Graad 9 – Boek A

(Onderwysers Handleiding)

(Hersiene KABV-uitgawe)

INHOUD:

Hierdie boek is deur EJ Du Toit opgestel en verwerk in 2013.

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Hoofstuk A1

Reële getalle

A1.1 Getallestelsels:

Voltooi: * Natuurlike getalle: $\mathbb{N} = \{1; 2; 3; 4; ---\}$
* Telgetalle: $\mathbb{N}_0 = \{0; 1; 2; 3; 4; ---\}$
* Heelgetalle: $\mathbb{Z} = \{---; -2; -1; 0; 1; 2; ---\}$
* Rasionale getalle: $\mathbb{Q} = \{a/b \mid a, b \in \mathbb{Z}; b \neq 0\}$

A1.2 Irrasionale getalle:

Hierdie getalle is oneindige, nie-repeterende desimale breuke:

Vb. 1 Irrasionale getalle:

* $\sqrt{2}$ *of* $\sqrt{7}$ *of* $\sqrt{\frac{3}{4}}$ *ens. want 2 ; 7 en 3 is nie volkome vierkante nie!*

* $\sqrt[3]{12}$ *of* $\sqrt[3]{100}$ *ens. want 12 en 100 is nie volkome derdemagte nie!*

Waar die volgende rasionale getalle is:

* $\sqrt{4}$ *of* $\sqrt{0{,}01}$ *of* $\sqrt{\frac{25}{9}}$ *ens. want 4 ; 0,01 ; 25 en 9 is volkome vierkante!*

* $\sqrt[3]{27}$ *of* $\sqrt[3]{125}$ *ens. want 27 en 125 is volkome derdemagte!*

Die reële getalle $\mathbb{R}$ bestaan uit die rasionale getalle $\mathbb{Q}$ en die irrasionale getalle $\mathbb{Q}'$. Onthou dat alle eindige en repeterende desimale breuke rasionale getalle is.

Oefening 1:

Watter van die volgende getalle is rasionale getalle $\mathbb{Q}$ en watter is irrasionale getalle $\mathbb{Q}'$?

(1) 14
(2) $\frac{1}{5}$
(3) $\sqrt{81}$
(4) $0{,}12$
(5) $\sqrt{18}$
(6) $12{,}\dot{2}\dot{3}$
(7) $-\sqrt{\frac{12}{3}}$
(8) $0{,}2945\ldots$
(9) $\sqrt[3]{64}$
(10) π
(11) $\sqrt[5]{32}$
(12) $\frac{11}{7}$

☺ **Watter van die volgende getalle is irrasionale getalle tussen 2 en 10?**

$\sqrt{10}$	$-\sqrt{20}$	$\sqrt{32}$	π	$\sqrt{25}$	$\sqrt[3]{9}$	$3{,}\dot{2}$	$\sqrt{99}$	$2{,}15$	$\sqrt{\frac{18}{2}} = \sqrt{9} = 3$
✓	X	✓	✓	X	✓	X	✓	X	X

A1.3 Herleiding van gewone breuke na desimale breuke:

Vb. 2 Druk die volgende as desimale breuke uit sonder om 'n sakrekenaar te gebruik:

(a) $\frac{3}{8} = \frac{3{,}000\ldots}{8} = \frac{3{,}{}^{3}0{}^{6}0{}^{4}0}{8} = \underline{0{,}375}$

(b) $1\frac{2}{3} = 1\frac{2{,}000}{3} = 1\frac{2{,}{}^{2}0{}^{2}0{}^{2}0\ldots}{3} = 1{,}6666\ldots = \underline{1{,}\dot{6}}$

Oefening 2: Datum: ____________________

Druk die volgende as desimale breuke uit sonder om 'n sakrekenaar te gebruik:

(1) $\frac{23}{7}$

$= \frac{23{,}{}^{2}0{}^{6}0{}^{4}0}{7} = \underrightarrow{3{,}285\ldots}$

(2) $1\frac{1}{3}$

$= 1\,\frac{1{,}{}^{1}0{}^{1}0{}^{1}0}{3} = 1{,}333\ldots = \underrightarrow{1{,}\dot{3}}$

(3) $\frac{-2}{12}$

$= \frac{-2{,}{}^{2}0{}^{8}0{}^{8}0}{12} = -0{,}166\ldots = \underrightarrow{-0{,}1\dot{6}}$

(4) $\frac{3}{5}$

$= \frac{3{,}{}^{3}0}{5} = \underrightarrow{0{,}6}$

(5) $\frac{1}{8}$

$= \frac{1{,}{}^{1}0{}^{2}0{}^{4}0}{8} = \underrightarrow{0{,}125}$

(6) $\frac{7}{9}$

$= \frac{7{,}{}^{7}0{}^{7}0{}^{7}0}{9} = 0{,}777\ldots = \underrightarrow{0{,}\dot{7}}$

(7) $\frac{17}{25}$

$= \frac{17{,}{}^{17}0\;{}^{20}0}{25} = \underrightarrow{0{,}68}$

(8) $\frac{5}{100}$

$= \underrightarrow{0{,}05}$

(9) $\frac{4}{11}$

$= \frac{4{,}{}^{4}0{}^{7}0{}^{4}0}{11} = 0{,}3636\ldots = \underrightarrow{0{,}\dot{3}\dot{6}}$

(10) $-3\frac{6}{7}$

$= -3\,\frac{6{,}{}^{6}0{}^{4}0{}^{5}0}{7} = \underrightarrow{-3{,}857\ldots}$

(11) $-5\frac{5}{6}$

$= -5\,\frac{5{,}{}^{5}0{}^{2}0{}^{2}0}{6} = -5{,}833\ldots = \underrightarrow{-5{,}8\dot{3}}$

(12) $\frac{11}{4}$

$= \frac{11{,}{}^{3}0{}^{2}0\,0}{4} = \underrightarrow{2{,}75}$

☺ **Jy het $^{14}/_{30}$ vir 'n wiskundetoets gekry. Bereken jou persentasie.**

$\% = \frac{14}{3\cancel{0}} \times \frac{10\cancel{0}}{1} = \frac{140}{3}$

$= \frac{1{}^{1}4{}^{2}0{,}{}^{2}0{}^{2}0}{3} = 46{,}66\ldots \approx \underrightarrow{47\,\%}$

A1.4 Herleiding van desimale breuke na gewone breuke:

Vb. 3 Druk die volgendeas gewone breuke uit: (a) $4{,}5 = 4\frac{5}{10}(\div\frac{5}{5}) = \underline{4\frac{1}{2}}$

(b) $-0{,}12 = -\frac{12}{100}(\div\frac{4}{4}) = \underline{-\frac{3}{25}}$

Oefening 3: Datum: ____________________

Druk die volgende as gewone breuke in hulle eenvoudigste vorm uit:

(1) 2,4

$= 2\frac{4}{10} = \underrightarrow{2\frac{2}{5}} \quad (\div\frac{2}{2})$

(2) 0,25

$= \frac{25}{100} = \underrightarrow{\frac{1}{4}} \quad (\div\frac{25}{25})$

(3) 33.6

$= 33\frac{6}{10} = \underrightarrow{33\frac{3}{5}} \quad (\div\frac{2}{2})$

(4) -0,5

$= -\frac{5}{10} = \underline{\underline{-\frac{1}{2}}} \quad (\div\frac{5}{5})$

(5) -1,2

$= -1\frac{2}{10} = \underrightarrow{-1\frac{1}{5}} \quad (\div\frac{2}{2})$

(6) 0,125

$= \frac{125}{1\,000} = \underrightarrow{\frac{1}{8}} \quad (\div\frac{125}{125})$

(7) 5,02

$= 5\frac{2}{100} = \underrightarrow{5\frac{1}{50}} \quad (\div\frac{2}{2})$

(8) 7,3

$= \underrightarrow{7\frac{3}{10}}$

(9) 100,75

$= 100\frac{75}{100} = 100\frac{3}{4} \quad (\div\frac{25}{25})$

(10) 0,0005

$= \frac{5}{10\,000} = \frac{1}{2\,000} \quad (\div\frac{5}{5})$

(11) -2,1

$= \underrightarrow{-2\frac{1}{10}}$

(12) 1,45

$= 1\frac{45}{100} = \underrightarrow{1\frac{9}{20}} \quad (\div\frac{5}{5})$

☺ **Jy en jou maats eet 0,84 van jou verjaarsdagkoek op. Bereken watter gedeelte van die koek oorgebly het. (Druk jou antwoord as 'n gewone breuk uit!)**

$1 - 0{,}84$

$= 0{,}16$ het oorgebly

$\therefore 0{,}16 = \frac{16}{100} \div \frac{4}{4}$

$= \underrightarrow{\frac{4}{25}}$

A1.5 Herleiding van repeterende breuke na gewone breuke:

Vb. 4 Herlei die volgende na 'n gewone breuk in sy eenvoudigste vorm:

(a) $0,\dot{1} = ?$ Laat $0,\dot{1} = x$

$$\begin{aligned} \therefore \quad 10x &= 1,11111.....\\ -x &= 0,11111.....\\ \therefore \quad 9x &= 1\\ \therefore \quad x &= \underline{\tfrac{1}{9}} \end{aligned}$$

(b) $3,\dot{2}\dot{4} = ?$ Laat $3,\dot{2}\dot{4} = x$

$$\begin{aligned} \therefore \quad 100x &= 324,2424.....\\ -x &= 3,2424.....\\ \therefore \quad 99x &= 321\\ \therefore \quad x &= \frac{321}{99} = \frac{107}{33} = \underline{3\tfrac{8}{33}} \end{aligned}$$

Oefening 4: Datum: ____________________

Herlei die volgende na gewone breuke in hulle eenvoudigste vorm:

(1) $4,\dot{6}$

V/s $4,\dot{6} = x$

$$\begin{aligned} \therefore \quad 10x &= 46,66---\\ -1x &= 4,66---\\ 9x &= 42\\ x &= \frac{42}{9}\\ x &= 4\frac{6}{9} = \underline{4\tfrac{2}{3}} \end{aligned}$$

(2) $0,\dot{1}\dot{5}$

V/s $0,\dot{1}\dot{5} = x$

$$\begin{aligned} \therefore \quad 100x &= 15,1515---\\ -1x &= 0,1515----\\ 99x &= 15\\ x &= \frac{15}{99}\\ \underline{x} &\underline{= \tfrac{5}{33}} \end{aligned}$$

(3) $12,3\dot{7}$

V/s $12,3\dot{7} = x$

$$\begin{aligned} \therefore \quad 100x &= 1\,237,77---\\ -10x &= 123,77---\\ 90x &= 1\,114\\ x &= \frac{1\,114}{90}\\ x &= 12\frac{34}{90} = \underline{12\tfrac{17}{45}} \end{aligned}$$

(4) $1,\dot{1}3\dot{5}$ or $1,\overline{135}$

V/s $1,\dot{1}\dot{3}\dot{5} = x$

$$\begin{aligned} \therefore \quad 1\,000x &= 1\,135,135---\\ -1x &= 1,135---\\ 999x &= 1\,134\\ x &= \frac{1\,134}{999}\\ x &= 1\frac{135}{999} = \underline{1\tfrac{5}{37}} \end{aligned}$$

(5) $0,\dot{9}$

V/s $0,\dot{9} = x$

$$\begin{aligned} \therefore \quad 10x &= 9,99---\\ -1x &= 0,99----\\ 9x &= 9\\ x &= \frac{9}{9}\\ \underline{x} &\underline{\approx 1} \end{aligned}$$

(6) $0,00\dot{3}$

V/s $0,00\dot{3} = x$

$$\begin{aligned} \therefore \quad 1\,000x &= 3,333---\\ -100x &= 0,333---\\ 900x &= 3\\ x &= \frac{3}{900}\\ \underline{x} &\underline{= \tfrac{1}{300}} \end{aligned}$$

(7) $2,\dot{2}$

V/S $2,\dot{2} = x$

$\therefore \quad 10x = 22,22\ldots$

$- \quad 1x = 2,22\ldots$

$9x = 20$

$x = \frac{20}{9}$

$x = 2\frac{2}{9}$

(8) $3,2\dot{5}\dot{8}$

V/S $3,2\dot{5}\dot{8} = x$

$\therefore \quad 1\,000\,x = 3\,258,58\ldots$

$- \quad 10\,x = 32,58\ldots$

$990\,x = 3\,226$

$x = \frac{3\,226}{990}$

$x = 3\frac{256}{990}$

$x = 3\frac{128}{495}$

(9) $0,0\dot{2}$

V/S $0,0\dot{2} = x$

$\therefore \quad 100x = 2,22\ldots$

$- \quad 10x = 0,22\ldots$

$90x = 2$

$x = \frac{2}{90}$

$x = \frac{1}{45}$

(10) $1,\overline{214}$

V/S $1,\overline{214} = x$

$\therefore \quad 1000x = 1\,214,214\ldots$

$- \quad 1x = 1,214\ldots$

$999x = 1\,213$

$x = \frac{1\,213}{999}$

$x = 1\frac{214}{999}$

☺ **Watter van die volgende is die grootste: 0,251 of $0,\dot{2}\dot{5}$?**

$0,251$

$= \frac{251}{1000}$

$= \frac{24\,849}{99\,000} \quad \left(\times \frac{99}{99}\right)$

V/S $0,\dot{2}\dot{5} = x$

$\therefore \quad 100x = 25,25\ldots$

$- \quad 1x = 0,25\ldots$

$99x = 25$

$x = \frac{25}{99}$

$x = \frac{25\,000}{99\,000} \quad \left(\times \frac{1000}{1000}\right)$

$\therefore 0,\dot{2}\dot{5}$ is groter!

A1.6 Voostelling van versamelings van getalle:

Versamelings van getalle kan op die volgende maniere geskryf of voorgestel word:

A1.6.1 Versamelingskeurdernotasie:

Vb. 5 Skryf die volgende versamelings van getalle in versamelingskeurdernotasie:

(a) Alle natuurlike getalle groter as 6: $\{x \,/\, x > 6 \; ; \; x \in \mathbb{N}\}$

(b) Alle reële getalle tussen -2 en 5: $\{m : -2 < m < 5 \; ; \; m \in \mathbb{R}\}$

Oefening 5: Datum: ____________

Skryf die volgende versamelings van getalle in versamelingskeurdernotasie:

(1) Die reële getalle tussen 1 en 6: $\{x / 1 < x < 6 ; x \in \mathbb{R}\}$

(2) Die telgetalle kleiner as 10: $\{p / p < 10 ; p \in \mathbb{N}_0\}$

(3) Die reële getalle vanaf -2 tot en met 3: $\{y / -2 \leq x \leq 3 ; y \in \mathbb{R}\}$

(4) Die natuurlike getalle groter as 4: $\{x : x > 4 ; x \in \mathbb{N}\}$

(5) $\{-8; -7; -6; -5; -4; -3; -2; -1\}$: $\{x : -8 \leq x \leq -1 ; x \in \mathbb{Z}\}$

(6) $\{17; 18; 19; \ldots\ldots\ldots\}$: $\{m / m \geq 17 ; m \in \mathbb{N}\}$ of $\mathbb{N}_0$ of $\mathbb{Z}$

(7) Die reële getalle groter as -20 maar kleiner as of gelyk aan 1: $\{x / -20 < x \leq 1 ; x \in \mathbb{R}\}$

(8) $\{\ldots\ldots; -6; -5; -4; -3\}$: $\{p / p \leq -3 ; p \in \mathbb{Z}\}$

(9) Alle ewe heelgetalle tussen 0 en 20: $\{2x / 0 < 2x < 20 ; x \in \mathbb{Z}\}$ of $\mathbb{N}_0$

(10) $\{-1; 0; 1\}$: $\{m / -1 \leq m \leq 1 ; m \in \mathbb{Z}\}$

A1.6.2 Intervalnotasie:

Slegs versamelings wat deel van die reële getalle uitmaak, kan in intervalnotasie geskryf word!

Vb. 6 Skryf die volgende in intervalnotasie:

(a) Die reële getalle tussen -2 en 4 met 4 ingesluit: $x \in (-2 ; 4]$ *Oop, geslote interval!*

(b) $\{m / m > 7 ; m \in \mathrm{R}\}$: $m \in (7 ; \infty)$ *Oop interval!*

Oefening 6: Datum: ____________

Skryf die volgende in intervalnotasie:

(1) Die reële getalle tussen -2 en 15: $x \in (-2 ; 15)$

(2) Die reële getalle kleiner as 10: $x \in (-\infty ; 10)$

(3) Die reële getalle vanaf -2 tot en met 3: $m \in [-2 ; 3]$

(4) $\{x / -7 < x \leq 0; x \in \mathrm{R}\}$: $x \in (-7 ; 0]$

(5) $\{y / y \leq 17; y \in \mathrm{R}\}$: $y \in (-\infty ; 17]$

(6) $\{p / -1 < p < 1; p \in \mathrm{R}\}$: $p \in (-1 ; 1)$

(7) Die reële getalle groter as -8 maar kleiner as of gelyk aan 11: $x \in (-8 ; 11]$

(8) $\{x / 3 < x \leq 8; x \in \underline{\underline{N}}\}$: Nut

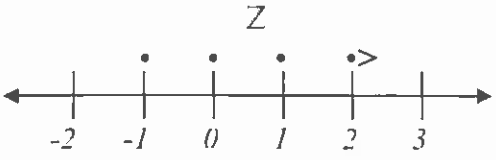
(9) Die versameling reële getalle: $x \in (-\infty ; \infty)$

(10) $\{t / t > 0; t \in \mathrm{R}\}$: $t \in (0 ; \infty)$

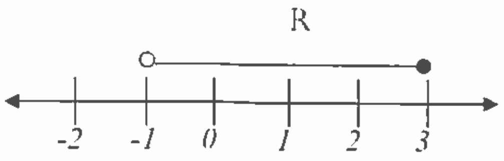
A1.6.3 Getallelyne:

Vb. 7 Stel die volgende op 'n getallelyn voor :

(a) $\{-1; 0; 1; 2; \ldots\ldots\}$



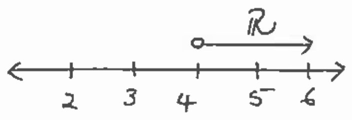
(b) $\{x: -1 < x \leq 3; x \in \mathbb{R}\}$



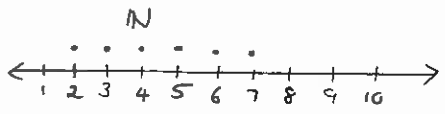
Oefening 7: Datum: ____________________

Stel die volgende op 'n getallelyn voor:

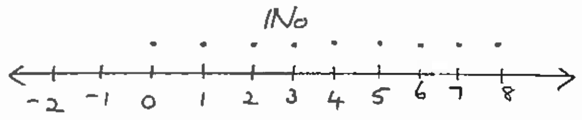
(1) $\{t: t > 4; t \in \mathbb{R}\}$



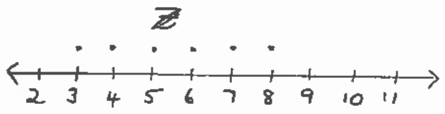
(2) $\{x / 1 < x \leq 7; x \in \mathbb{N}\}$



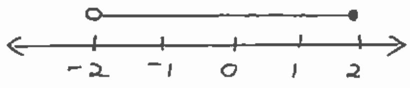
(3) $\{x: -3 \leq x \leq 8; x \in \mathbb{N}_0\}$



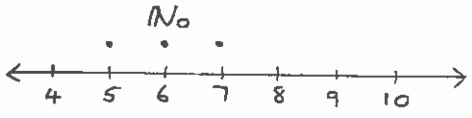
(4) $\{x / 2\frac{1}{2} \leq x \leq 8; x \in \mathbb{Z}\}$



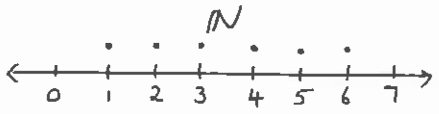
(5) $m \in (-2; 2]$



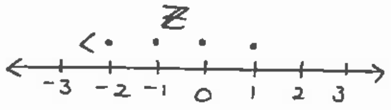
(6) Alle telgetalle tussen 4 en 8.



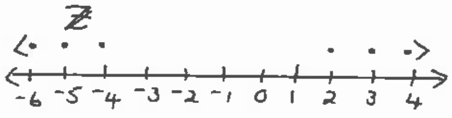
(7) $\{y / y < 7; y \in \mathbb{N}\}$



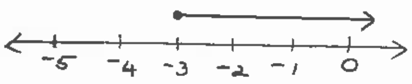
(8) $\{\ldots\ldots; -2; -1; 0; 1\}$



(9) $\{p / p < -3 \text{ of } p > 1; p \in \mathbb{Z}\}$



(10) $k \in [-3; \infty)$

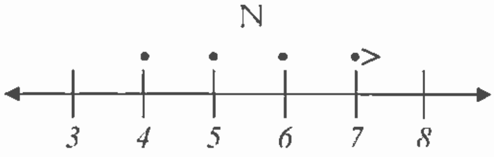


A1.6.4 Oplos van lineêre ongelykhede:

Vb. 8 Bereken x in elk van die volgende en stel jou antwoord op 'n getallelyn voor:

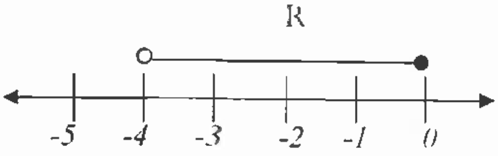
(a) $x - 2 \geq 2$ as $x \in \mathbb{N}$

$x \geq 2 + 2$
$x \geq 4$



(b) $-3 < x + 1 \leq 1$ as $x \in \mathbb{R}$

$-3 - 1 < x \leq 1 - 1$
$-4 < x \leq 0$

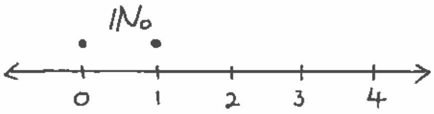


Oefening 8: Datum: ____________

(1) Los op vir x en stel jou antwoord op 'n getallelyn voor:

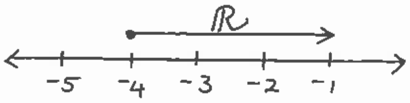
(a) $x + 1 < 3$; $x \in \mathbb{N}_0$

$x < 3 - 1$
$x < 2$



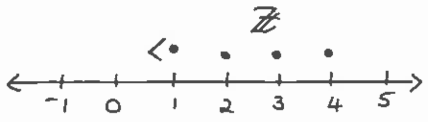
(b) $2x \geq -8$; $x \in \mathbb{R}$

$\frac{2x}{2} \geqslant -\frac{8}{2}$
$x \geqslant -4$



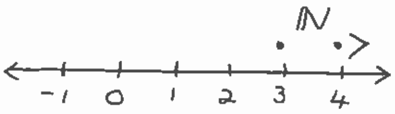
(c) $x - 4 \leq 0$; $x \in \mathbb{Z}$

$x \leq 0 + 4$
$x \leq 4$



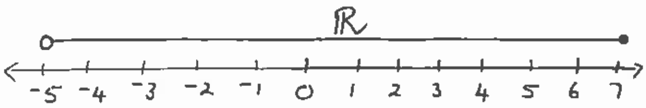
(d) $2x + 3 > 7$; $x \in \mathbb{N}$

$2x > 4$
$x > 2$



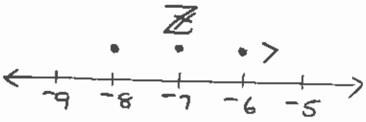
(e) $-6 < x - 1 \leq 6$; $x \in \mathbb{R}$

$-6 + 1 < x \leq 6 + 1$
$-5 < x \leq 7$



(f) $x + 7 \geq -1$; $x \in \mathbb{Z}$

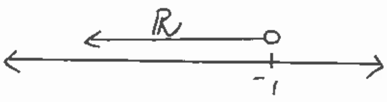
$x \geqslant -1 - 7$
$x \geqslant -8$



(2) Stel die volgende op 'n getallelyn voor:

(a) $\{x: \frac{2x}{2} < \frac{-2}{2};\ x \in \mathbb{R}\}$

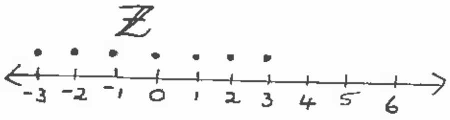
$x < -1$



(b) $\{x: -2 \leq x + 1 \leq 4;\ x \in \mathbb{Z}\}$

$-2 - 1 \leq x \leq 4 - 1$

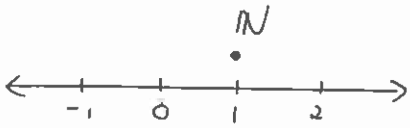
$-3 \leq x \leq 3$



(c) $\{y: y - 3 < -1;\ y \in \mathbb{N}\}$

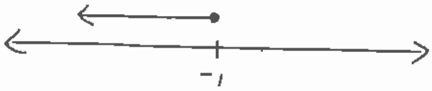
$y < 3 - 1$

$y < 2$



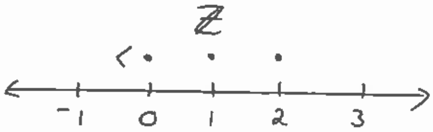
(d) $\{x: x \leq -1;\ x \in \mathbb{R}\}$

$x \leq -1$



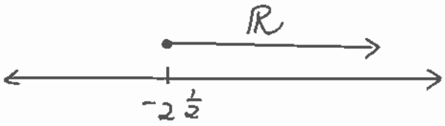
(e) $\{x / x < 3;\ x \in \mathbb{Z}\}$

$x < 3$



(f) $\{p / 2p \geq -5;\ p \in \mathbb{R}\}$

$p \geq -\frac{5}{2}$

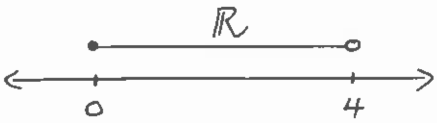


(g) $\{m: -1 \leq 2m - 1 < 7;\ m \in \mathbb{R}\}$

$-1 + 1 \leq 2m < 7 + 1$

$0 \leq 2m < 8$

$0 \leq m < 4$

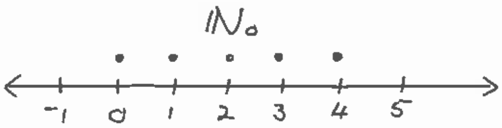


(h) $\{x: 2x - 3 < 7;\ x \in \mathbb{N}_0\}$

$2x < 7 + 3$

$2x < 10$

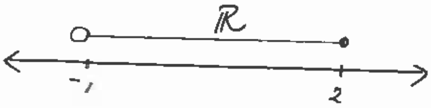
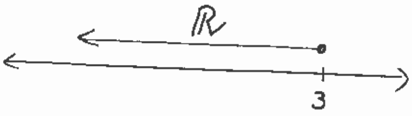
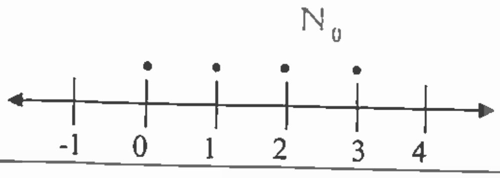
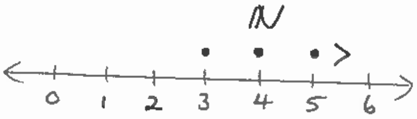
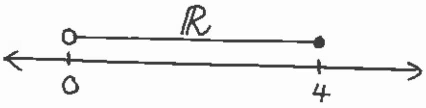
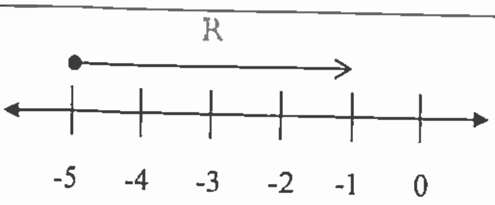
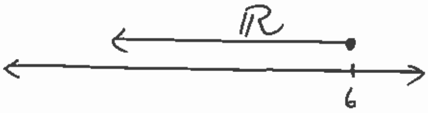
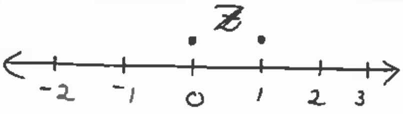
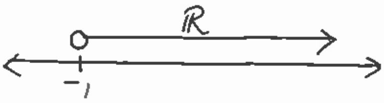
$x < 5$



A1.6.5 Kombinasies:

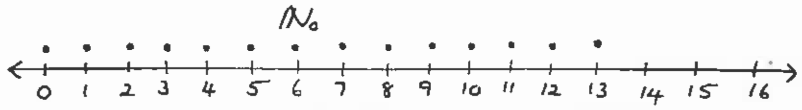
Oefening 9: Datum: ____________

Voltooi die ontbrekende voorstellings in die onderstaande tabel:

	Versamelingskeurdernotasie:	Intervalnotasie:	Getallelyn:
(1)	$\{x / -1 < x \leq 2; x \in \mathbb{R}\}$	$x \in (-1; 2]$	
(2)	$\{x / -2 \leq x \leq 5; x \in \mathbb{R}\}$	$x \in [-2; 5]$	
(3)	$\{y / y \leq 3; y \in \mathbb{R}\}$	$y \in (-\infty; 3]$	
(4)	$\{x / x \leq 3; x \in \underline{N_0}\}$	NvT	
(5)	$\{y / y \geq 3; y \in \underline{N}\}$	NvT	
(6)	$\{m / 0 < m \leq 4; m \in \mathbb{R}\}$	$m \in (0; 4]$	
(7)	$\{t / t \geq -5; t \in \mathbb{R}\}$	$t \in [-5; \infty)$	
(8)	$\{m: m \leq 6; m \in \mathbb{R}\}$	$m \in (-\infty; 6]$	
(9)	$\{x / -1 < x < 2; x \in \underline{Z}\}$	NvT	
(10)	$\{x / x > -1; x \in \mathbb{R}\}$	$x \in (-1; \infty)$	

☺ **'n Boer het genoeg weiding vir 13 beeste. Skryf die verskillende permutasies neer van die aantal beeste wat hy moontlik op die plaas kan aanhou. Stel jou antwoord ook grafies voor.**

Beeste $\in \{0; 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13\}$



A1.7 HERSIENINGSOEFENING:

Datum: ____________

(1) Voltooi die tabel deur 'n ✓ te maak in die toepaslike blokkie(s) waartoe die getal behoort:

		N	N_0	Z	Q	Q'	R			N	N_0	Z	Q	Q'	R
(1)	$\frac{-2}{3}$				✓		✓	(5)	$\frac{\sqrt{4}}{\sqrt{9}} =$	$\frac{2}{3}$			✓		✓
(2)	0		✓	✓	✓		✓	(6)	$\sqrt[3]{8} =$	2 ✓	✓	✓	✓		✓
(3)	$0,\dot{3}$				✓		✓	(7)	-1,7				✓		✓
(4)	$\sqrt{27}$					✓	✓	(8)	111	✓	✓	✓	✓		✓

(2) Druk elk van die volgende as 'n desimale breuk uit:

(a) $\frac{3}{7}$

$= \frac{3,{}^{3}0\,{}^{2}0\,{}^{6}0\,{}^{4}0}{7}$

$= 0,4285\ldots$

(b) $\frac{4}{25}$

$= \frac{4,{}^{4}0\,{}^{15}0}{25}$

$= 0,16$

(c) $-1\frac{5}{9}$

$= -1\,\frac{5,{}^{5}0\,{}^{5}0}{9}$

$= -1,55\ldots = -1,\dot{5}$

(d) $\frac{-7}{8}$

$= \frac{-7,{}^{7}0\,{}^{6}0\,{}^{4}0}{8}$

$= -0,875$

(e) $\frac{1}{6}$

$= \frac{1,{}^{1}0\,{}^{4}0\,{}^{4}0}{6}$

$= 0,166\ldots = 0,1\dot{6}$

(d) $\frac{23}{12}$

$= \frac{23,{}^{11}0\,{}^{2}0\,{}^{8}0\,{}^{8}0}{12}$

$= 1,9166\ldots = 1,91\dot{6}$

(3) Druk elk van die volgende as 'n gewone breuk in sy eenvoudigste vorm uit:

(a) 0,45

$= \frac{45}{100}$

$= \frac{9}{20}$

(b) -3,25

$= -3\,\frac{25}{100}$

$= -3\,\frac{1}{4}$

(c) 17,2

$= 17\,\frac{2}{10}$

$= 17\,\frac{1}{5}$

(4) Herlei die volgende na 'n gewone breuk in sy eenvoudigste vorm:

(a) $2,\dot{1}$

V/s $2,\dot{1} = x$

$\therefore \quad 10x = 21,111\ldots$

$- \quad 1x = 2,111\ldots$

$9x = 19$

$x = \frac{19}{9}$

$x = 2\frac{1}{9}$ $\rightarrow$

(b) 0,44

$= \frac{44}{100}$

$= \frac{11}{25}$ $\rightarrow$

(c) $0,0\dot{2}\dot{3}$

V/s $0,0\dot{2}\dot{3} = x$

$\therefore \quad 1\,000x = 23,2323\ldots$

$- \quad 10x = 0,2323\ldots$

$990x = 23$

$x = \frac{23}{990}$ $\rightarrow$

(d) $25,\dot{2}\dot{5}$

V/s $25,\dot{2}\dot{5} = x$

$\therefore \quad 100x = 2\,525,25\ldots$

$- \quad 1x = 25,25\ldots$

$99x = 2\,500$

$x = \frac{2\,500}{99}$

$x = 25\frac{25}{99}$ $\rightarrow$

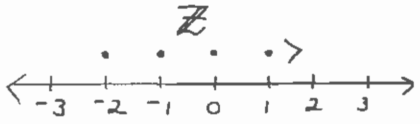
(5) Los vir x op. Gee jou oplossing in (i) versamelingskeurdernotasie
(ii) intervalnotasie en
(iii) stel dit grafies voor.

(a) $\frac{-4}{2} \leq \frac{2x}{2}$; $x \in \mathbb{Z}$

$-2 \leq x$

(i) $\{x \mid x \geq -2 \,;\, x \in \mathbb{Z}\}$

(ii) Geen interval notasie

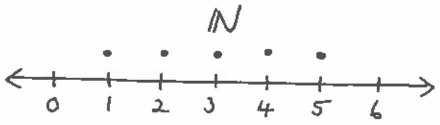


$x < 7-1$

$x < 6$

(i) $\{x \mid x < 6 \,;\, x \in \mathbb{N}\}$

(ii) Geen interval notasie



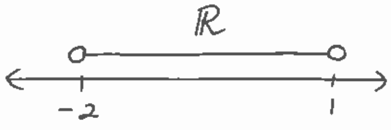
(c) $-1 < x + 1 < 2$; $x \in \mathbb{R}$

$-1-1 < x < 2-1$

$-2 < x < 1$

(i) $\{x \mid -2 < x < 1 \,;\, x \in \mathbb{R}\}$

(ii) $x \in (-2;\ 1)$



(d) $x - 2 \geq -5$; $x \in \mathbb{R}$

$x \geq -5+2$

$x \geq -3$

(i) $\{x \mid x \geq -3 \,;\, x \in \mathbb{R}\}$

(ii) $x \in [-3;\ \infty)$