



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL/NASIONALE
SENIOR CERTIFICATE/SERTIFIKAAT**

**GRADE 12
GRAAD 12**

SEPTEMBER 2013

**MATHEMATICS P2 / WISKUNDE V2
MEMORANDUM**

MARKS: 150
PUNTE:

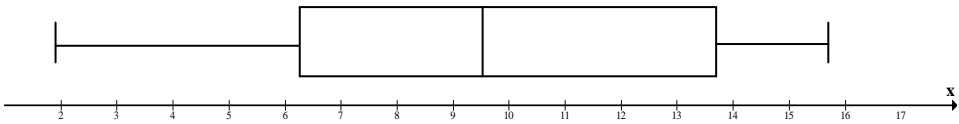
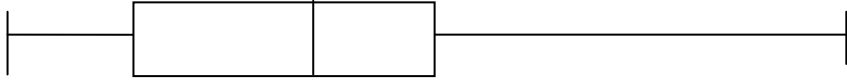
This memorandum consists of 10 pages.
Hierdie memorandum bestaan uit 10 bladsye.

QUESTION/VRAAG 1

1.1	Quadratic/ <i>Kwadraties</i>	✓ answer/ <i>antwoord</i>	(1)
1.2	2003	✓ 2003	(1)
1.3	2003 and/en 2008	✓ 2003 and/en 2008	(1)
1.4	5 000	✓ answer/ <i>antwoord</i>	(1)
1.5	2 000	✓ 2 000	(1)
1.6	Negative/ <i>Negatief</i> The number of listeners decreased./ <i>Die aantal luisteraars het afgeneem</i>	✓ Negative/ <i>Negatief</i> ✓ Reason/ <i>Rede</i>	(2)

[7]

QUESTION/VRAAG 2

2.1	<p>Player/<i>Speler</i> A : 2; 4; 6; 7; 8; 10;10; 13; 14; 15 Player/<i>Speler</i> B : 2; 3; 4; 6; 7; 7; 8; 9; 12; 16</p> <p>Player/<i>Speler</i> A</p>  <p>Player/<i>Speler</i> B</p>  <p>Player/<i>Speler</i> B</p>	<p>Player/<i>Speler</i> A ✓ Median/<i>Mediaan</i> ✓ Q_1 and/en Q_2 ✓ Min and/en max/<i>maks</i></p> <p>Player/<i>Speler</i> B ✓ Median/<i>Mediaan</i> ✓ Q_1 and/en Q_2 ✓ Min and/en max/<i>maks</i></p>	(6)
2.2	<p>Player/<i>Speler</i> A Scored 9 or more in more than 50% of the matches while Player B only did so in 25% of the matches./ <i>Het 9 of meer in 50% van die wedstryde aangeteken, terwyl B dit in 25% van die wedstryde gedoen het.</i> OR/OF The median number of goals scored by Player A is higher than that of Player B./<i>Die mediaan aantal doele van Speler A is hoër as die van B.</i></p>	<p>✓ Player/<i>Speler</i> A ✓ Reason/<i>Rede</i></p>	(2)

[8]

QUESTION/VRAAG 3

3.1	Mean/ <i>Gemiddelde</i> = 5 220	✓✓ Answer/ <i>Antwoord</i>	(2)
3.2	Standard Deviation/ <i>Standaardafwyking</i> = 2 652, 85	✓✓ Answer/ <i>Antwoord</i>	(2)
3.3	5	✓✓ Answer/ <i>Antwoord</i>	(2)

[6]

QUESTION/VRAAG 4

4.1	<table border="1"> <thead> <tr> <th>Interval</th> <th>Frequency <i>Frekwensie</i></th> <th>Cumulative Frequency <i>Kumulatiewe frekwensie</i></th> </tr> </thead> <tbody> <tr> <td>$10 < x \leq 20$</td> <td>8</td> <td>8</td> </tr> <tr> <td>$20 < x \leq 30$</td> <td>14</td> <td>22</td> </tr> <tr> <td>$30 < x \leq 40$</td> <td>20</td> <td>42</td> </tr> <tr> <td>$40 < x \leq 50$</td> <td>23</td> <td>65</td> </tr> <tr> <td>$50 < x \leq 60$</td> <td>17</td> <td>82</td> </tr> <tr> <td>$60 < x \leq 70$</td> <td>9</td> <td>91</td> </tr> <tr> <td>$70 < x \leq 80$</td> <td>4</td> <td>95</td> </tr> </tbody> </table>	Interval	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe frekwensie</i>	$10 < x \leq 20$	8	8	$20 < x \leq 30$	14	22	$30 < x \leq 40$	20	42	$40 < x \leq 50$	23	65	$50 < x \leq 60$	17	82	$60 < x \leq 70$	9	91	$70 < x \leq 80$	4	95	✓ 4 correct/ <i>korrek</i> ✓ Remaining 3 correct/ <i>oorblywende 3 korrek</i> (2)
	Interval	Frequency <i>Frekwensie</i>	Cumulative Frequency <i>Kumulatiewe frekwensie</i>																							
	$10 < x \leq 20$	8	8																							
	$20 < x \leq 30$	14	22																							
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	$50 < x \leq 60$	17	82																							
	$60 < x \leq 70$	9	91																							
$70 < x \leq 80$	4	95																								
4.2		✓ More than 6 points correct/ <i>Meer as 6 punte korrek</i> ✓ Shape/Vorm ✓ (10;0) (3)																								
4.3	52% [Accept/Aanvaar 51% – 53%]	✓✓ Answer/antwoord (2)																								

[7]

QUESTION/VRAAG 5

5.1	$PS = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $PS = \sqrt{(10 - 0)^2 + (-1 - 4)^2}$ $PS = \sqrt{125} = 5\sqrt{5}$	✓ Substitution/ <i>instelling</i> ✓ Answer/ <i>antwoord</i> (2)
5.2	$m_{PQ} = \frac{y_2 - y_1}{x_2 - x_1}$ $m_{PQ} = \frac{-2 - 4}{-6 - 0}$ $m_{PQ} = 1$	✓ Substitution/ <i>instelling</i> ✓ Answer/ <i>antwoord</i> (2)
5.3	$m_{SR} = m_{PQ} = 1$ $y - y_1 = m(x - x_1)$ $y + 1 = 1(x - 10)$ $y = x - 11$	✓ $m_{SR} = m_{PQ} = 1$ ✓ Substitution/ <i>instelling</i> ✓ Answer/ <i>antwoord</i> (3)
5.4	Midpoint of PR is the same as the midpoint of QS <i>Middelpunt van PR is dieselfde as middelpunt van QS</i> $M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$ $M\left(\frac{-6 + 10}{2}; \frac{-2 - 1}{2}\right)$ $M\left(2; -\frac{3}{2}\right)$	✓ same midpoint/ <i>dieselfde middelpunt</i> ✓ 2 ✓ $-\frac{3}{2}$ (3)

5.5	$x = \frac{x_1 + x_2}{2}$ $2 = \frac{0 + a}{2}$ $a = 4$ $y = \frac{y_1 + y_2}{2}$ $-\frac{3}{2} = \frac{4 + b}{2}$ $b = -7$ <p style="text-align: center;">OR/OF</p> $a = -6 + 10 = 4$ $b = -2 - 5 = -7$	✓ Substitution/ <i>instelling</i> ✓ $a = 4$ ✓ $b = -7$ <p style="text-align: right;">(3)</p> <p style="text-align: center;">OR/OF</p> ✓ method/ <i>metode</i> ✓ $a = 4$ ✓ $b = -7$ <p style="text-align: right;">(3)</p>
5.6	$m_{PQ} = 1$ $\tan\theta = 1$ $\theta = 45^\circ$ $m_{PS} = \frac{-1 - 4}{10 - 0}$ $m_{PS} = -\frac{1}{2}$ $\tan\alpha = -\frac{1}{2}$ $\alpha = 153,43^\circ$ $\widehat{QPS} = 153,43^\circ - 45^\circ$ $\therefore \widehat{QPS} = 108,43^\circ$ $\widehat{QRS} = 108,4^\circ \text{ [opposite angles of parm./}$ <p style="text-align: center;"><i>teenoorstaande hoeke van parallelogram]</i></p>	✓ $\tan\theta = 1$ ✓ $\theta = 45^\circ$ ✓ $m_{PS} = -\frac{1}{2}$ ✓ $\tan\alpha = -\frac{1}{2}$ ✓ $\alpha = 153,43^\circ$ ✓ $\widehat{QPS} = 108,43^\circ$ ✓ $\widehat{QRS} = 108,43^\circ$ <p style="text-align: right;">(7)</p>

[20]**QUESTION/VRAAG 6**

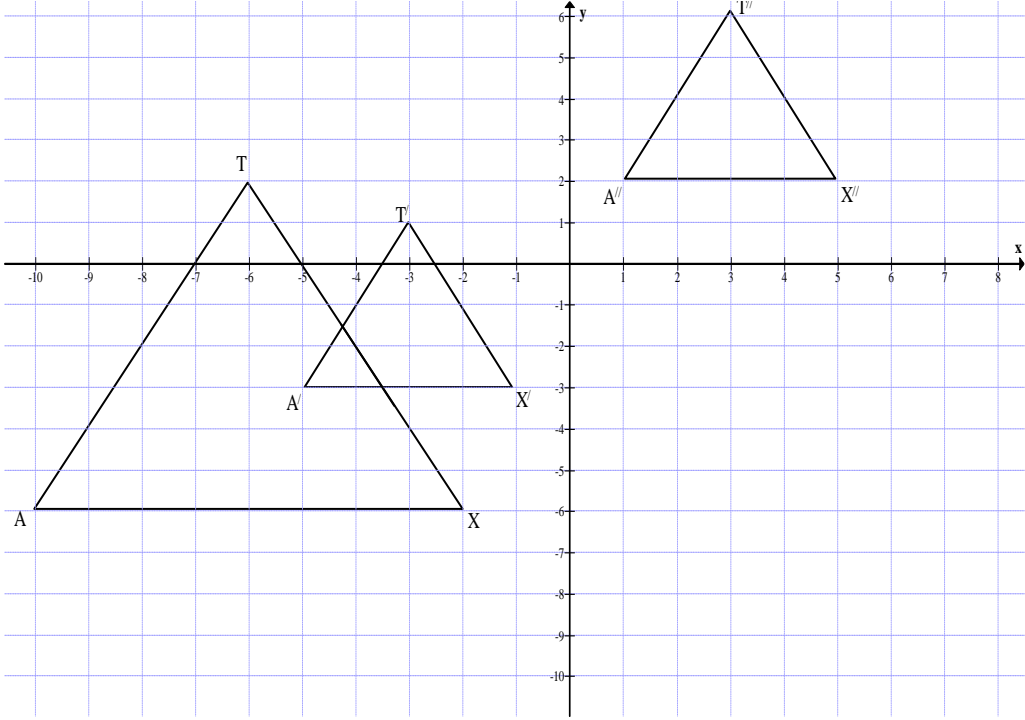
6.1	$OB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $OB = \sqrt{(-4 - 0)^2 + (-6 - 0)^2}$ $OB = \sqrt{52} = 2\sqrt{13}$ $\therefore r = \sqrt{13}$	✓ substitution/ <i>instelling</i> ✓ $OB = \sqrt{52}$ ✓ r <p style="text-align: right;">(3)</p>
6.2	$C\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$ $C\left(\frac{-4 + 0}{2}; \frac{-6 - 0}{2}\right)$ $C(-2; -3)$ $(x + 2)^2 + (y + 3)^2 = 13$	✓ x_C ✓ y_C ✓ $(x + 2)^2 + (y + 3)^2$ ✓ 13 <p style="text-align: right;">(4)</p>
6.3	Tangent is perpendicular to a diameter/radius. <i>Raaklyn is loodreg op middellyn/radius.</i>	✓ reason/ <i>rede</i> <p style="text-align: right;">(1)</p>

6.4	$m_{OB} = \frac{-6 - 0}{-4 - 0}$ $m_{OB} = \frac{3}{2}$ $\therefore m_{KL} = -\frac{2}{3}$ $y - y_1 = m(x - x_1)$ $y + 6 = -\frac{2}{3}(x + 4)$ $y = -\frac{2}{3}x - \frac{26}{3}$	✓ $m_{OB} = \frac{3}{2}$ ✓ $m_{KL} = -\frac{2}{3}$ ✓ Substitution/ <i>instelling</i> ✓ Answer/ <i>antwoord</i> (4)
6.5	E(0 ; -6)	✓ 0 ✓ -6 (2)
6.6	$(x + 2)^2 + (y + 3)^2 = 13$, E(0; -6), C(-2; -3) At/By F, y = 0: $(x + 2)^2 + (0 + 3)^2 = 13$ $\therefore x = -4 \quad \therefore F(-4 ; 0)$ $m_{FC} = \frac{-3-0}{-2+4} = -\frac{3}{2}$ $m_{CE} = \frac{-3+6}{-2+0} = -\frac{3}{2}$ \therefore F, C and E are collinear/ <i>F, C en E is saamlynig</i> \therefore EF is a diameter./ <i>EF is 'n middellyn</i> OR/OF $(x + 2)^2 + (y + 3)^2 = 13$, E(0; -6), C(-2; -3) At/By F, y = 0: $(x + 2)^2 + (0 + 3)^2 = 13$ $\therefore x = -4 \quad \therefore F(-4 ; 0)$ $m_{EF} = \frac{0+6}{-4+0} = -\frac{3}{2}$ Equation of EF: $y = -\frac{3}{2}x - 6$ If $x = -2$, $y = -\frac{3}{2}(-2) - 6 = -3$ \therefore C is on line EF/ <i>C is op lyn EF</i> \therefore EF is a diameter./ <i>is 'n middellyn</i> OR/OF $(x + 2)^2 + (y + 3)^2 = 13$, E(0;- 6) and/en C(-2;-3) At/By F, y = 0: $(x + 2)^2 + (0 + 3)^2 = 13$ $\therefore x = -4 \quad \therefore F(-4 ; 0)$ $EF = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $EF = \sqrt{(-4 - 0)^2 + (0 + 6)^2}$ $EF = \sqrt{52} = 2\sqrt{13} = OB$ \therefore EF is a diameter/ <i>EF is 'n middellyn.</i>	✓ x_F ✓ y_F ✓ m_{FC} ✓ m_{CE} ✓ F, C, E collinear/ <i>saamlynig</i> (5) ✓ x_F ✓ y_F ✓ m_{EF} ✓ substitution/ <i>instelling</i> ✓ C on/op EF (5) ✓ x_F ✓ y_F ✓ substitution/ <i>instelling</i> ✓ $EF = \sqrt{52}$ ✓ $EF = OB$ (5)

[19]

QUESTION/VRAAG 7

7.1.1	Translation: 6 units to the left and 10 units up./ <i>Translasie: 6 eenhede na links en 10 eenhede op.</i>	✓ 6 left/ <i>links</i> ✓ 10 up/ <i>op</i> (2)
7.1.2	Rotation through 90° anticlockwise about the origin./ <i>Rotasie deur 90° antikloksgewys om die oorsprong.</i>	✓ Rotation/ <i>rotasie</i> ✓ 90° anticlockwise/ <i>antikloksgewys</i> (2)
7.1.3	Reflection in the line $y = -x$ <i>Refleksie in die lyn $y = -x$</i>	✓ Reflection/ <i>refleksie</i> ✓ $y = -x$ (2)

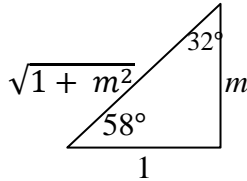
7.2.1	$T'(-3; 1)$, $A'(-5; -3)$, $X'(-1; -3)$		<p>✓ All points correct/ <i>alle punte korrek</i></p> <p>✓ Diagram (2)</p>
7.2.2	$T''(3; 6)$, $A''(1; 2)$, $X''(5; 2)$. Diagram in 7.2.1.		<p>✓ All points correct/<i>alle punte korrek</i></p> <p>✓ Diagram (2)</p>
7.2.3	Rigid. The shape and size did not change. <i>Rigied. Die vorm en grootte verander nie.</i>		<p>✓ Rigid/<i>rigied</i></p> <p>✓ Reason/<i>rede</i> (2)</p>
7.2.4	$(x; y) \rightarrow (\frac{1}{2}x; \frac{1}{2}y) \rightarrow (\frac{1}{2}x + 6; \frac{1}{2}y + 5)$		<p>✓ $\frac{1}{2}x$</p> <p>✓ $\frac{1}{2}y$</p> <p>✓ $\frac{1}{2}x + 6$</p> <p>✓ $\frac{1}{2}y + 5$ (4)</p>
7.2.5	4 : 1		<p>✓ answer/<i>antwoord</i> (1)</p>

QUESTION/VRAAG 8

8	<p>If R is rotated θ° anticlockwise to P: <i>As R θ° antikloksgewys na P geroteer word:</i> $\theta = \frac{3}{5} \times 360^\circ = 216^\circ$</p> $x' = x \cos \theta - y \sin \theta$ $x' = -2,5 \cos 216^\circ - 2 \sin 216^\circ$ $x' = 3,20$ $y' = y \cos \theta + x \sin \theta$ $y' = 2 \cos 216^\circ - 2,5 \sin 216^\circ$ $y' = -0,15$ <p>OR/OF If R is rotated θ° clockwise to P: <i>As R θ° kloksgewys na P geroteer word:</i> $\theta = \frac{2}{5} \times 360^\circ = 144^\circ$</p> $x' = x \cos \theta + y \sin \theta$ $x' = -2,5 \cos 144^\circ + 2 \sin 144^\circ$ $x' = 3,20$ $y' = y \cos \theta - x \sin \theta$ $y' = 2 \cos 144^\circ + 2,5 \sin 144^\circ$ $y' = -0,15$	<ul style="list-style-type: none"> ✓ $\frac{3}{5} \times 360^\circ$ ✓ 216° ✓ Substitution/<i>instelling</i> in x' formula/<i>formule</i> ✓ $x' = 3,20$ ✓ Substitution/<i>instelling</i> in y' formula/<i>formule</i> ✓ $y' = -0,15$ (6) ✓ $\frac{2}{5} \times 360^\circ$ ✓ 144° ✓ Substitution/<i>instelling</i> in x' formula/<i>formule</i> ✓ $x' = 3,20$ ✓ Substitution/<i>instelling</i> in y' formula/<i>formule</i> ✓ $y' = -0,15$ (6)
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[6]

QUESTION/VRAAG 9

9.1.1	<p> $\tan 58^\circ = m$ $r^2 = x^2 + y^2$ $r^2 = 1^2 + m^2$ $r = \sqrt{1 + m^2}$ $\sin 58^\circ = \frac{m}{\sqrt{1+m^2}}$ </p> 	<ul style="list-style-type: none"> ✓ $r = \sqrt{1 + m^2}$ ✓ Answer/<i>antwoord</i> (2)
9.1.2	<p> $\sin 296^\circ = -\sin 116^\circ$ $= -\sin 2 \times 58^\circ$ $= -2 \sin 58^\circ \cos 58^\circ$ $= -2 \times \frac{m}{\sqrt{1+m^2}} \times \frac{1}{\sqrt{1+m^2}}$ $= -\frac{2m}{1+m^2}$ </p> <p>OR/OF</p> <p> $\sin 296^\circ = -\sin 64^\circ$ $= -\sin 2 \times 32^\circ$ $= -2 \sin 32^\circ \cos 32^\circ$ $= -2 \times \frac{1}{\sqrt{1+m^2}} \times \frac{m}{\sqrt{1+m^2}}$ $= -\frac{2m}{1+m^2}$ </p>	<ul style="list-style-type: none"> ✓ $-\sin 116^\circ$ ✓ $-2 \sin 58^\circ \cos 58^\circ$ ✓ $\frac{1}{\sqrt{1+m^2}}$ (3) ✓ $-\sin 64^\circ$ ✓ $-2 \sin 32^\circ \cos 32^\circ$ ✓ $\frac{1}{\sqrt{1+m^2}}$ (3)

9.1.3	$\begin{aligned} \cos 2^\circ &= \cos(60^\circ - 58^\circ) \\ &= \cos 60^\circ \cos 58^\circ + \sin 60^\circ \sin 58^\circ \\ &= \frac{1}{2} \times \frac{1}{\sqrt{1+m^2}} + \frac{\sqrt{3}}{2} \times \frac{m}{\sqrt{1+m^2}} \\ &= \frac{1+\sqrt{3}m}{2\sqrt{1+m^2}} \end{aligned}$	$\begin{aligned} &\checkmark \cos 60^\circ \cos 58^\circ + \sin 60^\circ \sin 58^\circ \\ &\checkmark \frac{1}{\sqrt{1+m^2}} \\ &\checkmark \frac{\sqrt{3}}{2} \text{ and/en } \frac{1}{2} \end{aligned}$
9.2.1	$\begin{aligned} \text{LHS} &= \frac{\cos x - \sin x \sin 2x}{\cos 2x} \\ &= \frac{\cos x - \sin x \cdot 2 \sin x \cos x}{1 - 2\sin^2 x} \\ &= \frac{\cos x (1 - 2\sin^2 x)}{1 - 2\sin^2 x} \\ &= \cos x = \text{RHS} \end{aligned}$	$\begin{aligned} &\checkmark 2 \sin x \cos x \\ &\checkmark 1 - 2\sin^2 x \\ &\checkmark \text{Factors/faktore} \\ &\checkmark \text{Answer/antwoord} \end{aligned}$
9.2.2	$\begin{aligned} \cos 2x &= 0 \\ 2x &= 90^\circ + k \cdot 360^\circ \text{ or/ of } 2x = 270^\circ + k \cdot 360^\circ, \\ &\quad k \in \mathbb{Z} \\ \therefore x &= 45^\circ + k \cdot 180^\circ \text{ or /of } x = 135^\circ + k \cdot 180^\circ \end{aligned}$ <p style="text-align: center;">OR/OF</p> $\begin{aligned} \cos 2x &= 0 \\ 2x &= 90^\circ + k \cdot 180^\circ, k \in \mathbb{Z} \\ \therefore x &= 45^\circ + k \cdot 90^\circ \end{aligned}$	$\begin{aligned} &\checkmark \cos 2x = 0 \\ &\checkmark 2x = 90^\circ + k \cdot 360^\circ \text{ or/of } \\ &\quad 2x = 270^\circ + k \cdot 360^\circ \\ &\checkmark x = 45^\circ + k \cdot 180^\circ \text{ or/of } \\ &\quad x = 135^\circ + k \cdot 180^\circ \\ &\checkmark k \in \mathbb{Z} \\ &\checkmark \cos 2x = 0 \\ &\checkmark 2x = 90^\circ + k \cdot 180^\circ \\ &\checkmark x = 45^\circ + k \cdot 90^\circ \\ &\checkmark k \in \mathbb{Z} \end{aligned}$


[16]

QUESTION/VRAAG 10

10.1	$\begin{aligned} &\frac{2\cos(90^\circ + x) \sin 216^\circ \cos 396^\circ}{\sin 72^\circ} \\ &= \frac{-2\sin x (-\sin 36^\circ) \cos 36^\circ}{\sin 2 \times 36^\circ} \\ &= \frac{2\sin x \sin 36^\circ \cos 36^\circ}{2\sin 36^\circ \cos 36^\circ} \\ &= \sin x \end{aligned}$	$\begin{aligned} &\checkmark -\sin x \quad \checkmark -\sin 36^\circ \quad \checkmark \cos 36^\circ \\ &\checkmark 2 \sin 36^\circ \cos 36^\circ \\ &\checkmark \text{Answer/antwoord} \end{aligned}$
10.2	$\begin{aligned} 2 \tan x + \cos x &= \frac{1}{\cos x} \\ \frac{2 \sin x}{\cos x} + \cos x &= \frac{1}{\cos x} \\ 2 \sin x + \cos^2 x &= 1 \\ 2 \sin x + 1 - \sin^2 x &= 1 \\ 2 \sin x - \sin^2 x &= 0 \\ \sin x(2 - \sin x) &= 0 \\ \sin x = 0 \text{ or/ of } \sin x = 2 \\ x = 0^\circ \text{ or/of } 180^\circ \text{ or no solution/of geen oplossing} \end{aligned}$	$\begin{aligned} &\checkmark \frac{\sin x}{\cos x} \\ &\checkmark \text{multiplying/maal} \\ &\checkmark 1 - \sin^2 x \\ &\checkmark \text{Factors/faktore} \\ &\checkmark \sin x = 0 / \sin x = 2 \\ &\checkmark 0^\circ \text{ or/of } 180^\circ \\ &\checkmark \text{no solution/geen oplossing} \end{aligned}$

[12]

QUESTION/VRAAG 11

<p>11.1</p>	<p> $f(x) = g(x)$ $\cos 2x = -\sin x$ $\cos 2x = \cos(90^\circ + x)$ $\pm 2x = 90^\circ + x + k \cdot 360^\circ \ (k \in \mathbb{Z})$ $2x = 90^\circ + x + k \cdot 360^\circ \text{ or } -2x = 90^\circ + x + k \cdot 360^\circ$ $x = 90^\circ + k \cdot 360^\circ \text{ or/of } x = -30^\circ + k \cdot 120^\circ$ $\therefore x \in \{-150^\circ; -30^\circ; 90^\circ\}$ OR/OF $f(x) = g(x)$ $\cos 2x = -\sin x$ $1 - 2\sin^2 x = -\sin x$ $2\sin^2 x - \sin x - 1 = 0$ $(2\sin x + 1)(\sin x - 1) = 0$ $\sin x = -\frac{1}{2} \text{ or/of } \sin x = 1$ $x = 210^\circ + 360^\circ k \text{ or } x = 330^\circ + 360^\circ k \text{ or } x = 90^\circ + 360^\circ k,$ $(k \in \mathbb{Z})$ $\therefore x \in \{-150^\circ; -30^\circ; 90^\circ\}$ </p>	<p> $\checkmark \cos 2x = -\sin x$ $\checkmark \cos(90^\circ + x)$ $\checkmark \pm 2x = 90^\circ + x + k \cdot 360^\circ$ $\checkmark x = 90^\circ + k \cdot 360^\circ$ $\checkmark x = -30^\circ + k \cdot 120^\circ$ $\checkmark -150^\circ \checkmark -30^\circ \checkmark 90^\circ$ (8) </p> <p> $\checkmark \cos 2x = -\sin x$ $\checkmark 1 - 2\sin^2 x$ \checkmark Factors/faktore $\checkmark \sin x - \frac{1}{2} / \sin x = 1$ \checkmark General solution/ algemene oplossing $\checkmark -150^\circ \checkmark -30^\circ \checkmark 90^\circ$ (8) </p>
<p>11.2</p>	<p>  </p>	<p> $f(x)$ \checkmark x-intercepts/afsnitte \checkmark y-intercept/afsnit \checkmark amplitude </p> <p> $g(x)$ \checkmark x-intercepts/afsnitte \checkmark Turning points/ draaipunte \checkmark Shape/vorm (6) </p>
<p>11.3</p>	<p>180°</p>	<p> \checkmark Answer/antwoord (1) </p>
<p>11.4</p>	<p> $f(x) \leq g(x)$ $-150^\circ \leq x \leq -30^\circ \text{ or/of } 90^\circ$ OR/OF $x \in [-150^\circ; -30^\circ] \text{ or/of } x = 90^\circ$ </p>	<p> Interval: \checkmark endpoints/eindpunte \checkmark Notation/notasie $\checkmark 90^\circ$ (3) </p>
<p>11.5</p>	<p>-2</p>	<p> $\checkmark \checkmark$ Answer/antwoord (2) </p>
<p>11.6</p>	<p>$h(x) = \sin x - 1$</p>	<p> $\checkmark \sin x$ $\checkmark -1$ (2) </p>

QUESTION/VRAAG 12

12.1	$\widehat{PLK} = \widehat{PRL} = 35^\circ$ $\widehat{KPL} = 110^\circ$ $\widehat{KML} = 70^\circ$ $\frac{KP}{\sin 35^\circ} = \frac{KL}{\sin 110^\circ}$ $KP = \frac{KL}{\sin 110^\circ} \cdot \sin 35^\circ$ $\frac{KL}{\sin 70^\circ} = \frac{x}{\sin 42^\circ}$ $KL = \frac{x \sin 70^\circ}{\sin 42^\circ}$ $\therefore KP = \frac{x \sin 70^\circ \sin 35^\circ}{\sin 42^\circ \sin 110^\circ}$ $\therefore KP = \frac{x \sin 35^\circ}{\sin 42^\circ}$	<ul style="list-style-type: none"> ✓ $\widehat{KPL} = 110^\circ$ ✓ $\widehat{KML} = 70^\circ$ ✓ Sine rule/<i>sinusreël</i> ✓ KP as subject/<i>onderwerp</i> ✓ $KL = \frac{x \sin 70^\circ}{\sin 42^\circ}$ ✓ $KP = \frac{x \sin 70^\circ \sin 35^\circ}{\sin 42^\circ \sin 110^\circ}$ <p style="text-align: right;">(6)</p>
12.2	$KP = \frac{x \sin 35^\circ}{\sin 42^\circ}$ $KP = \frac{70 \sin 35^\circ}{\sin 42^\circ}$ $KP = 60 \text{ m}$ $\text{Area } \Delta PKL = \frac{1}{2} PK \cdot PL \cdot \sin P$ $= \frac{1}{2} (60)(60) \sin 110^\circ$ $= 1691,45 \text{ m}^2$	<ul style="list-style-type: none"> ✓ Substitute/ <i>stel in</i>: $x = 70$ ✓ $KP = 60 \text{ metres/meters}$ ✓ area formula substitution/<i>area formule instelling</i> ✓ Answer/<i>antwoord</i> <p style="text-align: right;">(4)</p>

[10]

TOTAL/TOTAAL: 150