Hierdie memorandum bestaan uit 14 bladsye.
VRAAG 1

| 1.1 | 55 | ✓ | Antwoord | 1 |

<table>
<thead>
<tr>
<th>1.2</th>
<th>OUDERDOMME</th>
<th>FREKWENSIE</th>
<th>KUMULATIEWE FREKWENSIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 ≤ x &lt; 23</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>23 ≤ x &lt; 28</td>
<td>8</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>28 ≤ x &lt; 33</td>
<td>13</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>33 ≤ x &lt; 38</td>
<td>15</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>38 ≤ x &lt; 43</td>
<td>10</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>43 ≤ x &lt; 48</td>
<td>4</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>48 ≤ x &lt; 53</td>
<td>1</td>
<td>55</td>
<td></td>
</tr>
</tbody>
</table>

Kumulatiewe frekwensie
✓ Eerste 4 waardes korrek
✓ oorbylwende 3 korrek

Frekwensie
✓ Eerste 4 waardes korrek
✓ oorbylwende 3 korrek (AA punte)

| 1.3 | Mediaan = 34 jaar | ✓ | Antwoord | 1 |

| 1.4 | Kiesers 35 jaar of ouer = 55 – 31 = 24 | ✓ | Antwoord | 1 |

[7]
VRAAG 2

2.1 27; 31; 31; 35; 39; 40; 44; 50; 54; 62; 65; 75
Min = 27, \( Q_1 = \frac{31+35}{2} = 33 \), \( Q_2 = \frac{40+44}{2} = 42 \), \( Q_3 = \frac{54+62}{2} = 58 \), Maks = 75
Sien onderste mond-en-snor diagram

\[ \text{Diagram} \]

\( \checkmark \) Min en Maks
\( \checkmark \) \( Q_1 \)
\( \checkmark \) \( Q_2 \)
\( \checkmark \) \( Q_3 \)

2.2 Min = 28, \( Q_1 = 32 \), \( Q_2 = 42 \), \( Q_3 = 32+18 = 50 \), Maks = 75
Sien diagram in 2.1(Boonste mond-en-snor diagram)

\( \checkmark \) Min, \( Q_1 \), \( Q_2 \) & maks
\( \checkmark \) \( Q_3 \)

2.3 Dutywa het meer families met ouer persone.
- 25% 58 jaar en ouer. (d.w.s. \( Q_3 = 58 \))
- 75% 33 jaar en ouer.
- Enige aanvaarbare rede wat na syfers verwys.
Aanvaar: Albei dorpe
Rede: Het dieselfde mediaan 42.
### VRAAG 3

#### 3.1 Gemiddelde

\[
\frac{65,3 + 81,9 + 70 + 88,2 + 56,5 + 94,8 + 83 + 44,1 + 75 + 79,4}{10} = \frac{738,2}{10} = 73,82
\]

Slegs antwoord: 2/2 (2)

#### 3.2

<table>
<thead>
<tr>
<th>( x )</th>
<th>( x-x )</th>
<th>( (x-x)^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>65,3</td>
<td>65,3 – 73,82 = -8,52</td>
<td>72,5904</td>
</tr>
<tr>
<td>81,9</td>
<td>81,9 – 73,82 = 8,08</td>
<td>65,2864</td>
</tr>
<tr>
<td>70</td>
<td>70 – 73,82 = -3,82</td>
<td>14,5924</td>
</tr>
<tr>
<td>88,2</td>
<td>88,2 – 73,82 = 14,18</td>
<td>201,0724</td>
</tr>
<tr>
<td>56,5</td>
<td>56,5 – 73,82 = -17,32</td>
<td>299,9824</td>
</tr>
<tr>
<td>94,8</td>
<td>94,8 – 73,82 = 20,98</td>
<td>440,1604</td>
</tr>
<tr>
<td>83</td>
<td>83 – 73,82 = 9,18</td>
<td>84,2724</td>
</tr>
<tr>
<td>44,1</td>
<td>44,1 – 73,82 = -29,72</td>
<td>883,2784</td>
</tr>
<tr>
<td>75</td>
<td>75 – 73,82 = 1,18</td>
<td>1,3924</td>
</tr>
<tr>
<td>79,4</td>
<td>79,4 – 73,82 = 5,58</td>
<td>31,1364</td>
</tr>
</tbody>
</table>

\[ \text{SA} = \frac{2093,764}{10} = \frac{2093764}{10} = 14,49 \]

Slegs antwoord: 3/3 (3)

#### 3.3

\[ 73,82 - 14,49 = 59,33 \]

Slegs antwoord: 3/3 (2)

[7]
**VRAAG 4**

| 4.1 | ![Graph] | ✓ Eerste 4 punte korrek.  
✓ oorblywende 3 punte korrek |
|     |          | (2) |

| 4.2 | Eksponensieel | ✓ Antwoord (1) |

| 4.3 | Minder as 5 drië. Soos die getal wedstryde toeneem, neem die getal drië af. | ✓ Antwoord met rede (1) |

|     | | [4] |
### VRAAG 5

#### 5.1

<table>
<thead>
<tr>
<th>C(-4 ; 7) A(1;4)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AC= ((-4 - 1)^2 + (7 - 4)^2)</td>
<td>✓ Instelling</td>
</tr>
<tr>
<td>AC= (\frac{34}{34})</td>
<td>✓ Antwoord</td>
</tr>
</tbody>
</table>

#### 5.2

<table>
<thead>
<tr>
<th>B(s ; -1) , M(-3 ; t) , C(-4 ; 7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(-6 = s - 4)</td>
<td>✓ Instelling</td>
</tr>
<tr>
<td>(s = -2)</td>
<td>✓ s = -2</td>
</tr>
<tr>
<td>(\frac{t}{2} = \frac{-1 + 7}{2})</td>
<td>✓ Instelling</td>
</tr>
<tr>
<td>(t = 3)</td>
<td>✓ t = 3</td>
</tr>
</tbody>
</table>

#### 5.3

<table>
<thead>
<tr>
<th>C(-4 ; 7) A(1 ; 4), B(- 2 ; -1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(m_{AB} = \frac{-1 - 4}{-2 - 1})</td>
<td>✓ gradiënt van AB</td>
</tr>
<tr>
<td>(m_{AB} = \frac{5}{3})</td>
<td>✓ gradiënt van AC</td>
</tr>
<tr>
<td>(m_{AC} = \frac{4 - 7}{1 + 4})</td>
<td>✓ Produk van gradiënte</td>
</tr>
<tr>
<td>(m_{AC} = \frac{-3}{5})</td>
<td></td>
</tr>
<tr>
<td>(m_{AC} \times m_{AC} = \frac{-3}{5} \times \frac{5}{3} = -1)</td>
<td>✓ Gevolgtrekking</td>
</tr>
<tr>
<td>(\Delta CAB is reghoekig)</td>
<td></td>
</tr>
</tbody>
</table>

#### OF

| \(AB = \frac{(-4 - 1)^2 + (7 - 4)^2}{34}\) |  |
| \(AB = \frac{34}{34}\) | ✓ Lengte van AB |
| \(AC = \frac{34}{34}\) | ✓ Lengte van AC |
| \(BC = \frac{(-4 + 2)^2 + (7 + 1)^2}{68}\) | ✓ Lengte van BC |
| \(BC^2=AB^2+AC^2\) | ✓ Gevolgtrekking met gebruik van Pythagoras se stelling |
| Dus is \(\Delta CAB reghoekig\). | (4) |
### 5.4 \( m_{AB} = \frac{5}{3}, C(-4 ; 7) \)

\[
\begin{align*}
y - 7 &= \frac{5}{3}(x + 4) \\
y &= \frac{5}{3}x + \frac{41}{3}
\end{align*}
\]

**Graad**

**Instelling**

**Antwoord**

### 5.5 \( A(1 ; 4), B(-2 ; -1) \)

\[
m_{AB} = \frac{-1 - 5}{-2 - 1} = \frac{5}{3}
\]

\[
\tan \alpha = \frac{5}{3}, \quad \alpha = 59,04^\circ
\]

\[
m_{AE} = -3
\]

\[
\tan \theta = -3, \quad \theta = 108,43^\circ
\]

**Antwoord**

\[
BAE = 108,43^\circ - 59,04^\circ = 49,39^\circ
\]

**Antwoord**

\[
CAE = 90^\circ + 49,39^\circ = 139,39^\circ
\]

### 5.6 \( C(-4 ; 7), A(1 ; 4), D(p ; 1) \)

\[
m_{AC} = \frac{-1}{3}
\]

\[
m_{AD} = \frac{1 - 4}{p - 1}
\]

\[
\frac{3}{5} = \frac{-3}{p - 1}
\]

\[
3p - 3 = 15
\]

\[
p = 6
\]

**Graad**

**Antwoord**

**Antwoord**

\[(3)\]
### VRAAG 6

#### 6.1 6.1.1

<table>
<thead>
<tr>
<th>OE(2; -1), O(0; 0)</th>
<th>Radius van die kleiner sirkel = OE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OE = ( 2^2 + (-1)^2 )</td>
<td>OE = ( \frac{5}{5} )</td>
</tr>
</tbody>
</table>

- Instelling
- Lengte van OE

\(OE = \frac{5}{2}\ \text{en} \ E(2; -1), D(a; -3)

\[OE = \frac{5}{2}\ \text{en} \ E(2; -1), D(a; -3)\]

**ED** = 2 \(\frac{5}{2}\)

**ED**\(^2\) = \((a - 2)^2 + (-3 + 1)^2\)

20 = \(a^2 - 4a + 4 + 4\)

\(a^2 - 4a - 12 = 0\)

\((a - 6)(a + 2) = 0\)

\(a = 6 \text{ of } a = -2\)

\(a = 6\)

- Lengte van ED
- Vergelyking in standaard vorm
- Faktore
- \(a = 6\)

\(OE = \text{en} \ E(2; -1), D(a; -3)

\[ED = 2 \left( \frac{5}{2} \right) \]

**ED**\(^2\) = \((a - 2)^2 + (-3 + 1)^2\)

20 = \(a^2 - 4a + 4 + 4\)

\(a^2 - 4a - 12 = 0\)

\((a - 6)(a + 2) = 0\)

\(a = 6 \text{ of } a = -2\)

\(a = 6\)

- Lengte van ED
- Vergelyking in standaard vorm
- Faktore
- \(a = 6\)

#### 6.1.2

**D(6; -3)**

\(r^2 = 20\)

\((x - 6)^2 + (y + 3)^2 = 20\)

- \(r^2 = 20\)
- \((x - 6)^2\)
- \((y + 3)^2\)

#### 6.1.3

\(|E(2; -1), D(6; -3), O(0; 0)|

**m\(_{OE}\)** = \(\frac{-1 - 0}{2 - 0} = \frac{1}{2}\)

**m\(_{raaklyn}\)** = 2

\(y + 1 = 2(x - 2)\)

\(y = 2x - 5\)

- Gradiënt van radius
- Gradiënt van raaklyn
- Instelling
- Antwoord

#### 6.1.4

\(|E(2; -1), D(6; -3), O(0; 0)|

\(x^2 + y^2 - 4x + 5y + k = 0\)

\(x^2 - 4x + 4 + y^2 + 5y + \frac{25}{4} = -k + 4 + \frac{25}{4}\)

\((x - 2)^2 + (y + \frac{5}{2})^2 = -k + \frac{41}{4}\)

Middelpunt \((2; -\frac{5}{2})\)

- Kwadraatsvoltooiing
- Faktor vorm
- x-waarde by middelpunt
- y-waarde by middelpunt

#### 6.2 6.2.1

\(|x^2 + y^2 - 4x + 5y + k = 0|

\(-k + \frac{41}{4} = 144\)

\(-4k = 576 - 41\)

\(k = \frac{-535}{4} = -133,75\)

- \(r^2 = 144\)
- vergelyking
- Antwoord

#### 6.2.2

middellyn = 24, dus radius = 12

\(-k + \frac{41}{4} = 144\)

\(-4k = 576 - 41\)

\(k = \frac{-535}{4} = -133,75\)

- \(r^2 = 144\)
- vergelyking
- Antwoord
### VRAAG 7

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7.1</strong></td>
<td>Refleksie in die y-as ((x = 0))</td>
<td>✓ reflleksie</td>
<td>✓ y-as () ((2))</td>
</tr>
</tbody>
</table>
| **7.2** | \((x ; y) \rightarrow (-y ; x)\)  
Aanvaar: Rotasie deur 90° antiklokgewys. | ✓ -y | ✓ x \(\) \((2)\) |
| **7.3** | \((x ; y) \rightarrow (-x ; y) \rightarrow (-y ; -x)\)  
\((x ; y) \rightarrow (-y ; -x)\)  
Aanvaar: Refleksie in die lyn \(y = -x\) | ✓ -y | ✓ -x \(\) \((2)\) |
| **7.4** | \(M''(2 ; 1), \ A''(6 ; 1), \ T''(6 ; 4), \ H''(4 ; 5), \ S''(2 ; 4)\)  
\(M''(4 ; 2), \ A''(12 ; 2), \ T''(12 ; 8), \ H''(8 ; 10), \ S''(4 ; 8)\)  
✓ Twee korrekte punte  
✓ Oorblywende 3 punte korrek  
✓ Diagram | ✓ | ✓ | ✓ \((3)\) |
| **7.5** | \((x ; y) \rightarrow (-y ; -x) \rightarrow (-2y ; -2x)\)  
\((x ; y) \rightarrow (-2y ; -2x)\) | ✓ -2y | ✓ -2x \(\) \((2)\) |
| **7.6** | As area van MATHS = \(a\), dan is area van \(M'''A'''T'''H'''S''' = 2 \times a\)  
Dus area van MATHS : area van \(M'''A'''T'''H'''S''' = 1 : 4\) | ✓ 1 | ✓ 4 \(\) \((2)\) |
| **7.7** | \((x ; y) \rightarrow (x - 4 ; y + 3)\) en M\((-1 ; -2)\)  
L\((-5 ; 1)\) | ✓ -5 | ✓ 1 \(\) \((2)\) |

\[15\]
VRAAG 8

8.1 \[ T' = \frac{5}{2}; -\frac{2}{2}, T(-3;2) \]

\[ x' = x \cos \theta - y \sin \theta \]

\[ -\frac{5}{2} = -3 \cos \theta - 2 \sin \theta \] ........................ (1)

\[ y' = y \cos \theta - x \sin \theta \]

\[ -\frac{2}{2} = 2 \cos \theta - 3 \sin \theta \] ........................ (2)

(1) \times 2 and (2) \times 3:

\[ -10 \frac{2}{2} = -6 \cos \theta - 4 \sin \theta \] ........................ (3)

\[ -3 \frac{2}{2} = 6 \cos \theta - 9 \sin \theta \] ........................ (4)

(3) + (4):

\[ -13 \sin \theta = \frac{-13 \frac{2}{2}}{2} \]

\[ \sin \theta = \frac{-2}{2} \]

\[ \theta = 45^\circ \]

\[ \beta = 146,31^\circ \]

\[ \theta + \beta = 191,31^\circ \]

\[ \theta = 45^\circ - 146,31^\circ \]

\[ \theta = 191,31^\circ - 146,31^\circ \]

\[ \theta = 45^0 \]

\[ \beta = 146,31^\circ \]

\[ \theta + \alpha = 180^\circ \]

\[ \alpha = 135^\circ \]
### VRAAG 9

| 9.1 | 9.1.1 | \(7 \cos \beta + 5 = 0\) en \(\tan \beta > 0\)  
|-----|------|------------------------------------------------|
|     |      | \(\cos \beta = -\frac{5}{7}\)  
|     |      | \(y^2 + (-5)^2 = (7)^2\)  
|     |      | \(y = -\frac{24}{5}\)  
|     |      | \(\tan \beta = -\frac{24}{5}\)  
|     |      | ✓ Diagram  
|     |      | ✓ \(y = -\frac{24}{5}\)  
|     |      | ✓ Antwoord  
|     |      | \(\text{(3)}\)  
| 9.2 |      | \(\cos 2x - \frac{1}{3} = \frac{1}{3} \sin x\)  
|     |      | \(1 - 2 \sin^2 x - \frac{1}{3} = \frac{1}{3} \sin x\)  
|     |      | \(6 \sin^2 x + \sin x - 2 = 0\)  
|     |      | \((3 \sin x + 2)(2 \sin x - 1) = 0\)  
|     |      | \(\sin x = -\frac{2}{3}\) of \(\sin x = \frac{1}{2}\)  
|     |      | \(x = 221.81^\circ + k.360^\circ\) of \(x = 318.19^\circ + k.360^\circ\) \((k \in \mathbb{Z})\)  
|     |      | OF  
|     |      | \(x = 30^\circ + k.360^\circ\) of \(x = 150^\circ + k.360^\circ\) \((k \in \mathbb{Z})\)  
| 9.1 | 9.1.2 | \(\sin(450^\circ + \beta) = \cos \beta\)  
|     |      | \(= -\frac{5}{7}\)  
|     |      | ✓ \(\cos \beta\)  
|     |      | ✓ Antwoord  
| 9.1 | 9.1.3 | \(\sin 2\beta = 2 \sin \beta \cos \beta\)  
|     |      | \(= 2 \times -\frac{24}{7} \times -\frac{5}{7}\)  
|     |      | \(= \frac{10}{49}\)  
|     |      | ✓ 2\sin\beta\cos\beta  
|     |      | ✓ Antwoord  
| 9.2 |      | \(1 - 2 \sin^2 x\)  
|     |      | ✓ Standaard vorm  
|     |      | ✓ Faktoren  
|     |      | ✓ waarden van \(\sin x\)  
|     |      | ✓ \(x = 221.81^\circ + k.360^\circ\)  
|     |      | ✓ \(x = 318.19^\circ + k.360^\circ\)  
|     |      | ✓ \(x = 30^\circ + k.360^\circ\)  
|     |      | ✓ \(150^\circ + k.360^\circ\)  
|     |      | \((k \in \mathbb{Z})\)  
| 9.2 |      | \(\text{(9)}\)  

\[16\]
### VRAAG 10

#### 10.1

\[
\begin{align*}
\tan 360^\circ - x \cdot \cos x - 90^\circ + \cos (540^\circ - x) &= \\
&= \tan x - \tan x \cdot \sin x - \cos x \\
&= \csc x \cdot \sin x - \cos x \\
&= -\sin^2 x - \cos^2 x \\
&= \sin x \cdot \cos x \\
&= -1 \\
&= \frac{1}{\sin x}
\end{align*}
\]

- \tan x
- \sin x
- \cos x
- \csc x
- \sin^2 x - \cos^2 x
- \sin x \cdot \cos x
- 1
- \frac{1}{\sin x}

#### 10.2

**10.2.1**

\[
LK = (\sin x + \cos x)^2 = \sin^2 x + 2 \sin x \cos x + \cos^2 x = 2 \sin x \cos x + 1 = RK
\]

- kwadreer
- Antwoord

**10.2.2**

\[
3 \sin 5\theta + 3 \cos 5\theta = 3(\sin 5\theta + \cos 5\theta) = 3 \sin 10\theta + 1 = \frac{3}{2}
\]

- gemene faktor
- vierkantswortel
- \sin 10\theta
- Antwoord

#### 10.3

\[
LK = \frac{\sin 2x + 1}{\cos 2x} = \frac{\sin^2 x + \cos^2 x}{\sin x \cos x - \sin^2 x} = \frac{\cos^2 x - \sin^2 x}{\sin x + \cos x} = \frac{\cos x - \sin x}{\cos x + \sin x} = RK
\]

- \sin^2 x + \cos^2 x
- 2\sin x \cos x
- \cos^2 x - \sin^2 x
- faktore

**OF gebruik 10.2.1**

- \cos^2 x - \sin^2 x
- faktore
VRAAG 11

| 11.1 | $x = -90°$ | ✓ $x = -90°$  
|      | $x = 90°$  | ✓ $x = 90°$  | (2) |
| 11.2 | $f(x) = \frac{1}{2} \tan x$  
|      | ✓ asimptote  
|      | ✓ x-afsnitte  
|      | ✓ vorm  
|      | $g(x) = \sin x + 1$  
|      | ✓ x-afsnit  
|      | ✓ y-afsnit  
|      | ✓ vorm  
|      | ✓ draaipunt  | (7) |
| 11.3 | $x = 0°$  
|      | ✓ $x = 0°$  
|      | ✓ $x = 180°$  | (2) |
| 11.4 | $f(45°) - g(30°)$  
|      | $= 0,5 - 1,5$  
|      | $= -1$  
|      | ✓ Instelling  
|      | ✓ Antwoord  | (2) |
| 11.5 | $m = -120°$  
|      | ✓ $m = -120°$  
|      | ✓ $m = 60°$  | (2) |
| 11.6 | $90°$  
|      | ✓ Antwoord  | (1) |

[16]
### VRAAG 12

| 12.1 | \( \text{UPQ} = 180^\circ - (\theta + \alpha) \)  \
|      | \( \sin \text{UPQ} = \sin 180^\circ - \theta + \alpha \)  \
|      | \( \therefore \sin \text{UPQ} = \sin (\theta + \alpha) \)  \
|      | √ \( \text{UPQ} = 180^\circ - (\theta + \alpha) \)  \
|      | √ Antwoord  \
|      | (2) |

| 12.2 | \( \text{UPQ} = 180^\circ - (\theta + \alpha) \) and \( \text{PQ} = 2t \)  \
|      | \( \frac{\text{UQ}}{\sin (\theta + \alpha) \sin \alpha} = \frac{2t}{\sin \alpha} \)  \
|      | \( \text{UQ} = \frac{2t \sin (\theta + \alpha)}{\sin \alpha} \)  \
|      | \( \sin \theta = \frac{t}{\text{QT}} \)  \
|      | \( \text{QT} = \frac{t}{\sin \theta} \)  \
|      | √ Sinusreël  \
|      | √ Instelling in sinusreël  \
|      | √ \( \text{UQ} = \frac{2t \sin (\theta + \alpha)}{\sin \alpha} \)  \
|      | √ Antwoord  \
|      | (5) |

| 12.3 | \( t = 3 \text{m}, \theta = 42^\circ \) en \( \alpha = 83^\circ \)  \
|      | \( \text{UQ} = \frac{2t \sin (\theta + \alpha)}{\sin \alpha} \)  \
|      | \( \text{UQ} = 2(3) \sin 83^\circ + 42^\circ \)  \
|      | \( \text{UQ} = \frac{2 \times 3 \times \sin 83^\circ + 42^\circ}{\sin 83^\circ} \)  \
|      | \( \text{UQ} = 4,95 \text{ m} \)  \
|      | √ Instelling  \
|      | √ Antwoord  \
|      | (4) |

|      | area of \( \triangle \text{UPQ} = \frac{1}{2} \times 4,95 \times 6 \times \sin 42^\circ \)  \
|      | \( = 9,94 \text{ m}^2 \)  \
|      | √ Instelling  \
|      | √ Antwoord  \


\[\text{[11]}\]

|      | TOTAAL: 150 |