



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

JAARLIKSE NASIONALE ASSESSERING

GRAAD 9

WISKUNDE

MEMORANDUM

STEL 1: 2012 VOORBEELD



GRAAD 9 WISKUNDE MEMORANDUM

REËLE GETALLESTELSE

1.1.1	$4^{1/2}$ - rasonaal	(1)																				
1.1.2	$\sqrt{2}$ - irrasonaal	(1)																				
1.1.3	0,2- rasonaal	(1)																				
1.2	<table border="1"><thead><tr><th>GETAL</th><th>RËEL</th><th>NIE - REËEL</th><th>ONGEDEFI NIEERD</th></tr></thead><tbody><tr><td>$\frac{0}{7}$</td><td>√</td><td></td><td></td></tr><tr><td>$\frac{7}{0}$</td><td></td><td></td><td>√</td></tr><tr><td>$\sqrt{7}$</td><td>√</td><td></td><td></td></tr><tr><td>$\sqrt{-7}$</td><td></td><td>√</td><td></td></tr></tbody></table>	GETAL	RËEL	NIE - REËEL	ONGEDEFI NIEERD	$\frac{0}{7}$	√			$\frac{7}{0}$			√	$\sqrt{7}$	√			$\sqrt{-7}$		√		(4)
GETAL	RËEL	NIE - REËEL	ONGEDEFI NIEERD																			
$\frac{0}{7}$	√																					
$\frac{7}{0}$			√																			
$\sqrt{7}$	√																					
$\sqrt{-7}$		√																				
1.3																						
1.3.1	$0,7 = \frac{7}{10}$	(1)																				
1.3.2	$0,13 = \frac{13}{100}$	(1)																				
1.3.3	$2,01 = \frac{201}{100} = 2\frac{1}{100}$	(1)																				
1.4.1	$2,5 \times 10^3 \times 7 = 1,75 \times 10^4$	(1)																				

1.4.2	0,007					(2)
1.4.3	$1,12 \times 10^{-4} \times 3 \times 10^{-2} = 3,36 \times 10^{-6}$					(2)
1.5.1	1,6					(1)
1.5.2	$-\sqrt{5}$					(1)
1.6						
1.6.1	0,152, 0,153, 0,154 enige een van die drie					(1)
1.6.2	0,71; 0,72; 0,73; 0,74; 0,75; 0,76; 0,77 enige een van die sewe					(1)
1.7.1	2 en 3					(2)
1.7.2	4 en 5					(2)
1.7.3	1 en 2					(2)
1.7.4	4 en 5					(2)
	NATUURLI KE GETAL	TELGETAL	HEELGE TAL	RASIONA LE GETAL	IRRASIO NALE GETAL	REËLE GETAL
$\frac{7}{15}$				√		√
$\sqrt{2\frac{1}{8}}$					√	√
$\sqrt[3]{0,081}$					√	√
2π					√	√
$-\sqrt{16}$			√	√		√
0,528				√		√
2,6				√		√
$\frac{6}{2}$	√	√	√	√		√

1.9.1	$0,6 < 0,625 < 0,75 < 0,8$	(1)
1.9.2	$0,2 < 0,2\dot{0} < 0,2 < 0,24$	(1)
1.9.3	$\sqrt{0,36} < \sqrt{0,366} < 0,6 < 0,69$	(1)
1.9.4	$\frac{-3}{2} < -\frac{5}{6} < -\frac{1}{6} < \frac{-2}{3}$	(1)
1.9.5	$-0,12 < -0,11 < -0,1 < -0,01$	(1)

FINANSIËLE WISKUNDE

1.1.	$\text{Verkoopsprys} = 22 \times R1,50 = R33$ $\text{Wins} = \text{Verkoopsprys} - \text{kosprys} = R33 - R20 = R13$			(3)
1.2.1				
a)	$18\% \text{ van } R75\,000 = R13\,500$			(2)
b)	$\begin{aligned} \text{Belasting} &= R12\,000 + 20\% \text{ van } (R97\,500 - R80\,000) \\ &= R12\,000 + R2\,100 \\ &= R14\,100 \end{aligned}$			(2)
c)	$\begin{aligned} \text{Belasting} &= R20\,000 + 25\% \text{ van } R30\,000 \\ &= R27\,500 \end{aligned}$			(2)
d)	$\begin{aligned} \text{Belasting} &= R42\,000 + 35\% \text{ van } R80\,000 \\ &= R70\,000 \end{aligned}$			(2)
1.2.2				
Belasbare inkomste	R140 000	R100 000	R230 000	
Belasting	R25 000	R16 000	R45 500	

1.3	$\text{Vermeerdering} : R1\,740 - R1500 = R240$ $\% \text{ vermeerdering} = \frac{R240}{R1500} \times 100 = 16$		(2)
1.4	$\begin{aligned} A &= P(1 + ni) \\ &= R1500(1 + 2(0,11)) \\ &= R1\,830 \end{aligned}$ <p>of</p>		

	$ER = \frac{Pnr}{100} = \frac{R1500 \times 2 \times 11}{100} = R330$ <p>Totale bedrag = $R1500 + R330 = R1\ 830$</p>		(2)
1.5.1	$\text{Belegging} = P(1 + i)^n$ $= R2\ 750 \left(1 + \frac{11,5}{100}\right)^7$ $= R5\ 891,92$		(3)
1.5.2	Rente verdien = $R5\ 891,92 - R2\ 750 = R3\ 141,92$		(1)
1.6			
1.6.1	$A = P(1 + i)^n$ $= R9500 \left(1 + \frac{12}{100 \times 4}\right)^{8 \times 4}$ $= R24\ 463,29$ <p>Rente = $R24\ 463,29 - R9\ 500$</p> $= R14\ 963,29$		(4)
1.6.2	$A = P(1 + i)^n$ $= R9500 \left(1 + \frac{8}{100 \times 2}\right)^{8 \times 2}$ $= R17\ 793,32$ <p>Rente = $R17\ 793,32 - R9\ 500$</p> $= R8293,32$		(4)
1.6.3	$A = P(1 + i)^n$ $= R9500 \left(1 + \frac{6,5}{100 \times 12}\right)^{8 \times 12}$ $= R15\ 956,86$ <p>Rente = $R15\ 956,86 - R9\ 500$</p> $= R6456,86$		(4)
1.6.4	$A = P(1 + i)^n$ $= R9500 \left(1 + \frac{7,25}{100}\right)^8$ $= R16630,37$		

	Rente = $R16630,37 - R9\ 500$ = $R7130,37$		(4)
--	---	--	-----

VERHOUDING EN KOERS

1.1	$\text{Spoed} = \frac{600}{2} = 300 \text{ km/h}$		(3)																		
1.2	<table border="1"> <tr> <td>Minute</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>20</td> </tr> <tr> <td>Koste</td> <td>R1,60</td> <td>R3,20</td> <td>R4,80</td> <td>R6,40</td> <td>R16,00</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Minute	2	4	6	8	20	Koste	R1,60	R3,20	R4,80	R6,40	R16,00								(3)
Minute	2	4	6	8	20																
Koste	R1,60	R3,20	R4,80	R6,40	R16,00																
1.3	<table border="1"> <tr> <td>Aantal mans</td> <td>Tyd</td> </tr> <tr> <td>5</td> <td>45</td> </tr> <tr> <td>9</td> <td>x</td> </tr> </table> <p> $x = \left(\frac{45 \times 5}{9}\right) = 25h$ of Tyd geneem deur 5 mans = $45h$ Tyd geneem deur 1 man = $(45 \times 5)h$ Tyd geneem deur 9 mans = $\left(\frac{45 \times 5}{9}\right) = 25h$ </p>	Aantal mans	Tyd	5	45	9	x		(3)												
Aantal mans	Tyd																				
5	45																				
9	x																				
1.4	<table border="1"> <tr> <td>Tyd</td> <td>Aantal ure</td> </tr> <tr> <td>8</td> <td>3</td> </tr> <tr> <td>2</td> <td>x</td> </tr> </table> <p> $2x = 8 \times 3$ $x = 12$ or In 8 ure aantal werkers = 3 In 1 uur aantal werkers = 3×8 In 2 ure aantal werkers = $3 \times 8 \div 2$ = 12 </p>	Tyd	Aantal ure	8	3	2	x		(3)												
Tyd	Aantal ure																				
8	3																				
2	x																				

1.5	<table border="1" data-bbox="320 230 834 347"> <thead> <tr> <th>AANTAL kg</th> <th>KOSTE in R</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>24</td> </tr> <tr> <td>7</td> <td>x</td> </tr> </tbody> </table> $\frac{x}{24} = \frac{7}{3}$ $x = \frac{7 \times 24}{3}$ <p>Koste = R56</p> <p>of</p> <p>Koste van 3kg = R24 Koste van 1kg = R24 ÷ 3 Koste van 7kg = R8 × 7 = R56</p>	AANTAL kg	KOSTE in R	3	24	7	x		(2)
AANTAL kg	KOSTE in R								
3	24								
7	x								
1.6.1	Direk eweredig.		(1)						
1.6.2	$y = 5x$		(1)						
1.6.3	$y = 5(25) = 125$		(1)						
1.7	<table border="1" data-bbox="320 1037 834 1193"> <thead> <tr> <th>KOSTE in R</th> <th>AANTAL APPELKOSE</th> </tr> </thead> <tbody> <tr> <td>5,60</td> <td>15</td> </tr> <tr> <td>10,08</td> <td>x</td> </tr> </tbody> </table> $\frac{15}{x} = \frac{R10,08}{R5,60}$ $x = \frac{R10,08 \times 15}{R5,60}$ $x = 27$	KOSTE in R	AANTAL APPELKOSE	5,60	15	10,08	x		(3)
KOSTE in R	AANTAL APPELKOSE								
5,60	15								
10,08	x								
1.8	Koste per l = $\frac{R605,50}{70} = R8,65$		(3)						
1.9	<table border="1" data-bbox="320 1628 834 1744"> <thead> <tr> <th>AANTAL kg</th> <th>KOSTE in R</th> </tr> </thead> <tbody> <tr> <td>0,35</td> <td>25,10</td> </tr> <tr> <td>1</td> <td>x</td> </tr> </tbody> </table> $\frac{x}{R25,10} = \frac{1}{0,35}$ $x = \frac{2510}{35}$ $= 71,714 \dots$ <p>Koste ~ R71,71</p>	AANTAL kg	KOSTE in R	0,35	25,10	1	x		(3)
AANTAL kg	KOSTE in R								
0,35	25,10								
1	x								

1.10	<table border="1" data-bbox="320 230 834 353"> <thead> <tr> <th>Aantal kg</th> <th>Koste in R</th> </tr> </thead> <tbody> <tr> <td>12,5</td> <td>90</td> </tr> <tr> <td>17,2</td> <td>x</td> </tr> </tbody> </table> $\frac{x}{90} = \frac{7,2}{12,5}$ $x = \frac{7,2 \times 90}{12,5}$ <p>Koste = R51,84</p>	Aantal kg	Koste in R	12,5	90	17,2	x		(3)
Aantal kg	Koste in R								
12,5	90								
17,2	x								
1.11	<table border="1" data-bbox="320 528 834 703"> <thead> <tr> <th>Afstand in km</th> <th>Aantal l</th> </tr> </thead> <tbody> <tr> <td>130</td> <td>6,5</td> </tr> <tr> <td>80</td> <td>x</td> </tr> </tbody> </table> $\frac{x}{6,5} = \frac{80}{130}$ $x = \frac{80 \times 6,5}{130}$ $x = 4$ <p>Aantal $l = 4$</p>	Afstand in km	Aantal l	130	6,5	80	x		(3)
Afstand in km	Aantal l								
130	6,5								
80	x								
1.12	<table border="1" data-bbox="320 1077 834 1256"> <thead> <tr> <th>AANTAL l</th> <th>AANTAL m^2</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>40</td> </tr> <tr> <td>1</td> <td>x</td> </tr> </tbody> </table> $\frac{x}{40} = \frac{1}{5}$ $x = \frac{1 \times 40}{5}$ $x = 8 m^2$	AANTAL l	AANTAL m^2	5	40	1	x		(3)
AANTAL l	AANTAL m^2								
5	40								
1	x								

SPOED/TYD/AFSTAND

1.1	$s \times t = a$ $120 \times t = 600$ $t = \frac{600}{120} h$ $t = 5 h$ <p>\therefore tyd is 5 ure.</p>		(2)																
1.2	$s \times t = a$ $s \times 8 = 600$ $s = \frac{600}{8} \text{ km/h.}$ $s = 75 \text{ km/h.}$ <p>\therefore Spoed is 75 km/h.</p>		(2)																
2.	<table border="1" data-bbox="320 927 1086 1151"> <thead> <tr> <th></th> <th>S (km/h)</th> <th>T (h)</th> <th>A (km)</th> </tr> </thead> <tbody> <tr> <td>Kar</td> <td>100</td> <td>x</td> <td>100x</td> </tr> <tr> <td>Vliegtuig</td> <td>300</td> <td>6-x</td> <td>300(6-x)</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> $100x + 300(6 - x) = 1200$ $100x + 1800 - 300x = 1200$ $-200x = -600$ $x = 3$ <p>Tyd geneem deur vliegtuig = $(6 - 3)h$ = $3h$</p>		S (km/h)	T (h)	A (km)	Kar	100	x	100x	Vliegtuig	300	6-x	300(6-x)						(3)
	S (km/h)	T (h)	A (km)																
Kar	100	x	100x																
Vliegtuig	300	6-x	300(6-x)																
3.	$x = (120 \times 1,5) \text{ km} = 180 \text{ km}$ $y = \left(\frac{343,75}{2,75}\right) \text{ km/h} = 125 \text{ km/h}$ $z = \left(\frac{660}{220}\right) h = 3h$		(3)																

4.		S (km/h)	T (h)	A (km)		
	Stap	5	0,5	2,5		
	Fiets	x	0,25	$0,25x$		
	$a = s \times t$ $= (5 \times 0,5) \text{ km}$ $= 2,5 \text{ km}$ $s \times 0,25 = 2,5$ $s = \frac{2,5}{0,25}$ $s = 10 \text{ km/h}$					(3)
5.1	Gemiddelde spoed = $\left(\frac{90}{12}\right) \text{ km/h}$ $= 7,5 \text{ km/h}$					(3)
5.2	Afstand = $s \times t$ $= (7,5 \times 6) \text{ km}$ $= 45 \text{ km}$					(1)
6	$s \times t = a$ $(P + 20)t = q$ $t = \left(\frac{q}{p+20}\right) h$					(3)

EKSPONENTE

1			
1.1	$99 \times 1001^0 = 99 \times 1 = 99$		(1)
1.2	$a^2 b^3 \times b^{-2} a^{-3} = a^{-1} b = \frac{b}{a}$		(1)
1.3	$\frac{a^4(b^2)^4}{a^{-3}b^5} = \frac{a^4b^8}{a^{-3}b^5} = a^7b^3$		(2)
1.4	$\frac{(8x^2)(-4x^{-2}y^3)}{(2x^{-1}y)^2} = \frac{-32x^{2-2}y^3}{4x^{-2}y^2}$ $= -8x^2y$		(3)
1.5	$\frac{2^{n+1}8^{n-1}}{2^{n-1}}$ $= \frac{2^{n+1}2^{3n-3}}{2^{n-1}}$ $= \frac{2^{3n-2}}{2^{n-1}}$ $= 2^{3n-1}$		(3)
1.6	$\frac{15^x \cdot 3^{x+1} \cdot 25^x}{9^{x+1} \cdot 125^x}$ $= \frac{3^x \cdot 5^x \cdot 3^{x+1} \cdot 5^{2x}}{3^{2x+2} \cdot 5^{3x}}$ $= \frac{3^{2x+1} \cdot 5^{3x}}{3^{2x+2} \cdot 5^{3x}}$ $= 3^{-1}$ $= \frac{1}{3}$		(4)
1.7	$(2p^2q^3) \times \frac{5p^0q}{q^5} = (2p^2q^3) \times \frac{5q}{q^5} = \frac{10p^2q^4}{q^5} = 10p^2q^{-1}$ $= \frac{10p^2}{q^1}$		(3)
1.8	$(x^{-3})(x^2) = x^{-3+2} = x^{-1} = \frac{1}{x}$		(1)
1.9	$(a^2 \cdot a^{-5} \cdot a^3) \div a^4 = a^0 \div a^4 = \frac{1}{a^4}$		(2)
1.10	$\frac{(3x^3y^2)^3(x^2y)^0}{(xy^3)^2} = \frac{27x^9y^6 \times 1}{x^2y^6} = 27x^{9-2}y^{6-6} = 27x^7$		(3)

PATRONE, FUNKSIES EN ALGEBRA

1.																											
1.1	90 en 69		(2)																								
1.2	36; 72; 108; 144; 180 ; 216		(2)																								
1.3	39; 48		(2)																								
1.2																											
2.1	Tel 6 by.		(1)																								
2.2	$T_n = 6n - 3$		(1)																								
2.3	$6n - 3 = 45$ $6n = 48$ $n = 8$ $T_8 = 45$		(1)																								
3.1	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Aantal panele</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>Aantal pale</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>Aantal plate</td> <td>6</td> <td>12</td> <td>18</td> <td>24</td> <td>30</td> <td>36</td> <td>42</td> </tr> </table>	Aantal panele	1	2	3	4	5	6	7	Aantal pale	2	3	4	5	6	7	8	Aantal plate	6	12	18	24	30	36	42		(2)
Aantal panele	1	2	3	4	5	6	7																				
Aantal pale	2	3	4	5	6	7	8																				
Aantal plate	6	12	18	24	30	36	42																				
3.2	$T_n = n + 1$		(2)																								
3.3	$T_n = 6n$		(2)																								
3.4	$T_{10}(pale) = 10 + 1 = 11$ $T_{10}(plate) = 6 \times 10 = 60$		(2)																								
4.	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>INVOER</th> <th>REËL</th> <th>UITVOER</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$-2n + 3$</td> <td>1</td> </tr> <tr> <td>2</td> <td></td> <td>-1</td> </tr> <tr> <td>3</td> <td></td> <td>-3</td> </tr> </tbody> </table>	INVOER	REËL	UITVOER	1	$-2n + 3$	1	2		-1	3		-3		(3)												
INVOER	REËL	UITVOER																									
1	$-2n + 3$	1																									
2		-1																									
3		-3																									

5.	<table border="1"> <thead> <tr> <th>INPUT</th> <th>REËL</th> <th>UITVOER</th> </tr> </thead> <tbody> <tr> <td>-2</td> <td></td> <td>7</td> </tr> <tr> <td>-1</td> <td></td> <td>1</td> </tr> <tr> <td>0</td> <td>$2x^2 - 1$</td> <td>-1</td> </tr> <tr> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>2</td> <td></td> <td>7</td> </tr> </tbody> </table>	INPUT	REËL	UITVOER	-2		7	-1		1	0	$2x^2 - 1$	-1	1		1	2		7		(5)
INPUT	REËL	UITVOER																			
-2		7																			
-1		1																			
0	$2x^2 - 1$	-1																			
1		1																			
2		7																			
6.1	$y = -2(0)^2 + 6(0) - 8 = -8$		(1)																		
6.2	$y = -2(-1)^2 + 6(-1) - 8 = -2 - 6 - 8 = -16$		(1)																		
6.3	$y = -2a^2 + 6a - 8$		(1)																		
6.4	$y = -2(a + 2)^2 + 6(a + 2) - 8$ $= -2(a^2 + 4a + 4) + 6a + 12 - 8$ $= -2a^2 - 8a - 8 + 6a + 4$ $= -2a^2 - 2a - 4$		(4)																		
7.																					
7.1	$y = 3^0 = 1$		(1)																		
7.2	$y = 3^3 = 27$		(1)																		
7.3	$y = 3^{-2} = \frac{1}{9}$		(1)																		

PRODUKTE

1.			
1.1	$6x - 3 - 5 = 6x - 8$		(2)
1.2	$5x - 6x + 3 = -x + 3$		(3)
1.3	$5x - 6x^2 + 3x = -6x^2 + 8x$		(3)
1.4	$a^2 - 9$		(2)
1.5	$9a^2 - 4$		(2)
1.6	$3(p^2 + 2p - 3) = 3p^2 + 6p - 9$		(3)
1.7	$-5(2p^4 + p^2q - q^2) = -10p^4 - 5p^2q + 5q^2$		(3)
1.8	$x^2 - 8x + 16$		(3)
1.9	$4x^2 - 12x + 9$		(3)
1.10	$3(16x^2 - 24x + 9) = 48x^2 - 72x + 27$		(3)
1.11	$a^2 - 5a + 6 - (a^2 + 4a + 4)$ $= -9a + 2$		(5)
1.12	$3a^2 - 6a - 12a^2 + 12a - 5a^2 + 10$ $= -14a^2 + 6a + 10$		(6)
1.13	$\frac{1}{3}(9x^2 - 1) - \frac{2}{3}(x^2 - 1)$ $= 3x^2 - \frac{1}{3} - \frac{2}{3}x^2 + \frac{2}{3}$ $= \frac{7}{3}x^2 + \frac{1}{3}$		(6)
1.14	$4(x^2 - \frac{1}{16}) - (x^2 + \frac{1}{2}x + \frac{1}{16})$ $= 4x^2 - \frac{1}{4} - x^2 - \frac{1}{2}x - \frac{1}{16}$ $= 3x^2 - \frac{1}{2}x - \frac{5}{16}$		(6)
1.15	$a(x^2y^2 - \frac{1}{a^2}) - a(x^2y^2 - \frac{2xy}{a} + \frac{1}{a^2})$ $= ax^2y^2 - \frac{1}{a} - ax^2y^2 + 2xy - \frac{1}{a}$ $= 2xy - \frac{2}{a}$		(6)

FAKTORE

1.			
1.1	$4(2a + 3b)$		(2)
1.2	$-5(2p + 3q)$		(2)
1.3	$p^2 + q$		(1)
1.4	$4(6a - 3b + 4)$		(2)
1.5	$p^3(p - 1)$		(2)
1.6	$-2x(1 + x^2)$		(2)
1.7	$2t^2(4t^2 - 5)$		(2)
1.8	$6x^2(x^4 - 2x^2 + 3)$		(2)
1.9	$4t^4(2t^8 - 3t^4 - 5) = 4t^4(2t^4 - 5)(t^4 + 1)$		(2)
1.10	$m(p - q) - n(p - q) = (p - q)(m - n)$		(3)
1.11	$(x - y)(t^2 + z^2)$		(3)
1.12	$x - y)(x + y)$		(2)
1.13	$a(a^2 - b^2) = a(a - b)(a + b)$		(3)
1.14	$(p^2 + t^2)(p^2 - t^2) = (p^2 + t^2)(p + t)(p - t)$		(3)
1.15	$(4q^8 + p^3)(4q^8 - p^3)$		(2)
1.16	$3(x^2 - 9y^2) = 3(x + 3y)(x - 3y)$		(3)
1.17	$\frac{1}{2}(x^2 - 4) = \frac{1}{2}(x - 2)(x + 2)$		(3)
1.18	$\frac{1}{8}(4q^2 - p^2) = \frac{1}{8}(2q - p)(2q + p)$ of $\frac{4q^2 - p^2}{8} = \frac{(2q - p)(2q + p)}{8}$		(3)
2.			
2.1	$(97 - 3)(97 + 3) = (94)(100) = 9400$		(2)
2.2	$(101 - 100)(101 + 100) = 1(201) = 201$		(2)
2.3	$(55 - 25)(55 + 25) = (30)(80) = 2400$		(2)
2.4	$(20,5 - 15,5)(20,5 + 15,5) = (5)(36) = 180$		(2)

VERGELYKINGS

1.			
1.1	$6a = 24$ $a = 4$		(2)
1.2	$a(a - 3) = 0$ $a = 0$ of $a = 3$		(3)
1.3	$22x + 4 = 9x - 12$ $7x = 16$ of $16 = 7x$ $x = \frac{16}{7}$ $\frac{16}{7} = x$		(2)
1.4	$\times 36: 9(x - 5) - 4(3 - 4x) = 468$ $9x - 45 - 12 + 16x = 468$ $25x = 525$ $x = 21$		(3)
1.5	$\times 15: 45x + 3x + 195 = 5(2x + 1)$ $48x + 195 = 10x + 5$ $38x = -190$ $x = -5$		(4)
1.6	$5^x = 5^4$ $\therefore x = 4$		(4)
1.7	$2^{-x} = 2^5$ $\therefore -x = 5$ $x = -5$		(2)
1.8	$3^{x+1} = 3^4$ $\therefore x + 1 = 4$ $x = 3$		(2)
2.1	$n + n + 1 + n + 2 = 78$ $3n + 3 = 78$ $3n = 75$ $n = 25$		(2)

	Die getalle is 25; 26; 27											
2.2	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>OUERDOM</th> <th>OUERDOM OOR 4 JAAR</th> </tr> </thead> <tbody> <tr> <td>Ben</td> <td>x</td> <td>$x + 4$</td> </tr> <tr> <td>Patrick</td> <td>$5x$</td> <td>$5x + 4$</td> </tr> </tbody> </table> <p> $5x + 4 = 3(x + 4)$ $5x + 4 = 3x + 12$ $2x = 8$ $x = 4$ </p> <p>Ben is 4 jaar oud en Patrick is 20 jaar oud.</p>		OUERDOM	OUERDOM OOR 4 JAAR	Ben	x	$x + 4$	Patrick	$5x$	$5x + 4$		(4)
	OUERDOM	OUERDOM OOR 4 JAAR										
Ben	x	$x + 4$										
Patrick	$5x$	$5x + 4$										
2.3	<p>Oppervlakte = $l \times b$</p> $-12a^6 + 6a^3 = -6a^3 \times b$ $b = \frac{-12a^6 + 6a^3}{-6a^3}$ $b = \frac{-6a^3(2a^3 - 1)}{-6a^3} m$ $b = (2a^3 - 1)m$		(4)									
2.4	<p>Oppervlakte = $l \times b$</p> $2x^2 - 8 = l \times (x + 2)$ $l = \frac{2x^2 - 8}{x + 2} m$ $l = \frac{2(x^2 - 4)}{x + 2} m$ $l = \frac{2(x + 2)(x - 2)}{x + 2} m$ $l = 2(x - 2)m$		(3)									
2.5	<p>$l = 2b$</p> <p>Oppervlakte = $l \times b = 32$</p> $2b \times b = 32$											

	$2b^2 = 32$ $b^2 = 16$ $b = \pm 4$ $b = 4 \quad (\text{want } b > 0)$ $\therefore b = 4m \text{ en } l = 2(4) = 8m$		(5)
--	---	--	-----

ONGELYKHEDE

1.			
1.1		(2)	
1.2		(2)	
1.3		(2)	
1.4		(2)	

1.5		(2)
2.		(2)
2.1	$x < 2$ en $x \in R$	(2)
2.2	$3 \leq x \leq 7$ en $x \in R$	(2)
2.3	$\sqrt{3} \leq x < 2,1$ en $x \in R$	(2)
2.4	$-3 \leq x \leq 0$ en $x \in Z$ of $-4 < x < 1$ en $x \in Z$	(2)
2.5	$x < -2$ of $x \geq 0$ $x \in R$	(2)

ALGEBRAÏESE BREUKE

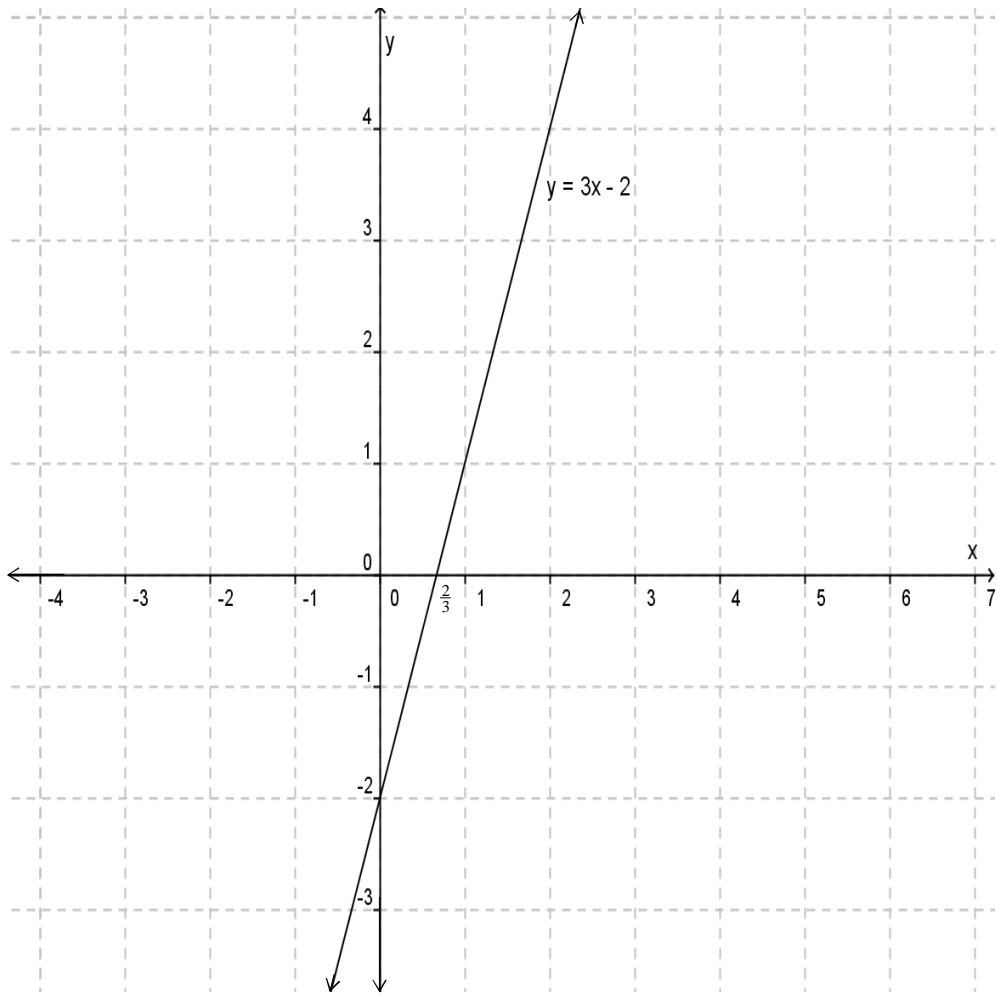
1.			
1.1	$2xy$		(2)
1.2	$x - y$		(2)
1.3	$\frac{3p^2q^4}{xy^2} \times \frac{2x^2y}{p^4q^2} \times \frac{y^2}{q^2} = \frac{6xy}{p^2}$		(5)
1.4	$\frac{x(x-4)}{4y} \times \frac{4xy}{xy(x-y)} \times \frac{y(y-1)}{x}$ $= \frac{(x-4)(y-1)}{(x-y)}$		(5)
1.5	$\frac{x}{2} + \frac{x}{2} = \frac{2x}{2} = x$		(1)

1.6	$\frac{3(7x-5)-2(10x-7)}{6}$ $= \frac{21x-15-20x+14}{6}$ $= \frac{x-1}{6}$		(3)
1.7	$\frac{5(6x+10)+6(3x-5)-180}{30}$ $= \frac{30x+50+18x-30-180}{30}$ $= \frac{48x-160}{30}$ $= \frac{16(3x-10)}{30}$ $= \frac{8(3x-10)}{15}$		(4)
1.8	$\frac{3(x-1)-(x+2)(x+1)}{(x-1)(x+1)} = \frac{3x-3-x^2-3x-2}{(x-1)(x+1)}$ $= \frac{-x^2-5}{(x-1)(x+1)}$		(4)

GRAFIEKE

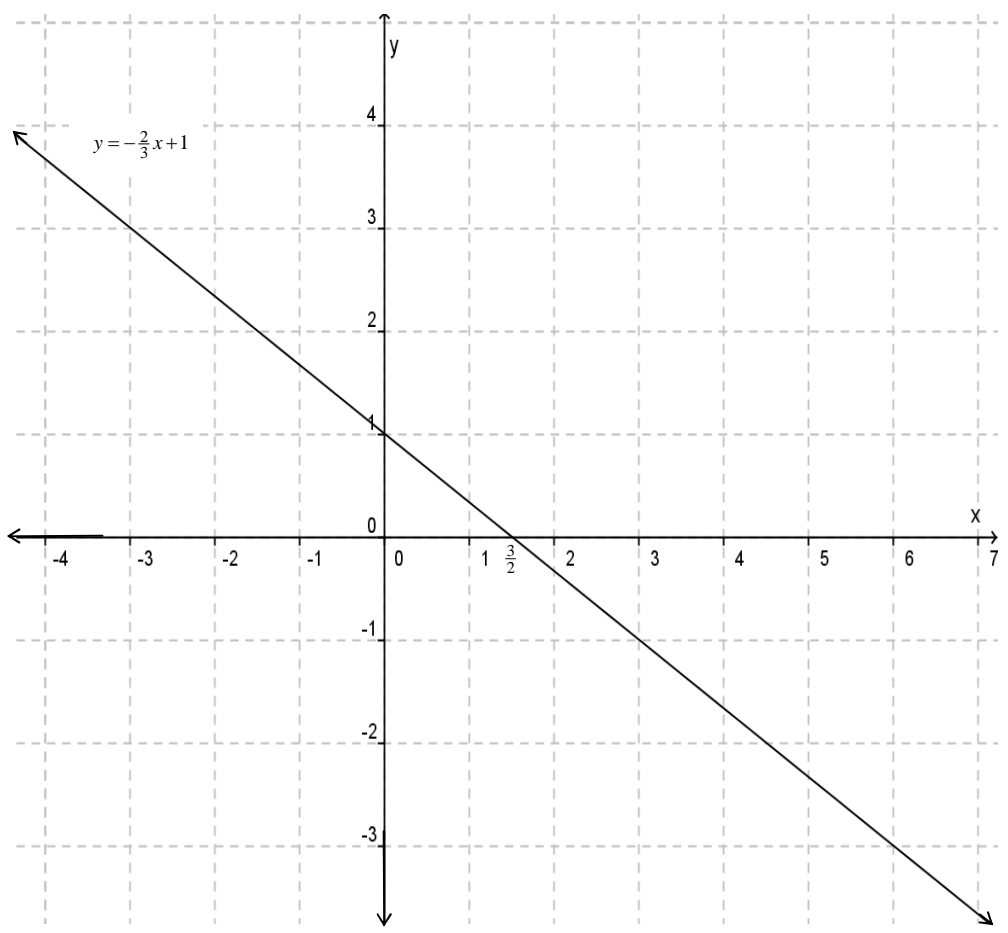
1.

1.1



(4)

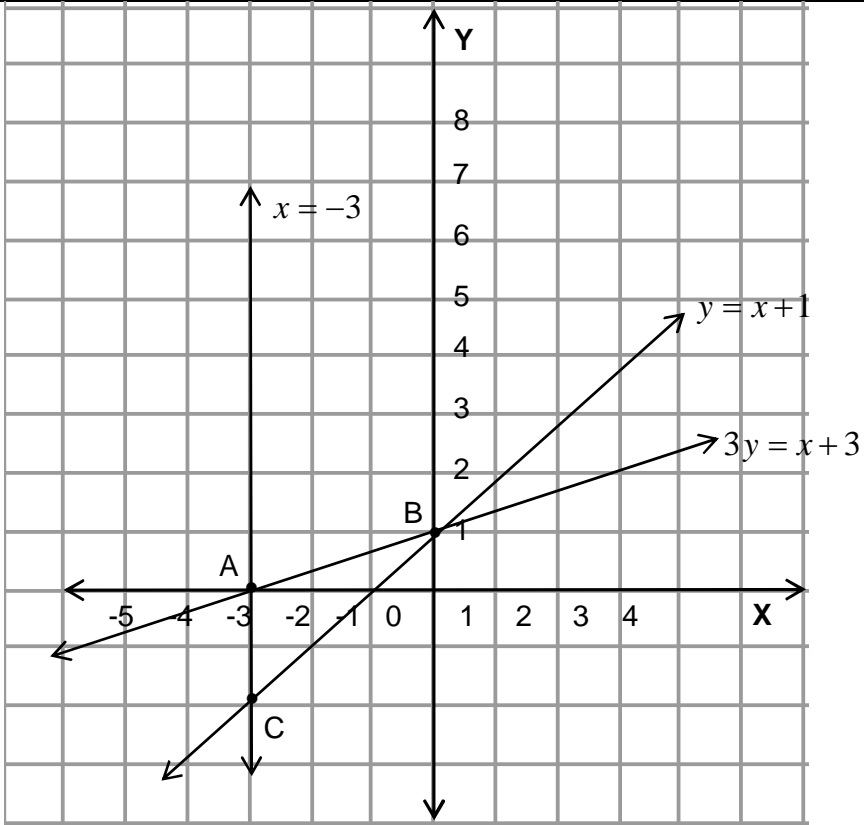
1.2



(4)

2.			
2.1	$y = -2x - 2$		(2)
2.2	$y = -2x + 3$		(2)
2.3	$y = \frac{1}{3}x + 1$		(2)

3.



(3)

4.

$$y = 2x + 2$$

(3)

RUIMTE EN VORM

1.1		
	A. Trapesium B. Oktagoon/agthoek C. Driehoek D. Reghoek E. Parallelogram	(5)
1.2	A. Silinder B. Reghoekige-basis piramide C. Kubus D. Driehoekige piramide	(4)
2.1	$E\hat{D}B$	(1)
2.2	70° Oos van Noord of 20° Noord van Oos of 70° Noord	(2)
3.	In ΔPQS en ΔRSQ $P\hat{Q}S = Q\hat{S}R = 90^\circ$ (gegee) QS is gemeenskaplik $PS = QR$ (gegee) $\therefore \Delta PQS \equiv \Delta RSQ$ (90° , skuinssy, sy)	(5)
4.	$AB^2 + BC^2 = AC^2$ (Pyth) $AB^2 + (3)^2 = (5)^2$ $AB^2 = 25 - 9 \text{ eenhede}^2$ $AB^2 = 16 \text{ eenhede}^2$ $AB = 4 \text{ eenhede}$ $AD = AB - DB$ $= 4 - \sqrt{7}$ $DC^2 = BD^2 + BC^2$ (Pyth) $= 7 + 9 \text{ eenhede}^2$ $= 16 \text{ eenhede}^2$ $DC = 4 \text{ eenhede}$	(5)

5.	$\widehat{L} + \widehat{M} = 180^\circ$ <p style="text-align: right;">(ko-binne $\angle e$, $KL \parallel NM$)</p> $\widehat{L} + 120^\circ = 180^\circ$ $\widehat{L} = 60^\circ$ $\widehat{L} + \widehat{T}_1 + \widehat{K}_2 = 180^\circ$ <p style="text-align: right;">(som van $\angle e$ van Δ)</p> <p>Maar $\widehat{T}_1 = \widehat{K}_2$</p> <p style="text-align: right;">($\angle e$ teenoor gelyke sye van Δ)</p> $\widehat{L} + 2\widehat{T}_1 = 180^\circ$ $60^\circ + 2\widehat{T}_1 = 180^\circ$ $2\widehat{T}_1 = 120^\circ$ $\therefore \widehat{T}_1 = 60^\circ$ $\widehat{M} + \widehat{T}_3 + \widehat{N}_3 = 180^\circ$ <p style="text-align: right;">(som van $\angle e$ van Δ)</p> <p>maar $\widehat{T}_3 = \widehat{N}_3$</p> <p style="text-align: right;">($\angle e$ teenoor gelyke sye van Δ)</p> $\widehat{M} + 2\widehat{T}_3 = 180^\circ$ $120^\circ + 2\widehat{T}_3 = 180^\circ$ $2\widehat{T}_3 = 60^\circ$ $\therefore \widehat{T}_3 = 30^\circ$ $\widehat{T}_1 + \widehat{T}_2 + \widehat{T}_3 = 180^\circ$ <p style="text-align: right;">(Suppl. $\angle e$ op reguitlyn of $L\widehat{T}M$ is gestrekte \angle)</p> $60^\circ + \widehat{T}_2 + 30^\circ = 180^\circ$ $\widehat{T}_2 = 180^\circ - 90^\circ = 90^\circ$	(4)
6.	$L\widehat{N}P = L\widehat{P}N$ <p style="text-align: right;">($\angle e$ teenoor gelyke sye)</p> $40^\circ + L\widehat{N}P + L\widehat{P}N = 180^\circ$ <p style="text-align: right;">(som van $\angle e$ van Δ)</p> $2L\widehat{P}N = 180^\circ - 40^\circ$ $2L\widehat{P}N = 140^\circ$ $L\widehat{P}N = 70^\circ$ $P\widehat{L}M = L\widehat{P}N = 70^\circ$ <p style="text-align: right;">(verw $\angle e$, $KM \parallel NP$)</p> $T\widehat{L}M + P\widehat{L}M = 180^\circ$ <p style="text-align: right;">(Suppl. $\angle e$ op reguitlyn of $K\widehat{L}M$ is gestrekte \angle)</p> $T\widehat{L}M = 180^\circ - 70^\circ$ $T\widehat{L}M = 110^\circ$	(6)

7.1	<p>In ΔPSQ en ΔRQS</p> <p>$SQ = SQ$ (gemeenskaplike sy)</p> <p>$\widehat{Q}_1 = \widehat{S}_1$ (verw. $< s, PQ SR$)</p> <p>$\widehat{S}_2 = \widehat{Q}_2$ (verw. $< s, PS QR$)</p> <p>$\therefore \Delta PSQ \equiv \Delta RQS$ ($<, <, s$)</p> <p>$\therefore PQ = SR$ en $PS = QR$ (ooreenk sye van kongruente Δe)</p>	(4)
7.2	<p>In ΔPMQ en ΔRMS</p> <p>$PQ = SR$ (bewys)</p> <p>$\widehat{Q}_1 = \widehat{S}_1$ (verw $< s, PQ SR$)</p> <p>$\widehat{P}_2 = \widehat{R}_2$ (verw. $< s, PS QR$)</p> <p>$\therefore \Delta PMQ \equiv \Delta RMS$ ($<, <, s$)</p> <p>$\therefore PM = MR$ en $SM = QM$ (ooreenk sye van kongruente Δe)</p>	(4)
7.3	Die hoeklyne van 'n parallellogram halveer mekaar	(1)
8.	<p>$\frac{PQ}{UV} = \frac{QR}{VW} = \frac{RS}{WX} = \frac{PS}{UX}$ (ewer. sye van gelykvormige vierhoeke)</p> <p>$\frac{PQ}{9} = \frac{7}{28}$</p> <p>$PQ = \frac{9 \times 7}{28} = 2,25$</p> <p>$\frac{6}{VW} = \frac{7}{28}$</p> <p>$VW = \frac{6 \times 28}{7} = 24$</p>	(6)
		(6)
9.	<p>In ΔKLO en ΔMNO</p> <p>$\widehat{L} = \widehat{M}$ (verw $< e, KL MN$)</p> <p>$\widehat{K} = \widehat{N}$ (verw $< e, KL MN$)</p>	

	$\widehat{O}_1 = \widehat{O}_2$ $\Delta KLO \parallel \Delta MNO$ $\therefore \frac{KL}{MN} = \frac{KO}{ON} = \frac{OL}{OM} \Delta$ $\therefore \frac{2}{6} = \frac{3}{ON}$ $ON = 9$ $\frac{2}{6} = \frac{2,5}{OM}$ $OM = 7,5$ $LM = OL + OM$ $LM = 2,5 + 7,5 = 10cm$	<p>(regoorstaande $< e$) ($<, <, <$)</p> <p>(ewer. sye van gelykvormige Δe)</p> <p>(5)</p>
--	--	---

TRANSFORMASIES

1.		(1)
1.1	$(-1; -4)$	(1)
1.2	$(3; -6)$	(1)
1.3	$(-3; -4)$	(1)
1.4	$(-4; 3)$	(4)
2.	Refleksie in die Y-as	
	Vertikale translasië	(2)
3.1	Refleksie in die Y-as.	(4)
3.2	Refleksie in die Y-as en dan refleksie in die X-as of refleksie in die X-as en dan refleksie in die Y-as .	(3)
4.	$A'(-6; 9) ; B'(3; 15) ; C'(15; -6)$	(1)
5.1		

		(1)
5.2		(1)

METING

1.		
1.1	Oppervlakte van $\Delta CED = \frac{1}{2}bh = \frac{1}{2} \times 3 \times 4 \text{ cm}^2 = 6 \text{ cm}^2$	(2)
1.2	Oppervlakte van $\Delta GBE = \frac{1}{2}bh = \frac{1}{2} \times 6 \times 4 \text{ cm}^2 = 12 \text{ cm}^2$	(3)
1.3	Oppervlakte van ABEG = $\frac{1}{2}(AD + GE)BF$	(3)

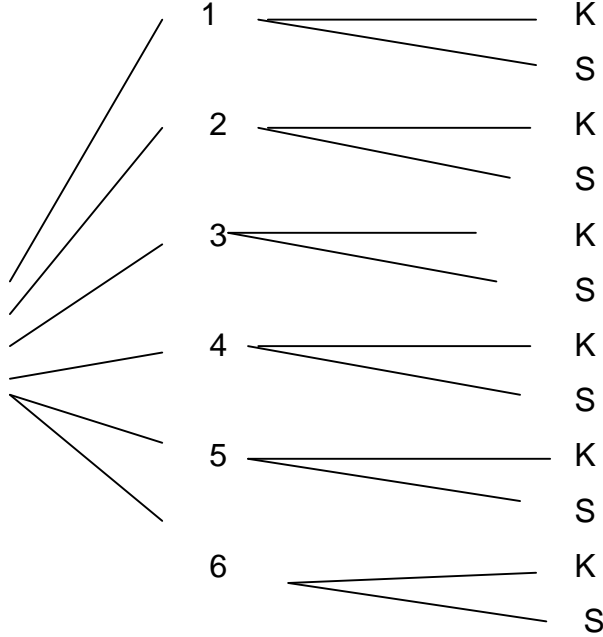
	$= \frac{1}{2}(9 + 6)4 \text{ cm}^2$ $= 30 \text{ cm}^2$	
1.4	Oppervlakte van BDEG = $b \times h = 6 \times 4 = 24 \text{ cm}^2$	(3)
1.5	$BE^2 = BC^2 + EC^2 \quad (\text{Pyth.})$ $= 3^2 + 4^2 \text{ cm}^2$ $= 9 + 16 \text{ cm}^2$ $= 25 \text{ cm}^2$ $\therefore BE = 5 \text{ cm}$	
1.6.1	Omtrek van $\triangle GBE = (5 + 5 + 6) \text{ cm} = 16 \text{ cm}$	(2)
1.6.2	Omtrek van ADEG = $(9 + 5 + 6 + 4) \text{ cm} = 24 \text{ cm}$	(4)
2.	$BC^2 = AB^2 + AC^2 \quad (\text{Pyth})$ $= 49 + 120 \text{ eenhede}^2$ $= 169 \text{ eenhede}^2$ $BC = 13 \text{ eenhede}$ $\text{Area} = \frac{1}{2}\pi r^2$ $= \left(\frac{1}{2} \times \pi \times \left(\frac{13}{2}\right)^2\right) \text{ eenhede}^2$ $= 66,36 \text{ eenhede}^2$	(3)
3.1	Totale buite-oppervlakte $= 2(8 \times 12) + 2(12 \times 18) + 2(8 \times 18) \text{ cm}^2 = 912 \text{ cm}^2$	(6)
3.2	Volume = $l \times b \times h$ $= (8 \times 12 \times 18) \text{ cm}^3$ $= 1728 \text{ cm}^3$	(3)
4.	Volume van silinder = $\pi r^2 h$ $550 = \frac{22}{7} \times (5)^2 \times h$ $h = \frac{550 \times 7}{22 \times (5)^2} \text{ cm}$ $h = 7 \text{ cm}$	(4)
5.	Volume = $l \times b \times h$ $50 \times 30 \times h = 24000 \text{ cm}^3$	

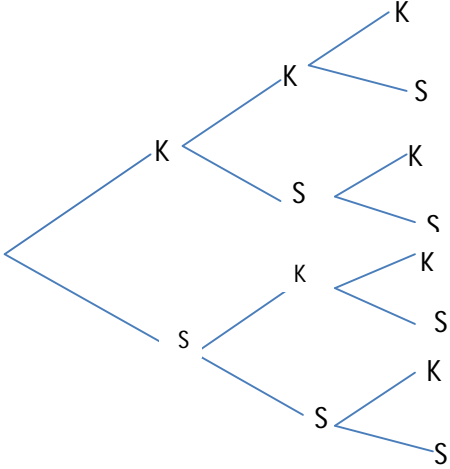
	$h = \left(\frac{24000}{50 \times 30}\right) \text{ cm}$ $h = 16 \text{ cm}$	(3)
--	--	-----

DATAHANTERING

1.																	
1.1	20 30 30 40 50 50 60 70 70 70 70 80 80 90 100	(1)															
1.2																	
1.2.1	Mediaan = 70	(1)															
1.2.2	Modus = 70	(1)															
1.2.3	Omvang = $100 - 20 = 80$	(1)															
1.2.4	Gemiddeld = $\frac{910}{15} = 60,67$ tot 2 desimale plekke	(2)															
2.																	
2.1	24 passasiers	(1)															
2.2	Omvang = $70 - 1 = 69$	(1)															
2.3	Gemiddeld = $\frac{641}{24} = 26,7 = 27$	(3)															
2.4	<table border="1"> <thead> <tr> <th>OUDERDOM IN JARE</th> <th>TELMERKIES</th> <th>FREKWENSIE</th> </tr> </thead> <tbody> <tr> <td>1 - 13</td> <td>IIIH</td> <td>7</td> </tr> <tr> <td>14 - 26</td> <td>III</td> <td>3</td> </tr> <tr> <td>27 - 39</td> <td>IIIH</td> <td>8</td> </tr> <tr> <td>40 - 70</td> <td>IIIH</td> <td>6</td> </tr> </tbody> </table>	OUDERDOM IN JARE	TELMERKIES	FREKWENSIE	1 - 13	IIIH	7	14 - 26	III	3	27 - 39	IIIH	8	40 - 70	IIIH	6	(4)
OUDERDOM IN JARE	TELMERKIES	FREKWENSIE															
1 - 13	IIIH	7															
14 - 26	III	3															
27 - 39	IIIH	8															
40 - 70	IIIH	6															
2.4.1	27-39	(1)															

2.4.2	18 passasiers	(1)		
3.				
3.1	22	(1)		
3.2	Omvang= 15 – 2 = 13	(1)		
3.3	SKOENGROOTTES	TELMERKIES	FREKWENSIE	(4)
	1 - 5	—	4	
	6 - 10	—	12	
	11 - 15	—	6	
4.				
4.1	18 babas	(2)		
4.2	15 babas	(1)		
4.3	11-15 maande	(1)		
5.		(2)		
5.1	DOBBLESTEEN	MUNTSTUK	UITKOMSTE	(6)
	1	K	1K	
		S	1S	
	2	K	2K	
		S	2S	
	3	K	3K	
		S	3S	
	4	K	4K	
S		4S		
5	K	5K		
	S	5S		
6	K	6K		
	S	6S		

5.2		(2)
5.3.1	$\frac{1}{12}$	(1)
5.3.2	$\frac{3}{12} = \frac{1}{4}$	(1)
6		(1)
6.1	$\frac{1}{10}$	(1)
6.2	$\frac{1}{10}$	(1)
6.3	$\frac{2}{10} = \frac{1}{5}$	
7.		(1)
7.1	$\frac{18}{30} = \frac{3}{5}$	(1)
7.2	$\frac{12}{30} = \frac{2}{5}$	
8.		(1)
8.1	3	(1)
8.2.1	$\frac{3}{10}$	(1)

8.2.2	$\frac{2}{10} = \frac{1}{5}$	(1)
8.2.3	$\frac{1}{10}$	(1)
		(1)
9.		(4)