



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE/GRAAD 10**

**MATHEMATICS P2/WISKUNDE V2**

**NOVEMBER 2017**

**MARKING GUIDELINES/NASIENRIGLYNE**

**MARKS/PUNTE: 100**

**These marking guidelines consist of 10 pages.  
*Hierdie nasienriglyne bestaan uit 10 bladsye.***

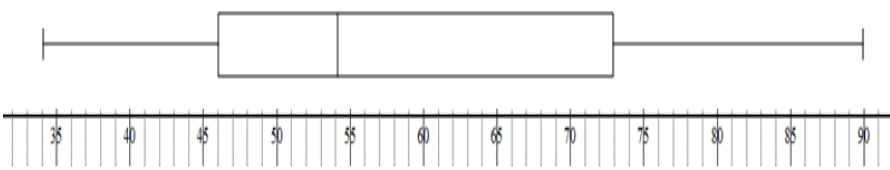
**NOTE:**

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

**LET WEL:**

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.
- Dit is onaanvaarbaar dat waardes/antwoorde veronderstel word om 'n probleem op te los.

**QUESTION/VRAAG 1**

|     |  |   |
|-----|--|---|
| 1.1 | Median/Mediaan = 54  | ✓✓ answ./antw.<br>(2)   |
| 1.2 | Range/Variasiewydte = $90 - 34 = 56$   | ✓✓ answ./antw.<br>(2)   |
| 1.3 | $\begin{aligned} \text{IQR(IKV)} &= Q_3 - Q_1 \\ &= 73 - 46 \\ &= 27 \end{aligned}$  | ✓ $Q_1 = 46$<br>✓ $Q_3 = 73$<br>✓ answ./antw.<br>(3)                                |
| 1.4 |  | ✓ min. & max./maks.<br>✓ median/mediaan<br>( $Q_2$ )<br>✓ $Q_1$ and/en $Q_3$<br>(3) |
|     |  | <b>[10]</b>   |

**QUESTION/VRAAG 2**

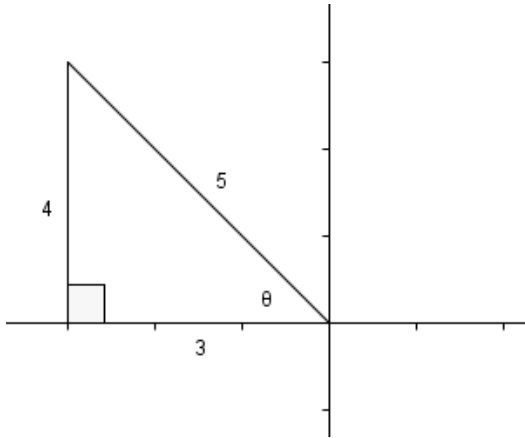
|     |   |  |
|-----|---|--|
| 2.1 | 30 days/dae   | ✓ answ./antw.<br>(1)                             |
| 2.2 | $28 \leq T < 32$  | ✓ answ./antw.<br>(1)                             |
| 2.3 | The mean/Gemiddeld ( $\bar{X}$ ) = $\frac{44 + 104 + 270 + 170 + 266 + 126}{30}$<br>$= \frac{980}{30}$<br>$= 32,666$<br>$= 32,67^\circ\text{C}$ . | ✓ addition/optel<br>✓ 30<br>✓ answ./antw.<br>(3) |
| 2.4 | $9 + 5 + 7 + 3 = 24$ days/dae<br>% of number of days/getal dae = $\frac{24}{30} \times 100$<br>$= 80\%$   | ✓ addition/optel<br>✓ answ./antw.<br>(2)         |
|     |   | <b>[7]</b>                                       |

**QUESTION/VRAAG 3**

|     |   |  |
|-----|---|--|
| 3.1 | $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$<br>$= \sqrt{(7 - 6)^2 + (4 - 6)^2}$<br>$= \sqrt{(1)^2 + (-2)^2}$<br>$= \sqrt{5}$  | ✓ subst./verv.<br>✓ answ./antw.<br>(2)   |
| 3.2 | $M_{QS} = T(x; y)$<br>$\left(\frac{6+x}{2}, \frac{6+y}{2}\right) = \left(\frac{7}{2}, \frac{7}{2}\right)$<br>$\frac{6+x}{2} = \frac{7}{2}$ $\frac{6+y}{2} = \frac{7}{2}$<br>$x = 1$ $y = 1$<br>$S(1;1)$ | ✓ $\frac{6+x}{2} = \frac{7}{2}$<br>✓ $\frac{6+y}{2} = \frac{7}{2}$<br>✓ answ./antw.<br>(3) |

|             |  |   |
|-------------|--|---|
| 3.3         | $PR = \sqrt{(x_p - x_R)^2 + (y_p - y_R)^2}$ $= \sqrt{(7 - 0)^2 + (4 - 3)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7,07$ <p><b>OR/OF</b></p> $QS = \sqrt{(x_S - x_Q)^2 + (y_S - y_Q)^2}$ $= \sqrt{(1 - 6)^2 + (1 - 6)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7,07$ $\therefore PR = QS$ | <p>✓ answ./antw.</p> <p>✓ answ./antw.</p> <p>(2)</p>  |
| 3.4         | $m_{QR} = \frac{6 - 3}{6 - 0} = \frac{1}{2}$ $m_{RS} = \frac{3 - 1}{0 - 1} = -2$ $m_{QR} \times m_{RS}$ $= \frac{1}{2} \times -2$ $= -1$ $m_{QR} \times m_{RS} = -1$ $\therefore QR \perp RS$  | <p>✓ <math>m_{QR} = \frac{1}{2}</math></p> <p>✓ <math>m_{RS} = -2</math></p> <p>✓ <math>\frac{1}{2} \times -2</math></p> <p>✓ <math>m_{QR} \times m_{RS} = -1</math></p> <p>(4)</p> |
| 3.5         | <p>Rectangle./Reghoek.</p> <p>The diagonals are equal and one of the interior angles is equal to <math>90^\circ</math>.</p> <p><i>Die hoeklyne is gelyk en een van die binnehoeke is gelyk aan <math>90^\circ</math>.</i></p>  | <p>✓ Rectangle/Reghoek</p> <p>✓ reason/rede</p> <p>(2)</p>  |
| 3.6         | $\cos \hat{RSQ} = \frac{\sqrt{5}}{5\sqrt{2}}$ $\hat{RSQ} = 71,57^\circ$  | <p>✓✓ <math>\cos \hat{RSQ} = \frac{\sqrt{5}}{5\sqrt{2}}</math></p> <p>✓ answ./antw.</p> <p>(3)</p>  |
| <b>[16]</b> |  |   |

**QUESTION/VRAAG 4**

|                      |  |   |
|----------------------|--|---|
| <p>4.1.1<br/>(a)</p> | <p><math>4 \cot \theta + 3 = 0</math><br/> <math>\cot \theta = -\frac{3}{4}</math></p>  <p><math>\cos \theta = -\frac{3}{5}</math></p>  | <p>✓ <math>\cot \theta = -\frac{3}{4}</math></p> <p>✓ diagram</p> <p>✓ <math>r = 5</math></p> <p>✓ <math>\cos \theta = -\frac{3}{5}</math></p> <p>(4)</p>                             |
| <p>4.1.1<br/>(b)</p> | <p><math>\frac{3 \sin \theta \sec \theta}{\tan \theta}</math><br/> <math>= 3 \left( \frac{\left(\frac{4}{5}\right) \left(-\frac{5}{3}\right)}{-\frac{4}{3}} \right)</math><br/> <math>= 3</math></p>   | <p>✓ <math>\frac{4}{5}</math></p> <p>✓ <math>-\frac{5}{3}</math></p> <p>✓ simpl./vereenv.</p> <p>✓ answ./antw.</p> <p>(4)</p>   |
| <p>4.1.2</p>         | <p><math>LHS = \left(\frac{4}{5}\right)^2 - 1</math><br/> <math>= -\frac{9}{25}</math><br/> <math>RHS = -\left(\frac{3}{5}\right)^2</math><br/> <math>= -\frac{9}{25}</math><br/> <math>\therefore \sin^2 \theta - 1 = -\cos^2 \theta.</math></p>  | <p>✓ subst./verv.</p> <p>✓ answ./antw.</p> <p>✓ answ./antw.</p> <p>(3)</p>  |
| <p>4.2</p>           | <p><math>\cos 30^\circ \tan 60^\circ + \operatorname{cosec}^2 45^\circ \sin^2 60^\circ</math><br/> <math>= \frac{\sqrt{3}}{2} \times \sqrt{3} + \left(\frac{2}{\sqrt{2}}\right)^2 \times \left(\frac{\sqrt{3}}{2}\right)^2</math><br/> <math>= \frac{3}{2} + \frac{4}{2} \times \frac{3}{4}</math><br/> <math>= \frac{3}{2} + \frac{3}{2}</math><br/> <math>= 3</math></p> | <p>✓ <math>\frac{\sqrt{3}}{2}</math> and/en <math>\sqrt{3}</math></p> <p>✓ <math>\frac{2}{\sqrt{2}}</math> and/en <math>\frac{\sqrt{3}}{2}</math></p> <p>✓ answ./antw.</p> <p>(3)</p> |

|     |  |   |
|-----|--|---|
| 4.3 | $\frac{4}{3} \sin \theta = \cos 37^\circ$ $\sin \theta = \frac{3(0,79863551)}{4}$ $\theta = 36,80^\circ$ | ✓ multiplying by/<br>vermenigvuldig met $\frac{3}{4}$<br>✓ answ./antw.<br>(2) |
|     |  | <b>[16]</b>   |

**QUESTION/VRAAG 5**

|              |   |  |
|--------------|---|--|
| <p>5.1</p>   |   | <p><i>f</i><br/>                 ✓ shape/vorm<br/>                 ✓ x-intercept/afsnit<br/>                 ✓ y-intercept/afsnit</p> <p><i>g</i><br/>                 ✓ shape/vorm<br/>                 ✓ x-intercepts/afsnitte<br/>                 ✓ y-intercept/afsnit</p> <p style="text-align: right;">(6)</p> |
| <p>5.2.1</p> | <p>Amplitude of/van <math>g = 2</math></p>  | <p>✓ answ./antw.<br/>                 (1)</p>  |
| <p>5.2.2</p> | <p>Range of/Waardeversameling van <math>f : -2 \leq y \leq 0</math><br/> <b>OR/OF</b><br/> <math>y \in [-2; 0]</math></p> | <p>✓ critical values/kritieke waardes<br/>                 ✓ notation/notasie<br/>                 (2)</p>   |
| <p>5.3.1</p> | <p>2 solutions/oplossings</p>   | <p>✓ answ./antw.<br/>                 (1)</p>  |
| <p>5.3.2</p> | <p><math>x = 180^\circ</math></p>   | <p>✓✓✓ <math>x = 180^\circ</math><br/>                 (3)</p>   |
|              |   | <p style="text-align: right;"><b>[13]</b></p>  |

**QUESTION/VRAAG 6**

|     |   |   |
|-----|---|---|
| 6.1 | $\theta = 47^\circ$   | ✓ answ./antw.<br>(1)  |
| 6.2 | $\sin P = \frac{RQ}{RP}$ $\sin 47^\circ = \frac{RQ}{21}$ $RQ = 21 \sin 47^\circ$ $RQ = 15,36m$                                  | ✓ trig. ratio/trig. verhoud<br>✓ subst./verv.<br>✓ answ./antw.<br>(3)                     |
| 6.3 | $\tan S = \frac{RQ}{QS}$ $\tan S = \frac{15,36}{17}$ $\hat{S} = \tan^{-1}\left(\frac{15,36}{17}\right)$ $\hat{S} = 42,10^\circ$ | ✓ subst./verv.<br>✓ answ./antw.<br>(2)  |
| 6.4 | $\cos 47^\circ = \frac{PQ}{21}$ $PQ = 21 \times \cos 47^\circ$ $PQ = 14,32m$ $PS = 14,32 + 17$ $= 31,32m$                       | ✓ trig. ratio/trig. verhoud<br>✓ PQ = 14,32 m<br>✓ addition/optel<br>✓ answ./antw.<br>(4) |
|     |   | <b>[10]</b>   |

**QUESTION/VRAAG 7**

|     |  |  |
|-----|--|--|
| 7.1 | $V = \frac{1}{3} \pi r^2 h$ $83,38 = \frac{1}{3} \times 6,5 \pi r^2$ $r^2 = \frac{3 \times 83,38}{6,5 \pi}$ $r = 3,5cm$  | ✓ subst./verv.<br>✓ answ./antw.<br>(2) |
| 7.2 | $s^2 = h^2 + r^2$ $s^2 = 6,5^2 + 3,5^2$ $s = 7,38cm$   | ✓ subst./verv.<br>✓ answ./antw.<br>(2) |
| 7.3 | Surface area of the solid/ <i>Buite-oppervlakte (Oppervlakarea) van die vaste liggaam</i><br>$= 2\pi r^2 + \pi rs$ $= 2\pi(3,5)^2 + \pi(3,5)(7,38)$ $= 158,12cm^2$ | ✓ subst./verv.<br>✓ answ./antw.<br>(2) |
|     |  | <b>[6]</b>                             |



**QUESTION/VRAAG 8**

|       |  |   |
|-------|--|---|
| 8.1.1 | $\hat{O}_1 = 90^\circ$ Diagonal bisect at/ <i>Hoeklyne sny by</i> $90^\circ$ .   | ✓S/R<br>(1)   |
| 8.1.2 | $\hat{L}_1 = 180^\circ - (34^\circ + 90^\circ)$ Sum of angles of/ <i>Som van hoeke</i> $\Delta$ .<br>$= 56^\circ$  | ✓S/R<br>✓answ./ <i>antw.</i><br>(2)   |
| 8.1.3 | $\hat{L}_1 = \hat{L}_2 = 56^\circ$ diagonals bisect the/ <i>hoeklyne sny die</i> $\angle$ s.<br>$\hat{L}_1 + \hat{L}_2 = \hat{N}_1 + \hat{N}_2$ opp. $\angle$ s of rhombus/<br><i>teenoorst <math>\angle</math>van die ruit =</i><br>$\therefore \hat{KNM} = 112^\circ$  | ✓S/R<br><br>✓answ./ <i>antw.</i><br>(2)   |
| 8.2   | <p>Given/<i>Gegee</i> : <math>//^m PQRS</math> with diagonals/<i>met hoeklyne PR and/en R.P.T</i> : <math>PM = MR</math></p> <p>Proof/<i>Bewys</i> : In <math>\Delta PMS</math> and/<i>en</i> <math>\Delta RMQ</math></p> <p>1. <math>\hat{P}_1 = \hat{R}_1</math> (alt./<i>verw. <math>\angle</math>s, PS // QR</i>)</p> <p>2. <math>\hat{S}_1 = \hat{Q}_1</math> (alt./<i>verw. <math>\angle</math>s, PS // QR</i>)</p> <p>3. <math>PS = QR</math> (opp. sides parm are /<i>teenoorst. sye van parm. =</i>)<br/><math>\therefore \Delta PMS \equiv \Delta RMQ</math> (AAS)<br/><math>\Rightarrow PM = MR</math> and <math>MS = MQ</math></p> <p><b>OR/OF</b></p> <p>Given/<i>Gegee</i> : <math>//^m PQRS</math> with diagonals/<i>met hoeklyne PR and/en R.P.T</i> : <math>QM = MS</math></p> <p>Proof/<i>Bewys</i> : In <math>\Delta PQM</math> and/<i>en</i> <math>\Delta RSM</math></p> <p>1. <math>\hat{P}_2 = \hat{R}_2</math> (alt./<i>verw. <math>\angle</math>s, QP // SR</i>)</p> <p>2. <math>\hat{S}_2 = \hat{Q}_2</math> (alt./<i>verw. <math>\angle</math>s, SR // PQ</i>)</p> <p>3. <math>PQ = SR</math> (opp. sides parm are /<i>teenoorst. sye van parm =</i>)<br/><math>\therefore \Delta PQM \equiv \Delta RSM</math> (AAS)<br/><math>\Rightarrow QM = MS</math> and <math>PM = MR</math></p> | <p>✓ 1. S/R<br/>✓ 2. S/R<br/>✓ 3. S/R</p> <p>✓ congruency/<i>kongruensie</i> (AAS)<br/>(4)</p> <p><b>OR/OF</b></p> <p>✓ 1. S/R<br/>✓ 2. S/R<br/>✓ 3. S/R</p> <p>✓ congruency/<i>kongruensie</i> (AAS)<br/>(4)</p> |
| 8.3   | <p>DB = 2DE (DE = EB)</p> <p>DE = FC (opp. side of/<i>teenoorst. sy van //gram.</i>)</p> <p>but/<i>maar</i> FC = 2KC (FK = KC)</p> <p>DE = 2KC (DE = FC)</p> <p>DB = 2(2KC) (DB = 2DE)</p> <p>DB = 4KC</p>   | <p>✓S/R<br/>✓S/R<br/>✓S/R<br/>✓S/R</p> <p>(4)</p>   |
|       |  | <b>[13]</b>   |

**QUESTION/VRAAG 9**

|     |  |  |
|-----|--|--|
| 9.1 | <p>In <math>\triangle ACG</math> <math>F</math> and/en <math>H</math> are midpoints/is middelpunte (given/gegee)<br/> <math>\therefore FH \parallel CG</math> (midpoint theorem/middelpuntstelling)<br/> <math>FE \parallel BC</math> (same straight lines/dieselfde reguitlyne)<br/>         In <math>\triangle AGB</math>, <math>H</math> is the midpoint/is die middelpunt<br/> <math>HE \parallel BG</math> (proved/bewys)<br/> <math>\therefore E</math> is the midpoint/is die middelpunt<br/>         (Line drawn from midpt of side/Lyn getrek vanaf midpt van sy,<br/>         // to 2nd side/na 2de sy )</p> | <p>✓ <math>FH \parallel CG</math><br/>         ✓ midpoint theorem/<br/>         middelpuntstelling<br/><br/>         ✓ reason/rede<br/>         (3)</p>                |
| 9.2 | <p><math>\hat{A}EH = \hat{A}BC = 90^\circ</math> (Corresponding angle/Ooreenst hoek)<br/> <math>\text{Area/Oppervl.} = \frac{1}{2} EH \times AE</math><br/> <math>9,5 = \frac{1}{2} \times 3,5 \times AE</math><br/> <math>AE = \frac{38}{7} = 5,43\text{cm}</math><br/> <math>AB = 2AE</math><br/> <math>AB = 2\left(\frac{38}{7}\right)</math><br/> <math>= \frac{76}{7}</math><br/> <math>= 10,86\text{cm}</math></p>   | <p>✓ subst./verv.<br/>         ✓ <math>AE</math><br/><br/>         ✓ <math>AB</math><br/>         (3)</p>  |
| 9.3 | <p><math>BG = 7\text{ cm}</math> (midpoint theorem/middelpuntstelling)<br/> <math>BC = 14\text{ cm}</math><br/> <math>\text{Area/Oppervl.} = \frac{1}{2} BC \times AB</math><br/> <math>= \frac{1}{2} \times 14 \times \frac{76}{7}</math><br/> <math>= 76\text{cm}^2</math></p>   | <p>✓ <math>BG = 7</math> (midpt thm)/<br/>         (middelpuntstelling)<br/>         ✓ <math>BC = 2BG = 14</math><br/><br/>         ✓ answ./antw.<br/>         (3)</p> |
|     |  | <b>[9]</b>   |

**TOTAL/TOTAAL: 100**