Funzioni lineari (p. 176 - 177)

$f(x) = ax + b$ ← grafico cartesiano è una retta

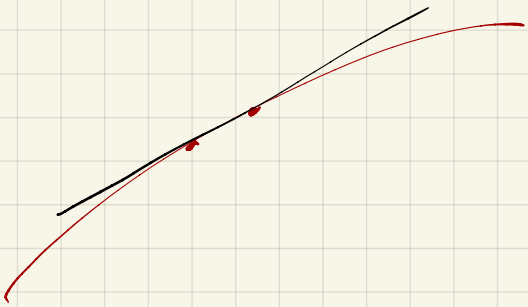
$f(2) = 7$

$f(5) = 4$

$$\begin{cases} a \cdot 2 + b = 7 \\ a \cdot 5 + b = 4 \end{cases} \qquad \begin{cases} a = -1 \\ b = 9 \end{cases}$$

$$f(x) = 9 - x$$

ξ		p
0.50	35.21	38.29
0.55	34.29	41.77
0.60	33.32	45.15
0.65	32.30	48.43
0.70	31.23	51.61



$\xi = ?$ $\qquad p = 50.00$

$f(48.43) = 0.65$

$f(51.61) = 0.70$

$f(50.00) = ?$

$$\begin{cases} 48.43 \cdot a + b = 0.65 \\ 51.61 \cdot a + b = 0.70 \\ \vdots \end{cases}$$

x_0 y_0

x y ?

x_1 y_1

Interpolazione lineare

$$y = y_0 + \frac{y_1 - y_0}{x_1 - x_0} \cdot (x - x_0)$$

y x

z p

0.50	35.21	38.29
0.55	34.29	41.77
0.60	33.32	45.15
0.65	32.30	48.43
0.70	31.23	51.61

y_0 x_0 y_1 x_1

$z = ?$ $p = 50.00$

y ? x

$$y = 0.65 + \frac{0.70 - 0.65}{51.61 - 48.43}(50 - 48.43)$$

$$\approx 0.6747$$

Esponenziali p. 104 —

$$y = x^a$$

$$= \underbrace{x \cdot x \cdot x \cdots \cdot x}_{a \text{ volte}}$$

$$y = x^{\frac{1}{2}} = \sqrt{x}$$

$y = x^a$ ha senso per $x > 0$ e a qualunque numero reale.

$b^0 = 1$ $\quad b^x \cdot b^y = b^{x+y}$ $\quad a^x b^x = (ab)^x$ $\quad (b^x)^y = b^{x \cdot y}$

$b^1 = b$ $\quad \frac{b^x}{b^y} = b^{x-y}$ $\quad \frac{a^x}{b^x} = \left(\frac{a}{b}\right)^x$ $\quad b^{\frac{1}{n}} = \sqrt[n]{b}$

$1^x = 1$

$x^{y^z} = x^{(y^z)} \neq (x^y)^z$

Sapendo che $10^{3x} = 64$ calcola 100^x

$$100^x = (10^2)^x = 10^{2\cdot x} = 10^{x\cdot 2} = (10^x)^2$$

$$64 = 10^{3x} = 10^{x\cdot 3} = (10^x)^3$$

$$10^x = \sqrt[3]{64} = 4 \qquad (b^x)^y = (b^y)^x$$

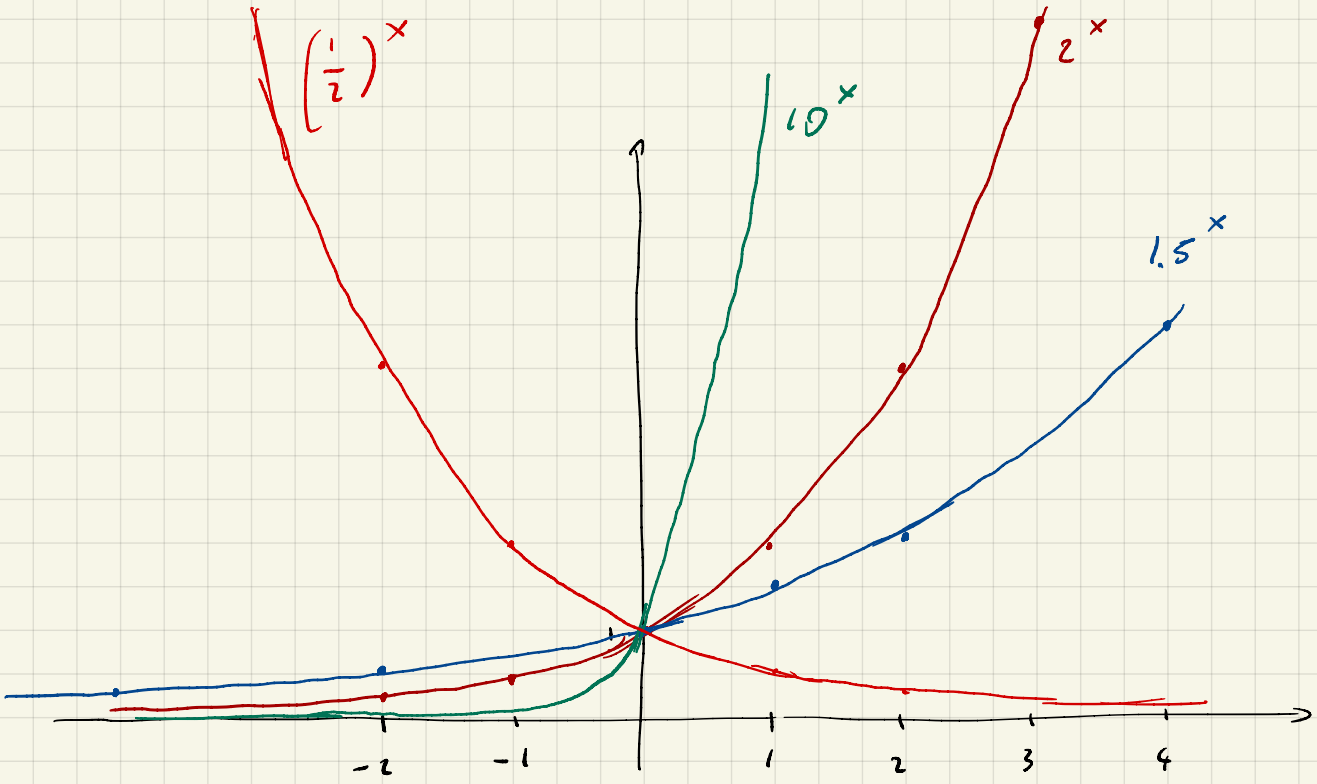
$$100^x = (10^x)^2 = 4^2 = 16.$$

Es $8^x = 2.7 \cdot 10^4$ $\qquad 2^x = ?$

$$8^x = (2^3)^x = (2^x)^3$$

$$2^x = \sqrt[3]{2.7\cdot 10^4} = \sqrt[3]{27\cdot 10^3} =$$

$$= \underbrace{\sqrt[3]{27}}_{3} \cdot \underbrace{\sqrt[3]{10^3}}_{10} = 30$$



Es. Risolvi $2^x < 5^x$ $\boxed{x > 0}$

$1 < \frac{5^x}{2^x}$ $1 < \left(\frac{5}{2}\right)^x$

$$\boxed{10^{0.3} \approx 2}$$

x	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
10^x	1	1.25	1.6	2	2.5	3.2	4	5	6.4	8	10

$$10^{0.6} = 10^{0.3 \cdot 2} = \left(10^{0.3}\right)^2 \approx 2^2 = 4$$

$$10^{0.1} = \frac{10^1}{10^{0.9}} \approx \frac{10}{8}$$

$$10^{4.4} = 10^4 \cdot 10^{0.4} \approx 10\,000 \cdot 2.5 = 25\,000$$

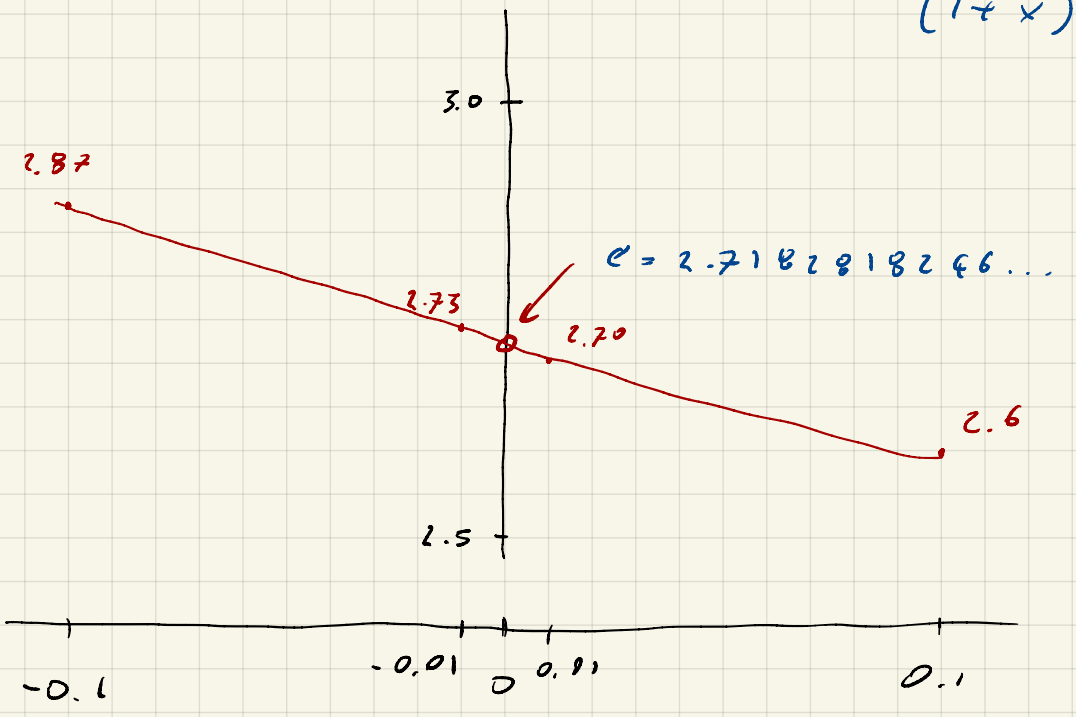
$$\sim 25\,118.8643$$

Il numero e

Disegnamo il grafico di $f(x) = (1+x)^{\frac{1}{x}}$

per $-0.1 \leq x \leq 0.1$.

$(1+x)^{\frac{1}{x}}$



Logaritmi

$$x = \log_b y \iff b^x = y$$

$$\square = \log_b \triangle \iff b^{\square} = \triangle$$

$$\log_b 1 = 0 \qquad \log_b (x \cdot y) = \log_b x + \log_b y$$

$$\log_b b = 1 \qquad \log_b \left(\frac{x}{y}\right) = \log_b x - \log_b y$$

$$\log_b (x^y) = y \cdot \log_b (x)$$

$$\log_b \left(\sqrt[n]{x}\right) = \frac{1}{n} \log_b (x)$$

$$\log_a x = \frac{\log_b x}{\log_b a}$$

Es Calcola $\log_2 \left(\frac{8^{3.7}}{4}\right) =$

$$= \log_2 \left(8^{3.7}\right) - \log_2 (4)$$

$$= 3.7 \cdot \underbrace{\log_2 (8)}_{3} - \underbrace{\log_2 (4)}_{2} = \boxed{9.1}$$

Es $\log_e x = 10$ $\log_e (x \cdot \sqrt{x}) = ?$

$$\log_e(x) + \log_e(\sqrt{x}) = \log_e(x) + \frac{1}{2}\log_e(x)$$

$$= \frac{3}{2}\underbrace{\log_e(x)}_{10} = 15.$$