac{3}{k}$ $k = 3\sqrt{2}$ OR / OF $\cos 45^\circ = \frac{t}{k} = \frac{3}{k}$ $k = 3\sqrt{2}$	✓ correct trig ratio korrekte trig. verhouding ✓ k-value/waarde	(2)
4.2.1	$8\cos^2 \alpha - 2 = 0$ $\cos^2 \alpha = \frac{1}{4}$ $\cos \alpha = \frac{1}{2}$	✓ simplification vereenvoudiging ✓ answer/antwoord	(2)
4.2.2	<p>OR / OF</p> $y = \sqrt{2^2 - 1^2} \quad \text{Pyth}$ $= \sqrt{3}$ $4\left[\tan^2 \alpha - \cos^2 \alpha\right] = 4\left[\left(\frac{\sqrt{3}}{1}\right)^2 - \left(\frac{1}{2}\right)^2\right]$ $= 11$	<div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> ✓ diagram/diagram OR / OF ✓ $y = \sqrt{3}$ </div> ✓ correct substitution korrekte vervanging ✓ answer/antwoord	(3)

4.3.1	$\frac{\cos x \cdot \tan x}{2[\sin x \cdot \cos(x - 90^\circ) + \cos x \cdot \cos(-x)]}$ $= \frac{\cos x \cdot \frac{\sin x}{\cos x}}{2[\sin x \cdot (\sin x) + \cos x \cdot (\cos x)]}$ $= \frac{\sin x}{2[\sin^2 x + \cos^2 x]}$ $= \frac{\sin x}{2(1)}$ $= \frac{\sin x}{2}$	<p>✓ $\frac{\sin x}{\cos x}$</p> <p>✓ $\sin x$ ✓ $\cos x$</p> <p>✓ simplification vereenvoudiging</p> <p>✓ $\sin^2 x + \cos^2 x = 1$</p> <p>✓ answer/antwoord</p>	(6)
4.3.2	<p>Period/Periode = 360°</p>	<p>✓ answer/antwoord</p>	(1)
4.4	$\frac{\cos 42^\circ \sin 48^\circ - \tan^2(-45^\circ)}{\cos^2 132^\circ}$ $= \frac{\cos 42^\circ \cdot \cos 42^\circ - (-\tan 45^\circ)^2}{(\cos(90^\circ + 42^\circ))^2}$ $= \frac{\cos^2 42^\circ - (-1)^2}{(-\sin 42^\circ)^2}$ $= \frac{\cos^2 42^\circ - 1}{\sin^2 42^\circ}$ $= \frac{1 - \sin^2 42^\circ - 1}{\sin^2 42^\circ}$ $= -1$	<p>✓ $\sin 48^\circ = \cos 42^\circ$</p> <p>✓ $(-\tan 45^\circ)^2$</p> <p>✓ $(-\sin 42^\circ)^2$</p> <p>✓ $\cos^2 42^\circ = 1 - \sin^2 42^\circ$</p> <p>✓ answer/antwoord</p>	(5)
4.5.1	<p>LHS/LK = $\tan \beta - \sin \beta \cdot \cos \beta$</p> $= \frac{\sin \beta}{\cos \beta} - \sin \beta \cdot \cos \beta$ $= \frac{\sin \beta - \sin \beta \cos^2 \beta}{\cos \beta}$ $= \frac{\sin \beta (1 - \cos^2 \beta)}{\cos \beta}$ $= \tan \beta \cdot \sin^2 \beta$ <p>= RHS / RK</p>	<p>✓ $\frac{\sin \beta}{\cos \beta}$</p> <p>✓ simplification vereenvoudiging</p> <p>✓ common factor gemeenskaplike faktor</p>	(3)
4.5.2	<p>$\beta = -90^\circ$ and / en $\beta = 90^\circ$</p>	<p>✓ $\beta = -90^\circ$ ✓ $\beta = 90^\circ$</p>	(2)

4.6	$3 \sin \theta = -2 \cos^2 \theta$ $2(1 - \sin^2 \theta) + 3 \sin \theta = 0$ $2 - 2 \sin^2 \theta + 3 \sin \theta = 0$ $2 \sin^2 \theta - 3 \sin \theta - 2 = 0$ $(2 \sin \theta + 1)(\sin \theta - 2) = 0$ $\sin \theta = -\frac{1}{2} \text{ or / of } \sin \theta \neq 2$ $\theta = 210^\circ + 360.k \quad \theta = 330^\circ + 360.k, \quad k \in \mathbb{Z}$	<p>✓ $1 - \sin^2 \theta$</p> <p>✓ standard form <i>standaardvorm</i></p> <p>✓ factors/<i>faktore</i></p> <p>✓ both equations <i>beide vergelykings</i></p> <p>✓ $\theta = 210^\circ + 360.k$</p> <p>✓ $\theta = 330^\circ + 360.k, k \in \mathbb{Z}$</p>	(6)
			[32]



QUESTION 5/VRAAG 5

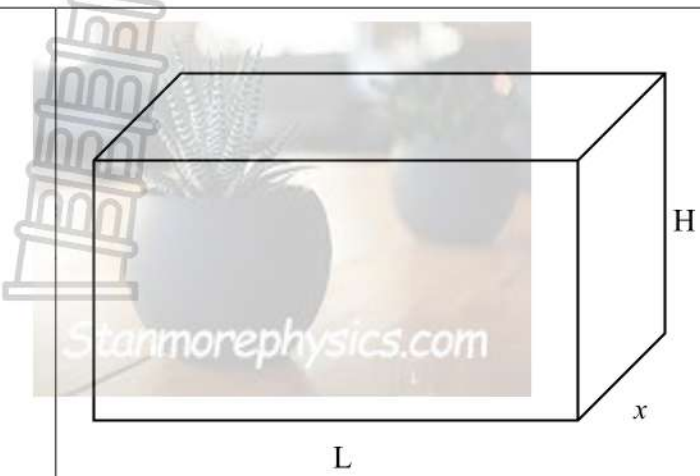


5.1	$a = 1$ $q = 0$	✓ value of a / waarde van a ✓ value of q / waarde van q	(2)
5.2	$y \in [-2; 0]$ or / of $-2 \leq y \leq 0$	✓ correct critical value korrekte kritieke waarde ✓ correct notation korrekte notasie	(2)
5.3	Amplitude = 1	✓ correct answer korrekte antwoord	(1)
5.4	$x = 0^\circ$	✓ answer / antwoord	(1)
5.5	$-90^\circ \leq x \leq 90^\circ$	✓✓ correct answer korrekte antwoord	(2)
5.6	$h(x) = g(x + 90^\circ)$ $= \cos(x + 90^\circ)$ $= -\sin x$	✓ $\cos(x + 90^\circ)$ ✓ $-\sin x$	(2)
			[10]

QUESTION 6/VRAAG 6

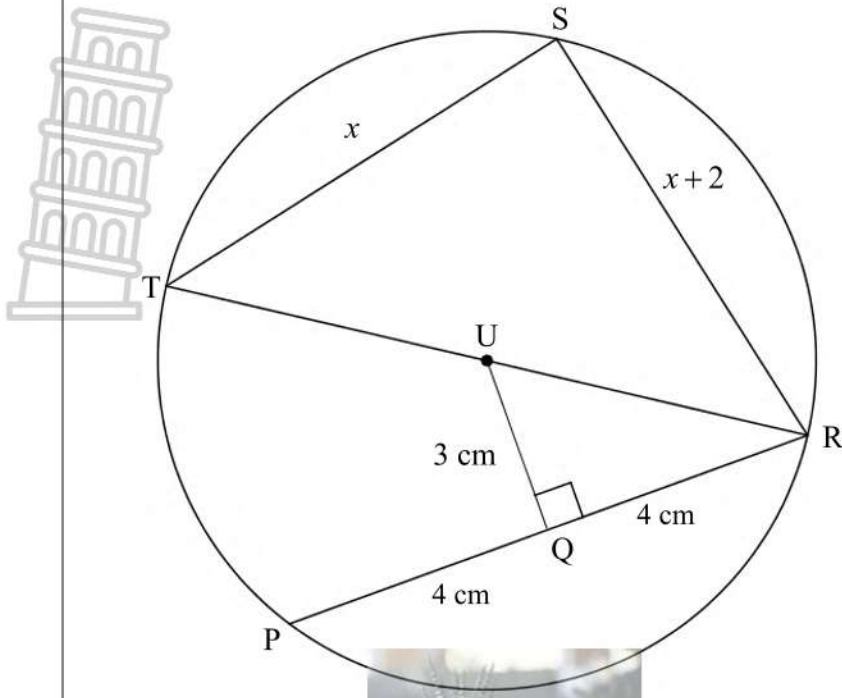
6.1	$\hat{SPO} = \theta + \alpha \quad [\text{alt. } \angle\text{s, verw. } \angle\text{e : } SP \parallel OT] \therefore$ $\hat{QOP} = \beta - \theta$ $\hat{OQP} = 180^\circ - (\theta + \alpha) - (\beta - \theta) [\angle\text{s in } \Delta / \angle\text{in } \Delta]$ $= 180^\circ - (\beta + \alpha)$	$\checkmark \hat{SPO} = \theta + \alpha$ $\checkmark \text{ using sum of angles in } \Delta$ $\text{gebruik van som van } \angle\text{e in } \Delta$	(2)
6.2	$\frac{OQ}{\sin \hat{P}} = \frac{OP}{\sin \hat{OQR}}$ $\frac{OQ}{\sin(\alpha + \theta)} = \frac{x}{\sin[180^\circ - (\beta + \alpha)]}$ $OQ = \frac{x \cdot \sin(\alpha + \theta)}{\sin(\beta + \alpha)}$	$\checkmark \text{ application of sine rule}$ $\text{toepassing van sinusreël}$ $\checkmark \text{ correct substitution}$ $\text{korrekte vervanging}$ $\checkmark \text{ reduction } \sin(\beta + \alpha)$ $\text{reduksie } \sin(\beta + \alpha)$	(3)
6.3	$\frac{5\sqrt{2}}{\sin 45^\circ} = \frac{x}{\sin 90^\circ}$ $x = 10$	$\checkmark \text{ correct substitution}$ $\text{korrekte vervanging}$ $\checkmark \text{ answer/antwoord}$	(2)
			[7]

QUESTION 7/VRAAG 7

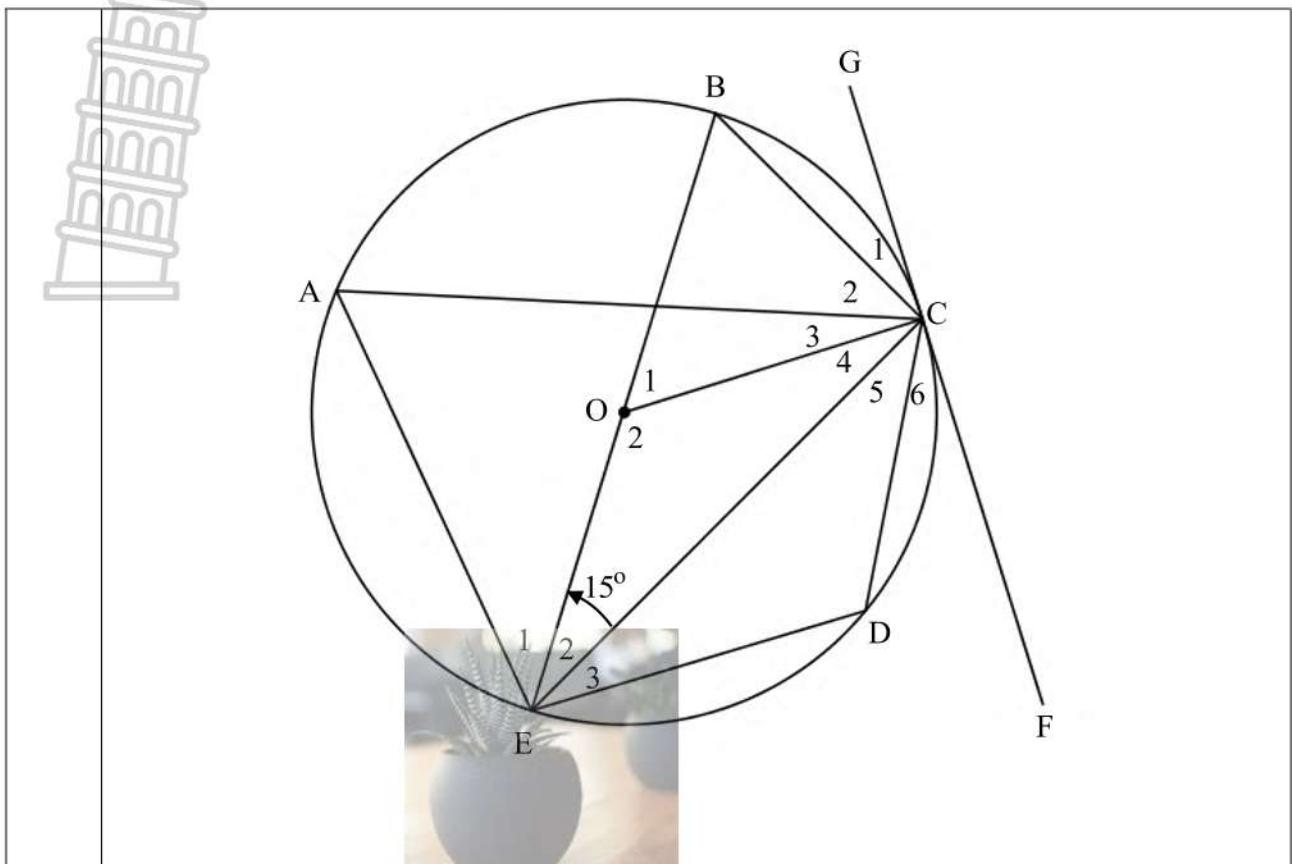
		
7.1	$L = 2x$ $H = 3 + x$	✓ $L = 2x$ ✓ $H = 3 + x$
7.2	$SA = 2(2x \times x) + 2(x(3 + x)) + 2(2x(3 + x))$ $= 4x^2 + 6x + 2x^2 + 12x + 4x^2$ $= 10x^2 + 18x$	✓ correct substitution / <i>korrekte vervanging</i> ✓ simplification / <i>vereenvoudiging</i> ✓ answer / <i>antwoord</i>
7.3	$10x^2 + 18x = 784$ $10x^2 + 18x - 784 = 0$ $5x^2 + 9x + 392 = 0$ $(5x + 49)(x - 8) = 0$ $x \neq \frac{40}{5}$ or $x = 8$	✓ correct substitution/ <i>korrekte vervanging</i> ✓ standard form/ <i>standaardvorm</i> ✓ factors/ <i>faktore</i> ✓ correct answer/ <i>korrekte antwoord</i>
7.4	$V = (8)(2 \times 8)(3 + 8)$ $= 1408$	✓ correct substitution into volume / <i>korrekte vervanging in volume</i> ✓ answer/ <i>antwoord</i>
		[11]

QUESTION 8/VRAAG 8

<p>8.1</p> <p>Constructions: Join OA and OC <i>Konstruksies: Verbind OA en OC</i></p> <p>Proof in ΔAOB and ΔCOB <i>Bewys in ΔAOB en ΔCOB</i></p> <p>1. $AO = CO$ [radii]/[radiusse]</p> <p>2. $\hat{A}BC = \hat{C}BO = 90^\circ$ [\angles on a str. line]/[\angleop reguitlyn]</p> <p>3. $OB = OB$ [common]/[gemeen]</p> <p>$\therefore \Delta AOB \equiv \Delta COB$ [RHS]/[90° Sk S]</p> <p>$\therefore AB = BC$</p>	<p>✓ construction <i>konstruksie</i></p> <p>✓ S/R ✓ S/R ✓ S ✓ R</p> <p>(5)</p>

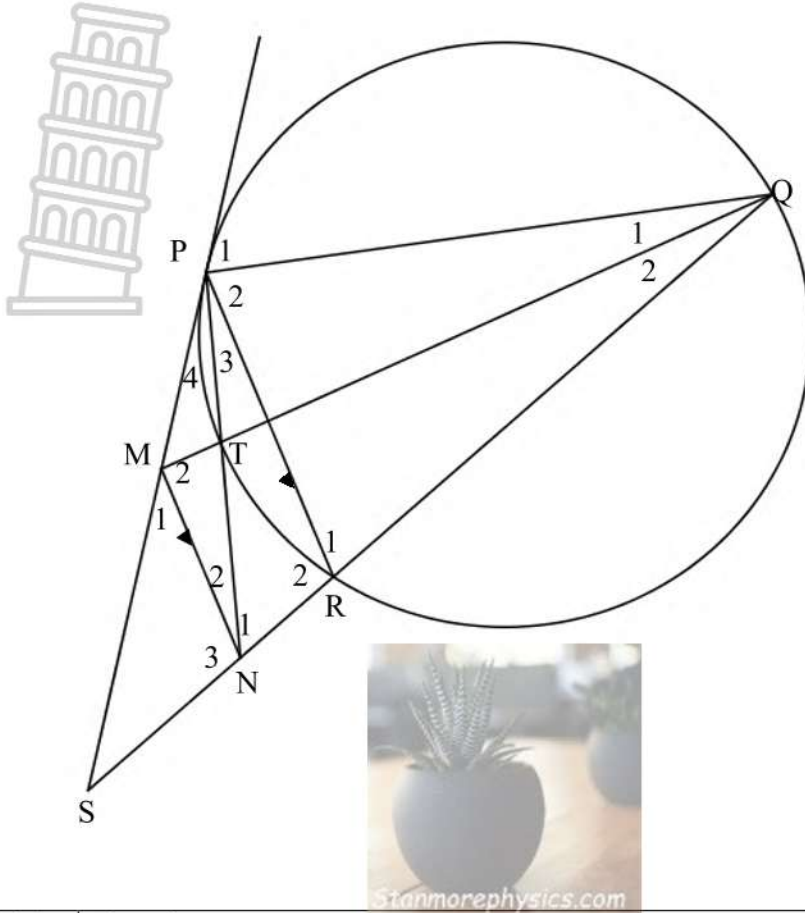
<p>8.2</p> 			
<p>8.2.1</p>	<p>$PQ = QR = 4 \text{ cm}$ [line from centre \perp to chord] [lyn vanaf middelpunt \perp op koord] $UR = \sqrt{4^2 + 3^2}$ [Pyth.theo]/ [Stelling van Pythagoras] $= 5$</p>	<p>\checkmark S \checkmark R \checkmark correct substitution/ korrekte vervanging \checkmark answer/antwoord</p>	<p>(4)</p>
<p>8.2.2</p>	<p>$TR = 2(UR) = 10$ [diameter]/ [middellyn] $\hat{S} = 90^\circ$ [\angle in semi - circle]/ [\angle in semi - sirkel] $10^2 = x^2 + (x + 2)^2$ [Pyth. theo]/ [Stelling van Pythagoras] $100 = x^2 + x^2 + 4x + 4$ $2x^2 + 4x - 96 = 0$ $x^2 + 2x - 48 = 0$ $(x - 6)(x + 8) = 0$ $x = 6 \text{ or / of } x \neq -8$ $\therefore TS = 6$</p>	<p>\checkmark S \checkmark R \checkmark correct substitution/ korrekte vervanging \checkmark standard form / standaardvorm \checkmark factors / faktore \checkmark correct value of x / korrekte waarde van x</p>	<p>(6)</p>
			<p>[15]</p>

QUESTION 9 / VRAAG 9



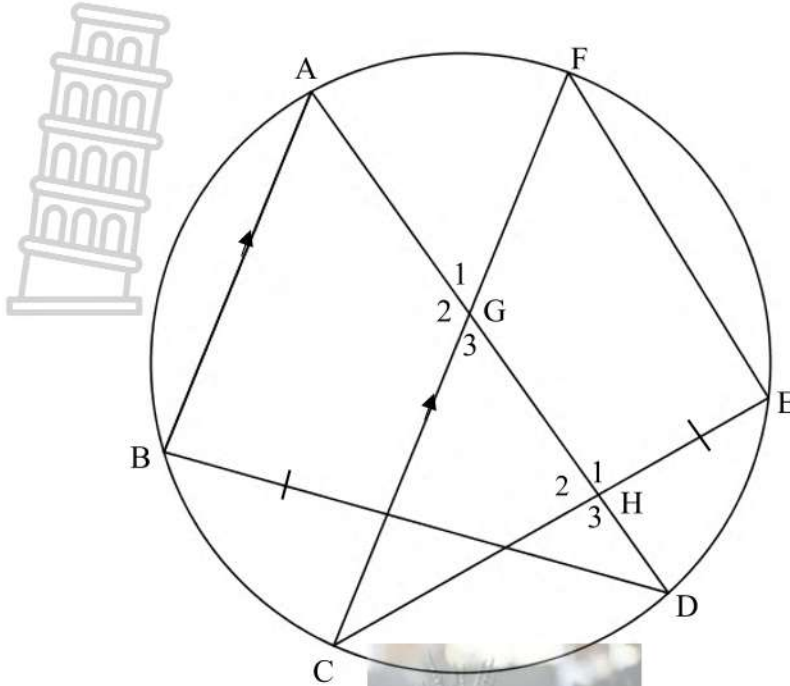
9.1.1	$\hat{O}_1 = 30^\circ$ [\angle at centre = $2\angle$ at circumf.] [Middelpunts $\angle = 2 \times$ Omtreks \angle]	\checkmark S \checkmark R	(2)
9.1.2	$\hat{O}_2 = 150^\circ$ $\hat{A} = 75^\circ$ [\angle s on a str.line]/[\angle e op reguitlyn] [\angle at centre = $2\angle$ at circumf.] [Middelpunts $\angle = 2 \times$ Omtreks \angle]	\checkmark S \checkmark S/R	(2)
9.1.3	$\hat{D} = 105^\circ$ [opp. \angle s of a cyclic quad] [Teenoorst. \angle e van koordevierhoek]	\checkmark S \checkmark R	(2)
9.1.4	$E\hat{C}F = 75^\circ$ [tan chord theo.]/[raaklyn-koord stelling]	\checkmark S \checkmark R	(2)
9.1.5	$O\hat{C}G = 90^\circ$ [rad \perp tan]/[radius \perp raaklyn]	\checkmark S \checkmark R	(2)

9.2



9.2.1	$\hat{P}_1 = \hat{R}_1$ [tan chord theo] / [raaklyn – koord stelling] $\hat{P}_1 = \hat{M}\hat{N}\hat{Q}$ [corresp. \angle s, / ooreenk. \angle e : $MN \parallel PR$] $\hat{R}_1 = \hat{P}\hat{T}\hat{Q}$ [\angle s same seg] / [\angle e in dies. segment]	\checkmark S \checkmark R \checkmark S \checkmark R Any 2 angles with reasons / Enige 2 hoeke met redes	(4)
9.2.2	$\hat{S}\hat{P}\hat{Q} = \hat{Q}$ [tan chord theo] / [raaklyn – koord stelling] $\hat{S}\hat{P}\hat{Q} = \hat{M}_1$ [corresp. \angle s, / ooreenk. \angle e : $MN \parallel PR$] $\therefore \hat{Q}_1 = \hat{M}_1$ $\therefore MNQP$ is a cyclic quad [conv. ext. \angle of a cyclic quad] <i>MNQP is 'n koordevh. [omgek. buite \angle van koordevh]</i>	\checkmark S \checkmark R \checkmark S \checkmark R	(4)
9.2.3	$\hat{P}_3 = \hat{N}_2$ [alt. \angle s, $MN \parallel PR$] / [verw. \angle e : $MN \parallel PR$] $\hat{N}_2 = \hat{Q}_1$ [\angle s same seg] / [\angle e in dies. segment] $\hat{Q}_1 = \hat{P}_4$ [tan chord theo] / [raaklyn – koord stelling] $\therefore \hat{P}_3 = \hat{P}_4$ PN bisects $\hat{S}\hat{P}\hat{R}$ / <i>PN halveer $\hat{S}\hat{P}\hat{R}$</i>	\checkmark S/R \checkmark S \checkmark R \checkmark S/R	(4)
			[22]

QUESTION 10/VRAAG 10



$\hat{G}_3 = \hat{A}$	[corresp. \angle s / ooreenk. \angle e, $GC \parallel AB$]	✓ S	✓ R	
$\hat{A} = \hat{F}$	[\angle s subt by = chords] / [\angle e onderspan deur = koorde]	✓ S	✓ R	
$\therefore \hat{G}_3 = \hat{F}$				
$\therefore AB \parallel FE$	[corresp. \angle s, =] / [ooreenkomstige \angle e =]	✓ R		
				[5]

TOTAL/TOTAAL: 150