

**PROVINCIAL EXAMINATION/  
*PROVINSIALE EKSAMEN***

**NOVEMBER 2022**

**GRADE 10/*GRAAD 10***

**MARKING GUIDELINES/  
*NASIENRIGLYNE***

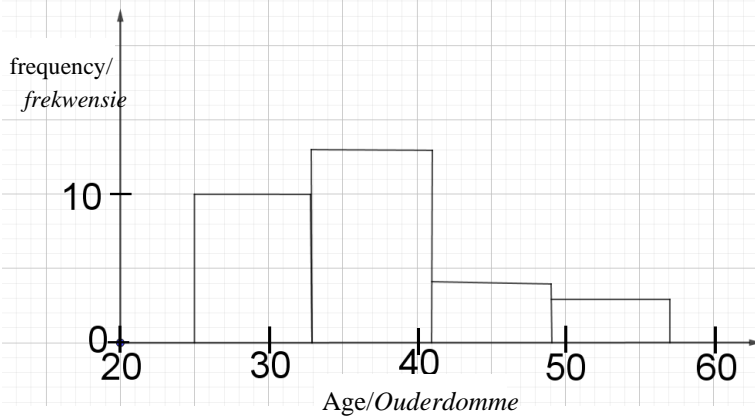

**MATHEMATICS (PAPER 2)/*WISKUNDE (VRAESTEL 2)***

**10 pages/*bladsye***

QUESTION/VRAAG 1

QUESTION/ VRAAG	Suggested solution/ Voorgestelde oplossing	Explanation/ Verduideliking	Marks/ Punte																																																												
1.1	<table border="1"> <tr> <td>11</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>12</td> <td>5</td> <td>8</td> <td>9</td> <td>9</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>13</td> <td>0</td> <td>1</td> <td>3</td> <td>9</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>14</td> <td>2</td> <td>3</td> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>15</td> <td>1</td> <td>2</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>16</td> <td>2</td> <td>2</td> <td>5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>should be in order eg. 0139 moet in volgorde wees bv.0139</p> <p>Should be in order eg. 237 moet in volgorde wees bv.0139</p> <p>Key : 13/3=133</p>	11	0									12	5	8	9	9						13	0	1	3	9						14	2	3	7							15	1	2	3							16	2	2	5							<p>✓ Ist and 2<sup>nd</sup> leaf 1<sup>ste</sup> en 2<sup>de</sup> tak</p> <p>✓ 3<sup>rd</sup> and 4<sup>th</sup> leaf 3<sup>de</sup> en 4<sup>de</sup> tak</p> <p>✓ 5<sup>th</sup> and 6<sup>th</sup> leaf 5<sup>de</sup> en 6<sup>de</sup> tak</p> <p>✓ key/sleutel</p>	(4)
11	0																																																														
12	5	8	9	9																																																											
13	0	1	3	9																																																											
14	2	3	7																																																												
15	1	2	3																																																												
16	2	2	5																																																												
1.2	1.2.1	$Q_2 = \frac{139 + 142}{2}$ $= 140,5$	<p>✓ method/metode</p> <p>✓ answer/antwoord</p>	(2)																																																											
	1.2.2	129 and/en 162	<p>✓ both values beide waardes</p>	(1)																																																											
	1.2.3	<p>Lower Quartile/onderste kwartiel = 129</p> <p>Upper Quartile/ boonste kwartiel = 152</p>	<p>✓ answer/antwoord</p> <p>✓ answer/antwoord</p>	(2)																																																											
	1.2.4	$\bar{x} = \frac{\sum x}{n}$ $= \frac{2531}{18}$ $= 140,61$	<p>✓ 2 531</p> <p>✓ 140,61</p>	(2)																																																											
				[11]																																																											

**QUESTION/VRAAG 2**

QUESTION/ VRAAG	Suggested solution/ Voorgestelde oplossing			Explanation/ Verduideliking	Marks/ Punte															
2.1	<table border="1"> <thead> <tr> <th>AGE INTERVALS OUDERDOMS- INTERVALLE</th> <th>TALLY/ TELLING</th> <th>FREQUENCY/ FREKWENSIE</th> </tr> </thead> <tbody> <tr> <td><math>25 \leq x &lt; 33</math></td> <td>###-###</td> <td>10</td> </tr> <tr> <td><math>33 \leq x &lt; 41</math></td> <td>###-### III</td> <td>13</td> </tr> <tr> <td><math>41 \leq x &lt; 49</math></td> <td>////</td> <td>4</td> </tr> <tr> <td><math>49 \leq x &lt; 57</math></td> <td>///</td> <td>3</td> </tr> </tbody> </table>	AGE INTERVALS OUDERDOMS- INTERVALLE	TALLY/ TELLING	FREQUENCY/ FREKWENSIE	$25 \leq x < 33$	###-###	10	$33 \leq x < 41$	###-### III	13	$41 \leq x < 49$	////	4	$49 \leq x < 57$	///	3			<ul style="list-style-type: none"> <li>✓ tallies and <math>f=10</math>/ telling en <math>f=10</math></li> <li>✓ tallies and <math>f=13</math>/ telling en <math>f=13</math></li> <li>✓ tallies and <math>f=4</math> / telling en <math>f=4</math></li> <li>✓ tallies and <math>f=3</math> / telling en <math>f=3</math></li> </ul>	(4)
AGE INTERVALS OUDERDOMS- INTERVALLE	TALLY/ TELLING	FREQUENCY/ FREKWENSIE																		
$25 \leq x < 33$	###-###	10																		
$33 \leq x < 41$	###-### III	13																		
$41 \leq x < 49$	////	4																		
$49 \leq x < 57$	///	3																		
2.2				<ul style="list-style-type: none"> <li>✓ 1<sup>st</sup> and 2<sup>nd</sup> column/ 1<sup>ste</sup> en 2<sup>de</sup> kolomme</li> <li>✓ 3<sup>rd</sup> and 4<sup>th</sup> column/ 3<sup>de</sup> en 4<sup>de</sup> kolomme</li> </ul>	(2)															
2.3				<ul style="list-style-type: none"> <li>✓ shape/vorm</li> <li>✓ (29;10) (28;13) (45;4) (53; 3)</li> <li>✓ grounding both sides/begroning beide kante At/By (21;0) and/en (61;0)</li> </ul>	(3)															
<b>[9]</b>																				

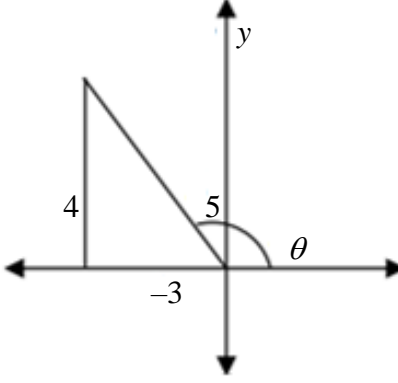
**QUESTION/VRAAG 3**

<b>QUESTION/ VRAAG</b>	<b>Suggested solution/ Voorgestelde oplossing</b>	<b>Explanation/ Verduideliking</b>	<b>Marks/ Punte</b>
3.1	$m_{BC} = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{6 - 2}{4 + 8}$ $= \frac{1}{4}$	<p>✓ substitution/<i>vervang</i>ing</p> <p>✓ answer/<i>answer</i></p>	(2)
3.2	$BC = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ $BC = \sqrt{(4 + 8)^2 + (6 - 2)^2}$ $BC = 12,65 \text{ OR } 4\sqrt{10}$	<p>✓ substitution/<i>vervang</i>ing</p> <p>✓ answer/<i>answer</i></p>	(2)
3.3	$k = \frac{6 + 2}{2}$ $= 4$	<p>✓ correct substitution/ <i>korrekte vervang</i>ing</p> <p>✓ answer/<i>antwoord</i></p>	(2)
3.4	<p>For <math>AD \perp BC</math></p> $m_{BC} \times m_{AD} = -1$ $m_{AD} = \frac{7 - 4}{3 + 2}$ $m_{AD} = -3$ $\therefore \frac{1}{4} \times -3 \neq -1$ <p><math>\therefore AD</math> not <math>\perp BC</math> <i>AD nie <math>\perp</math> op <math>BC</math></i></p>	<p>✓ deduction/<i>afleiding</i></p> <p>✓ substitution/<i>vervang</i>ing</p> <p>✓ answer/<i>antwoord</i></p>	(3)
			<b>[9]</b>

**QUESTION/VRAAG 4**

QUESTION/ VRAAG		Suggested solution/ Voorgestelde oplossing	Explanation/ Verduideliking	Punte/ Marks
4.1	4.1.1	$\cos(x + y)$ $= \cos(66,4^\circ + 114,7^\circ)$ $= \cos(181,1^\circ)$ $= -1,00$	✓ substitution/vervanging ✓ answer/antwoord	(2)
	4.1.2	$2\sin x$ $= 2\sin(66,4^\circ)$ $= 1,83$	✓ substitution/vervanging ✓ answer/antwoord	(2)
	4.1.3	$\operatorname{cosec} x$ $\frac{1}{\sin(66,4^\circ)}$ $= 1,09$	✓ correct substitution/ korrekte vervanging ✓ answer/antwoord	(2)
4.2	4.2.1	$\sin \theta + 0,38 = 1$ $\sin \theta = 0,62$ $\theta = 38,3^\circ$	✓ 0,62 ✓ answer/antwoord	(2)
	4.2.2	$2 \cot 2\theta = 3$ $2 \cot 2\theta = \frac{3}{2}$ $2\theta = \tan^{-1}\left(\frac{2}{3}\right)$ $2\theta = 33,69 \dots^\circ$ $\theta = 16,8^\circ$	✓ $\frac{3}{2}$ ✓ $\tan^{-1}\left(\frac{2}{3}\right)$ OR/OF $2\theta = 33,69 \dots^\circ$ ✓ answer/antwoord	(3)
	4.2.3	$2 \cos(3\theta - 60^\circ) = 1,71$ $\cos(3\theta - 60^\circ) = 0,855$ $3\theta - 60^\circ = 31,24 \dots^\circ$ $3\theta = 91,24 \dots^\circ$ $\theta = 30,4^\circ$	✓ 0,855 ✓ $3\theta - 60^\circ = 31,24^\circ$ ✓ $3\theta = 91,24^\circ$ ✓ answer/antwoord	(4)
				<b>[15]</b>

QUESTION/VRAAG 5

QUESTION/ VRAAG	Suggested solution/ Voorgestelde oplossing	Explanation/ Verduideliking	Punte/ Marks
5.1 5.1.1	 <p> <math>y^2 = (5)^2 - (4)^2</math> Pythagoras; <math>90^\circ \angle</math>  <math>y^2 = 25 - 16</math>  <math>y = -3</math>  <math>\tan \theta = -\frac{4}{3}</math> </p>	<p>✓ diagram</p> <p>✓ S</p> <p>✓ <math>y = -3</math></p> <p>✓ answer/antwoord</p>	(4)
5.1.2	$2\cos^2\theta - 1$ $= 2\left(-\frac{3}{5}\right)^2 - 1$ $= -\frac{7}{25}$	<p>✓ <math>2\left(-\frac{3}{5}\right)^2 - 1</math></p> <p>✓ answer/antwoord</p>	(2)
5.2	$\cos 0^\circ + \sin^2 60^\circ + \sqrt{2} \cdot \sec 45^\circ$ $= 1 + \left(\frac{\sqrt{3}}{2}\right)^2 + \sqrt{2} \cdot \frac{2}{\sqrt{2}}$ $3\frac{3}{4}$ <b>OR/OF</b> $\frac{15}{4}$	<p>✓ 1</p> <p>✓ <math>\left(\frac{\sqrt{3}}{2}\right)^2</math></p> <p>✓ <math>\sqrt{2} \cdot \frac{2}{\sqrt{2}}</math></p> <p>✓ answer/antwoord</p>	(4)
5.3	<p>Distance/Afstand DB: <math>\tan 21^\circ = \frac{DB}{30}</math>  <math>DB = 11,515 \dots m</math></p> <p>Distance/Afstand BC: <math>\tan 15^\circ = \frac{BC}{30}</math>  <math>BC = 8,038 \dots m</math></p> <p><math>\therefore DC = 11,515 m - 8,038 m</math>  <math>\therefore DC = 3,48</math></p>	<p>✓ <math>\tan 21^\circ = \frac{DB}{30}</math></p> <p>✓ <math>DB = 11,515 m</math></p> <p>✓ <math>\tan 15^\circ = \frac{BC}{30}</math></p> <p>✓ <math>BC = 8,038 m</math></p> <p>✓ <math>DC = 11,515 m - 8,038 m</math></p> <p>✓ answer/antwoord</p>	(6)
			<b>[16]</b>

**QUESTION/VRAAG 6**

<b>QUESTION/ VRAAG</b>	<b>Suggested solution/ Voorgestelde oplossing</b>	<b>Explanation/ Verduideliking</b>	<b>Punte/ Marks</b>
6.1	$a = 1$	✓ 1	(1)
6.2	$y \in [0;2]$ <b>OR/OF</b> $0 \leq y \leq 2; y \in \mathbb{R}$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 20px;"> <p><b>NOTE/NOTA</b></p> <p>In this type of answers – look at values and give the mark. Then look at inequalities. If values are wrong, then ZERO marks</p> <p><i>In hierdie tipe antwoorde – kyk na waardes en gee die punt. Kyk dan na ongelykhede. As waardes verkeerd is, dan NUL</i></p> </div>	✓ critical values/ <i>kritieke waardes</i> ✓ notation/ <i>notasie</i>	(2)
6.3	1	✓ 1	(1)
6.4	$90^\circ \leq x \leq 180^\circ$ <b>OR/OF</b> $x \in [90^\circ; 180^\circ]$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 20px;"> <p>See note above <i>Sien nota hierbo</i></p> </div>	✓ values/ <i>waardes</i> ✓ inequality signs/ <i>ongelykheidstekens</i>	(2)
6.5	$x = 0^\circ$ or/of $x = 270^\circ$ or/of $x = 360^\circ$	✓ $x = 0^\circ$  ✓ $x = 270^\circ$ ✓ $x = 360^\circ$	(3)
6.6	$h(x) = -\sin x$	✓ answer/ <i>antwoord</i>	(1)
			<b>[10]</b>

**QUESTION/VRAAG 7**

QUESTION/ VRAAG		Suggested solution/ <i>Voorgestelde oplossing</i>	Explanation/ <i>Verduideliking</i>	Punte/ Marks
7.1	7.1.1	$AH^2 = 0,8^2 + 1,5^2$ $AH^2 = 2,89$ $AH = 1,7 \text{ m}$	$\checkmark AH^2 = 0,8^2 + 1,5^2$  $\checkmark$ answer/ <i>antwoord</i>	(2)
	7.1.2	Surface area of roof/ <i>Buite-oppv van dak</i> $= 4 \times \frac{1}{2} (3 \times 1,7)$ $= 10,2 \text{ m}^2$	$\checkmark 4 \times \frac{1}{2} (3 \times 1,7)$ $\checkmark$ answer/ <i>antwoord</i>	(2)
	7.1.3	Surface area of walls/ <i>Buite-oppv van mure</i> $= 4 \times 3 \times 2,1$ $= 25,2 \text{ m}^2$ Total surface area/ <i>Totale oppv</i> $= 10,2 \text{ m}^2 + 25,2 \text{ m}^2 = 35,4 \text{ m}^2$	$\checkmark = 25,2 \text{ m}^2$  $\checkmark$ answer/ <i>antwoord</i>	(2)

QUESTION/ VRAAG		Suggested solution/ Voorgestelde oplossing	Explanation/ Verduideliking	Punte/ Marks
7.2	7.2.1	$\text{Volume} = \frac{4}{3} \pi r^3$ $= \frac{4}{3} \pi \times 8^3$ $= 2\,144,62 \text{ m}^3$	$\checkmark = \frac{4}{3} \pi \times 8^3$ $\checkmark \text{ answer/antwoord}$	(2)
	7.2.2	New volume/ <i>Nuwe volume</i> : Orig volume/ <i>Oorspronklike volume</i> $= 2^3 : 1$ $= 8:1$	$\checkmark 2^3$ $\checkmark \text{ answer/antwoord}$	(2)
	7.2.3	Volume including silver/ <i>Volume met silwer ingesluit</i> $= \frac{4}{3} \pi \times 9^3 = 3\,053,66 \text{ mm}^3$ Volume of silver/ <i>Volume van silwer</i> $= 3\,053,66 - 2\,144,62 = 908, \text{ mm}^3$	$\checkmark \frac{4}{3} \pi \times 9^3$ $\checkmark \text{ answer/antwoord}$	(2)
				<b>[12]</b>

**QUESTION/VRAAG 8**

8.1	$\hat{P}_1 = \hat{P}_2 = x$ $\hat{S}_1 = \hat{S}_2 = y$ $x + x + y + y = 180^\circ$ $2x + 2y = 180^\circ$ $\therefore x + y = 90^\circ$	[given/gegee] [given/gegee] [co-interior $\angle$ s PQ // SR/ <i>ko-binne <math>\angle</math>e ; PQ // SR]</i>	$\checkmark \text{ S}$ $\checkmark \text{ S}$ $\checkmark \text{ S } \checkmark \text{ R}$	(4)
8.2	$\hat{W}_1 + x + y = 180^\circ$ $\hat{W}_1 = 90^\circ$ PWST is a parallelogram/ <i>PWST is 'n parallelogram</i> $\therefore \text{PWST is a rectangle}$ <i>PWST is 'n reghoek</i>	[sum int $\angle$ of $\Delta$ / <i>som binne <math>\angle</math>e van <math>\Delta</math>]</i>  [both pairs of opp sides parallel/ <i>albei pare</i> <i>teenoorstaande sye ewewydig</i> ]  [ $\hat{W}_1 = 90^\circ$ and PWST is a parm $\hat{W}_1 = 90^\circ$ en PWST is 'n parm]	$\checkmark \text{ S/R}$ $\checkmark \text{ S}$  $\checkmark \text{ S}$ $\checkmark \text{ R}$	(4)
				<b>[8]</b>

**QUESTION/VRAAG 9**

$BD = BD$	[common/ <i>gemeenskaplik</i> ]	✓ S	
$\hat{D}_1 = \hat{B}_2$	[alternate $\angle$ s AD // BC/ <i>verw.binne</i> $\angle^e$ ; AD // BC]	✓ S/R	
$\hat{B}_2 = \hat{D}_1$	[alternate $\angle$ s AB // DC <i>verw.binne</i> $\angle^e$ ; AB // DC]	✓ S	
$\therefore \triangle ABC \equiv \therefore \triangle CBD$	[AAS/HHS]	✓ S	
$\therefore \triangle AD = BC, AB = DC$	$\triangle^s/\triangle^e \equiv$	✓ R	(5)
			<b>[5]</b>

**QUESTION/VRAAG 10**

$DE // BC$	[midpoint theorem/ <i>middelpunt stelling</i> ]	✓ S ✓ R	
$\hat{D}_2 = \hat{A}$	[corresponding $\angle$ s DE // BC <i>ooreenkomstige</i> $\angle^e$ ; DE // BC]	✓ S/R	
$\hat{B}_1 = \hat{A}$	[ $\angle$ s opp = sides / $\angle^e$ <i>teenoor gelyke sye</i> ]	✓ S/R	
$\hat{D}_2 = \hat{B}_1$			
$DR = RB$	[sides opp equal $\angle^s$ / <i>syte teenoor gelyke</i> $\angle^e$ ]	✓ S/R	
$\triangle RDB$ is isosceles $\triangle RDB$ is gelykbenig	[two equal angles/ <i> twee gelyke hoeke</i> ]		(5)
			<b>[5]</b>
<b>TOTAL/TOTAAL:</b>			<b>100</b>