

Funções exponenciais

R\$0,01 no primeiro dia, dobrando por dia, 30 dias.

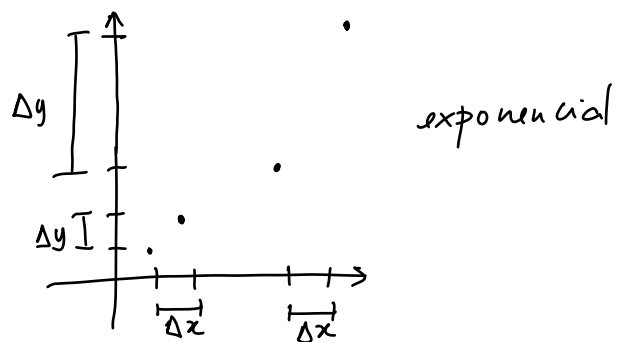
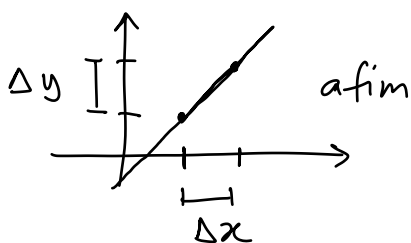
1	2	3	4	5	6	7
0,01	0,02	0,04	0,08	0,16	0,32	0,64
	"	"	"	"		
	$0,01 \cdot 2$	$0,01 \cdot 2^2$	$0,01 \cdot 2^3$	$0,01 \cdot 2^4$		

8	9	10	11	12	13	14
1,28	2,56	5,12	10,24	20,48	40,96	81,92

15	16	17	18	19	20	21
163,84	327,68	655,36	1310,72	2621,44	5242,88	10485,76

22	23	24	25	26	27
20971,52	41943,04	83886,08	167772,16	335544,32	671088,64

28	29	30
1.342.177,28	2.684.354,56	5.368.709,12 = $0,01 \cdot 2^{25}$



$$f(x) = a^x$$

Ex.: $2^x, 3^x, \pi^x, \sqrt{2}^x, (-2)^x$

$$f(x) = 2^x$$

$$f(1) = 2^1 = 2$$

$$f(2) = 2^2 = 4$$

$$f(0) = 2^0 = 1$$

$$f(-1) = 2^{-1} = ?$$

$$f\left(\frac{1}{2}\right) = 2^{1/2} = ?$$

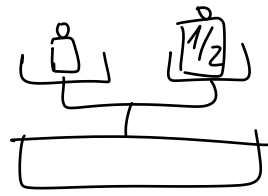
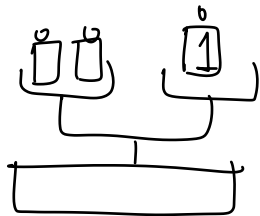
$$f(\sqrt{2}) = 2^{\sqrt{2}} = ?$$

ultima
seme me

$$2^2 \cdot 2^3 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2^{2+3} = 2^5$$

$$\underbrace{2^{-1}}_? \cdot 2^1 = 2^{-1+1} = 2^0 = 1 \Rightarrow 2^{-1} = \frac{1}{2}$$

$$x \cdot 2 = 1$$



$$\underbrace{2^{-2}}_? \cdot \underbrace{2^2}_4 = 2^{-2+2} = 2^0 = 1 \Rightarrow 2^{-2} = \frac{1}{4}$$

$$n > 0: \underbrace{2^{-n}}_? \cdot 2^n = 2^{-n+n} = 2^0 = 1 \Rightarrow$$

$$2^{-n} = \frac{1}{2^n}$$

$$2^{1/2} = \sqrt{2}$$

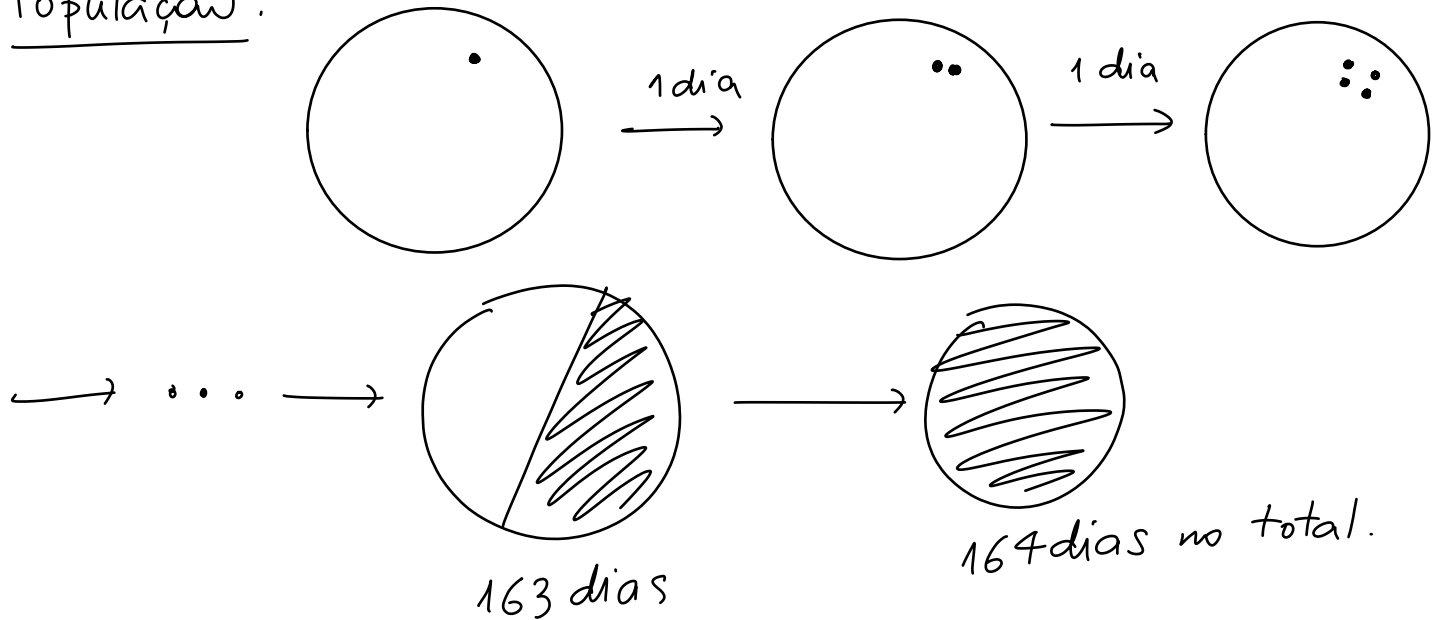
$$2^{1/3} = \sqrt[3]{2}, \quad 2^{1/7} = \sqrt[7]{2}$$

$$2^{1/n} = \sqrt[n]{2}$$

$$2^{m/n} = \sqrt[n]{2^m} = \left(\sqrt[n]{2}\right)^m$$

$$\begin{aligned} \sqrt[3]{16} \cdot \sqrt[5]{128} &= \sqrt[3]{2^4} \cdot \sqrt[5]{2^7} = 2^{\frac{4}{3}} \cdot 2^{\frac{7}{5}} = 2^{\frac{4}{3} + \frac{7}{5}} \\ &= 2^{\frac{20+21}{15}} = 2^{\frac{41}{15}} = \sqrt[15]{2^{41}} \end{aligned}$$

População:



dia	0	1	2	3	4	...	t
#bac.	1	2 2^1	4 2^2	8 2^3	16 2^4	...	2^t

2^{164} = muito grande!

$$\frac{2^{164}}{2} = 2^{164} \cdot \frac{1}{2} = 2^{164} \cdot 2^{-1} = 2^{163}$$