

10.7 Logaritmisch papier

Opgave 83:

a. $\frac{100000}{10} = 10000$

$$\frac{100000}{0,002} = 50000000$$

b. $100000 \text{ kg} = 10^8 \text{ g}$

$$\frac{10^8}{10} = 10^7 \text{ cm} = 100000 \text{ m}$$

c. $\frac{100000}{1000} = 100 \text{ mm} = 10 \text{ cm}$

bezwaar: de eerste acht dieren liggen allemaal binnen 1 mm.

Opgave 84:

a. $A = 1,3$ $B = 7,5$ $C = 23$ $D = 55$ $E = 150$ $F = 2400$

b. 550 , 210 , $9,5$, $2,4$

c. $A = 1300$ $B = 7500$ $C = 23000$ $D = 55000$ $E = 150000$ $F = 2400000$

Opgave 85:

a. minimum: $1,1 \cdot 10^4 \cdot 1000 = 1,1 \cdot 10^7 \text{ kg}$

maximum: $2,6 \cdot 10^4 \cdot 1000 = 2,6 \cdot 10^7 \text{ kg}$

b. schol: $5,3 \cdot 10^4$

tarbot: $2,9 \cdot 10^3$

dus: $\frac{5,3 \cdot 10^4}{2,9 \cdot 10^3} = 18 \text{ keer}$

c. $\frac{1,3 \cdot 10^4 - 2,6 \cdot 10^4}{2,6 \cdot 10^4} \cdot 100\% = -50\%$

d. 1998: $10^3 = 1000$ 2001: $5 \cdot 10^3 = 5000$

1999: $3 \cdot 10^3 = 3000$ 2002: $1,4 \cdot 10^4 = 14000$

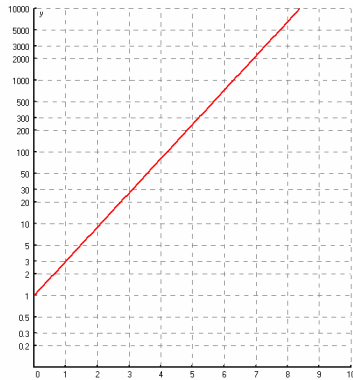
dus in de periode 2001-2002

e. $6,5 \cdot 10^4 \cdot 1000 : 1000000 = 65 \text{ cm}$

Opgave 86:

a.

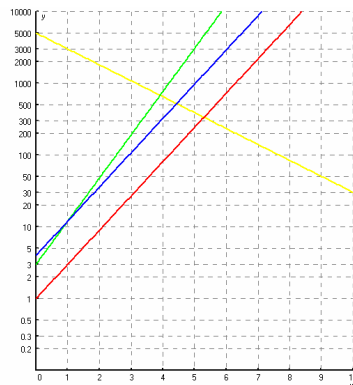
| | | | | | |
|-------|---|---|----|-----|------|
| x | 0 | 2 | 4 | 6 | 8 |
| 3^x | 1 | 9 | 81 | 729 | 6561 |



b.

De punten liggen op logaritmisches papier op een rechte lijn.

c.



Opgave 87:

a. $t = 1 \quad N = 30$

$t = 7 \quad N = 400$

$$g^6 = \frac{400}{30} \text{ dus } g = \sqrt[6]{\frac{400}{30}} = 1,54$$

$$30 = b \cdot 1,54^1$$

$$b = \frac{30}{1,54^1} = 19$$

$$N = 19 \cdot 1,54^t$$

b. $t = 2 \quad N = 100$

$t = 6 \quad N = 20$

$$g^4 = \frac{20}{100} = 0,2 \text{ dus } g = \sqrt[4]{0,2} = 0,67$$

$$100 = b \cdot 0,67^2$$

$$b = \frac{100}{0,67^2} = 224$$

$$N = 224 \cdot 0,67^t$$

Opgave 88:

a. B en C

b. plant B: $t = 0 \quad l = 60$

$$t = 21 \quad l = 200$$

$$g^{21} = \frac{200}{60} = 3,33 \text{ dus } g = \sqrt[21]{3,33} = 1,059$$

plant C: $t = 5 \quad l = 40$

$$t = 21 \quad l = 200$$

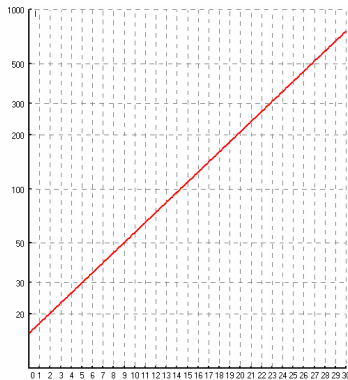
$$g^{16} = \frac{200}{40} = 5 \text{ dus } g = \sqrt[16]{5} = 1,106$$

c. $l_B = 60 \cdot 1,059^t$

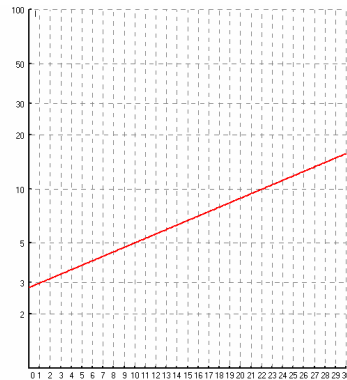
plant C: $b = \frac{40}{1,106^5} = 24,2$

$$l_C = 24,2 \cdot 1,106^t$$

d.



e.



Opgave 89:

a.



b. $g^{18} = \frac{0,5}{10} = 0,05 \text{ dus } g = \sqrt[18]{0,05} = 0,85$

$$b = \frac{10}{0,85} = 11,8$$

$$C = 11,8 \cdot 0,85^t$$

c. $C(0) = 11,8$

$$\frac{60}{11,8} = 5,1 \text{ liter}$$

Opgave 90:

a. $t = 0 \quad N_A = 5 \cdot 10^3 = 5000$

$$t = 10 \quad N_A = 2 \cdot 10^4 = 20000$$

$$g^{10} = \frac{20000}{5000} = 4$$

$$g = \sqrt[10]{4} = 1,149$$

$$N_A = 5000 \cdot 1,149^t$$

$$t = 0 \quad N_B = 8 \cdot 10^4 = 80000$$

$$t = 10 \quad N_B = 10^4 = 10000$$

$$g^{10} = \frac{10000}{80000} = 0,125$$

$$g = \sqrt[10]{0,125} = 0,812$$

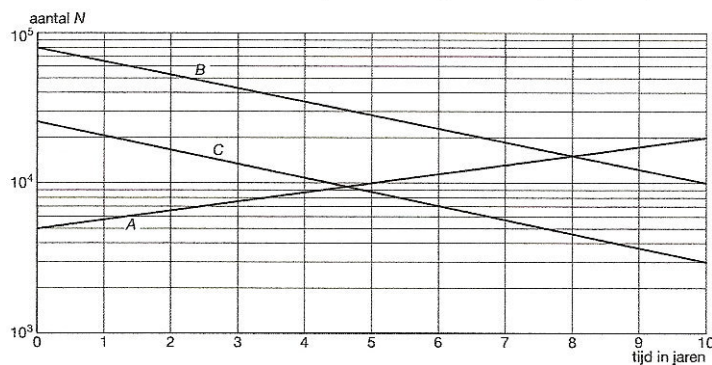
$$N_B = 80000 \cdot 0,812^t$$

b. $N_B = 2 \cdot N_A$

$$y_1 = 80000 \cdot 0,812^x \text{ en } y_2 = 10000 \cdot 1,149^x$$

intersect geeft $x = 6,0$ dus $t = 6,0$

c.



d. $y_1 = 5000 \cdot 1,149^x$ en $y_2 = 80000 \cdot 0,812^x$

intersect geeft $x = 8,0$

$$y_3 = y_1 + y_2 \text{ de optie minimum geeft } x = 9,15 \quad y = 29719$$

de bewering is dus niet juist

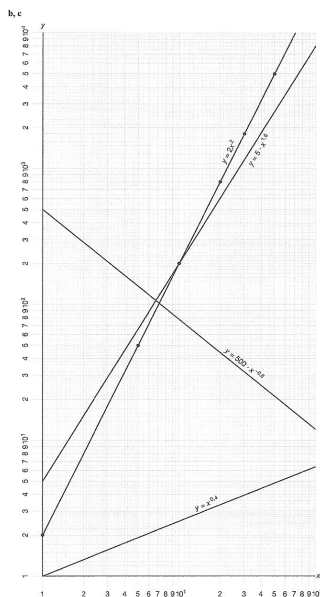
Opgave 91:

a.

| | | | | | | |
|------------|---|----|-----|-----|------|------|
| x | 1 | 5 | 10 | 20 | 30 | 50 |
| $y = 2x^2$ | 2 | 50 | 200 | 800 | 1800 | 5000 |

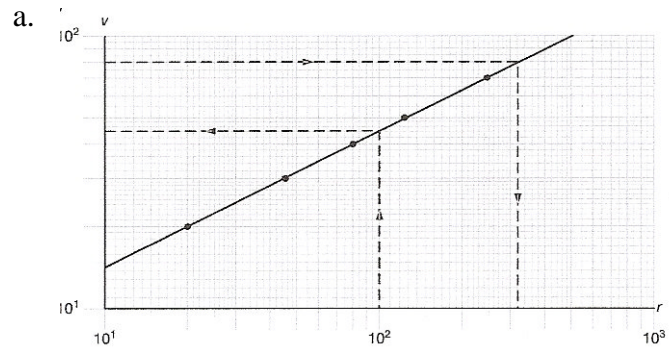
b.

c.



d. rechte lijnen

Opgave 92:



b. $V = a \cdot r^n$

c. $V = 44$

$r = 320$