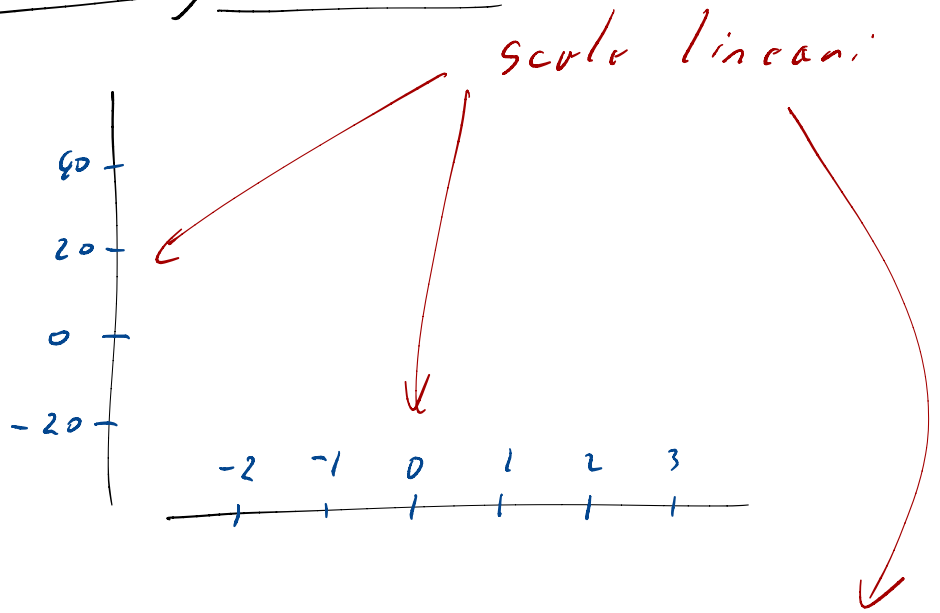
Scale logaritmiche



$$d(x,y) : d(x,z) = y - x : z - x$$

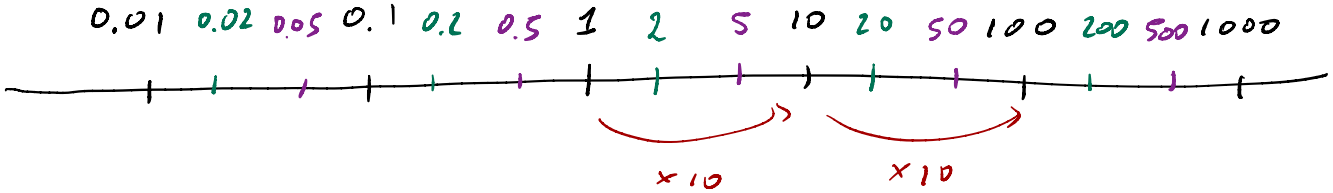
$$d(0,y) : \underbrace{d(0,1)}_{\text{unità della scala}} = y : 1$$

Scale logaritmiche

$$d(x,y) : d(x,z) = \log_{10} \frac{y}{x} : \log_{10} \frac{z}{x}$$

e

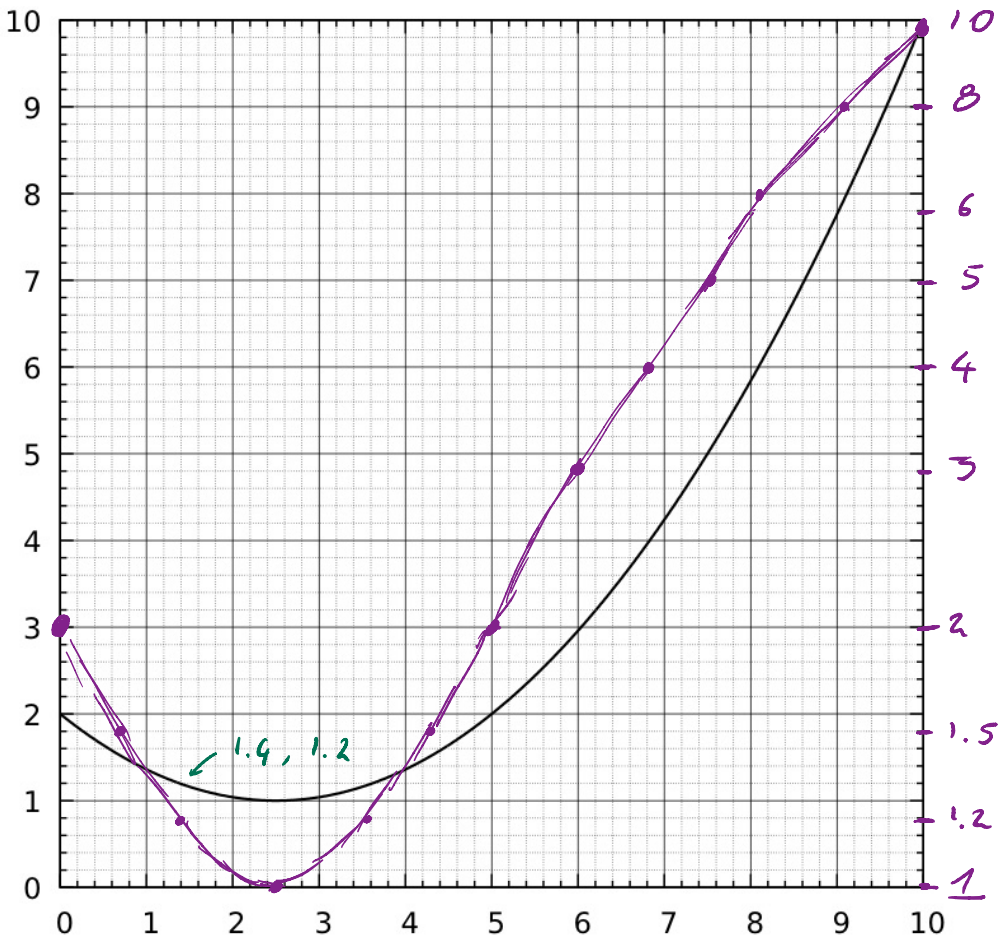
42



$$\underbrace{d(1,2)}_{\text{1.5 quadr.}} : \underbrace{d(1,10)}_{\text{5 quadr.}} = \underbrace{\log_{10} \frac{2}{1}}_{0.3} : \underbrace{\log_{10} \frac{10}{1}}_{1}$$

25·1·2023 Esercizio C

Considera la funzione f(x) rappresentata dal seguente diagramma.



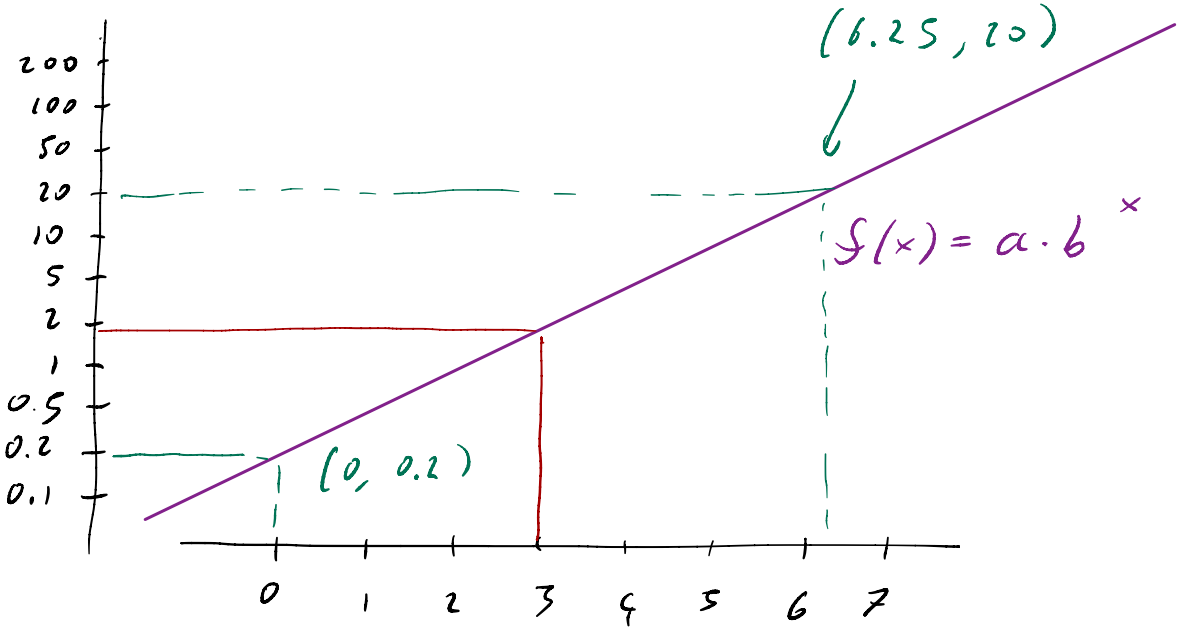
Rappresenta la medesima funzione per mezzo di un grafico semi-logaritmico.

$$\underbrace{d(1,2)}_{3\ \text{quadr.}} : \underbrace{d(1,10)}_{10\ \text{quadr.}} = \underbrace{\log_{10}\frac{2}{1}}_{0.3} : \underbrace{\log_{10}\frac{10}{1}}_{1}$$

$$\underbrace{d(1,3)}_{4.77\ \text{quadr.}} : \underbrace{d(1,10)}_{10\ \text{quadr.}} = \underbrace{\log_{10}\frac{3}{1}}_{0.477} : \underbrace{\log_{10}\frac{10}{1}}_{1}$$

$$\underbrace{d(1,1.2)}_{0.8\ \text{quadr.}} : \underbrace{d(1,10)}_{10\ \text{quadr.}} = \underbrace{\log_{10}\frac{1.2}{1}}_{0.08} : \underbrace{\log_{10}\frac{10}{1}}_{1}$$

Grafici lin - log



$$\begin{cases} f(0) = 0.2 \\ f(6.25) = 20 \end{cases} \qquad \begin{cases} a \cdot b^0 = 0.2 \\ a \cdot b^{6.25} = 20 \end{cases}$$

$a \cdot b^0 = 0.2 \longrightarrow a = 0.2$

$a \cdot b^{6.25} = 20 \longrightarrow b^{6.25} = 100$

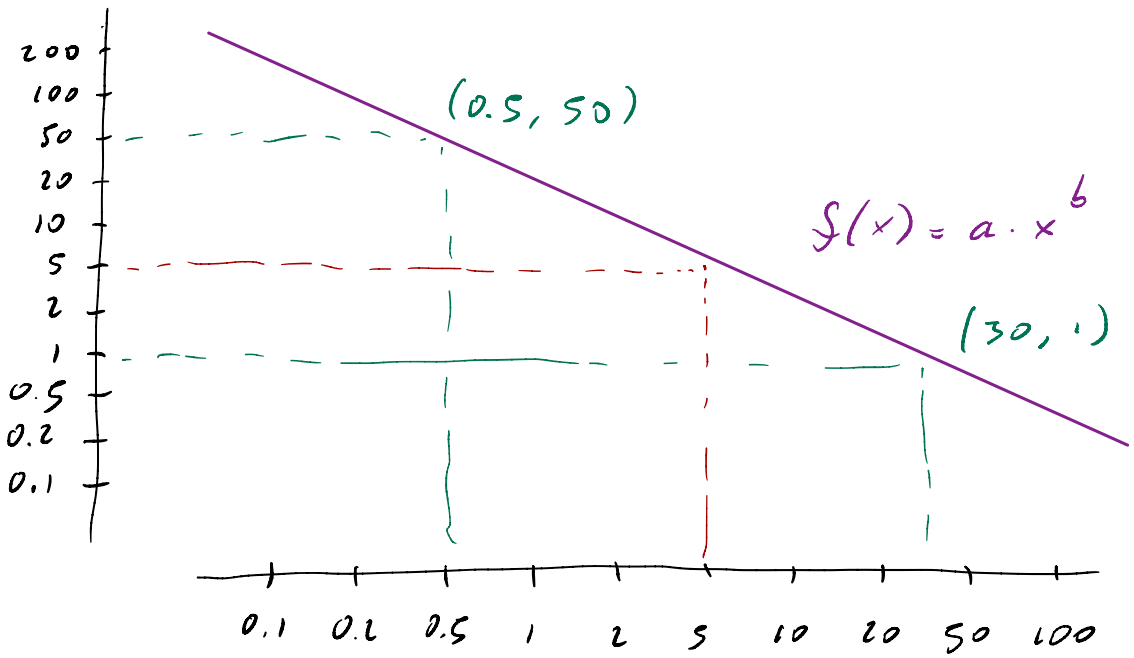
$b = 100^{\frac{1}{6.25}}$

$= 2.1$

$f(x) = 0.2 \cdot 2.1^x$

$f(3) = 1.9$

Grafici log-log



$$\begin{cases} f(0.5) = 50 \\ f(30) = 1 \end{cases} \qquad \begin{cases} a \cdot 0.5^{b} = 50 \\ a \cdot 30^{b} = 1 \end{cases}$$

$$\left(\frac{30}{0.5}\right)^{b} = \frac{a \cdot 30^{b}}{a \cdot 0.5^{b}} = \frac{1}{50}$$

$$60^{b} = 0.02 \qquad b = \log_{60} 0.02 = \frac{\log 0.02}{\log 60}$$

$$= -0.36$$

$$f(x) = 26 \cdot x^{-0.36} \qquad a = 26$$

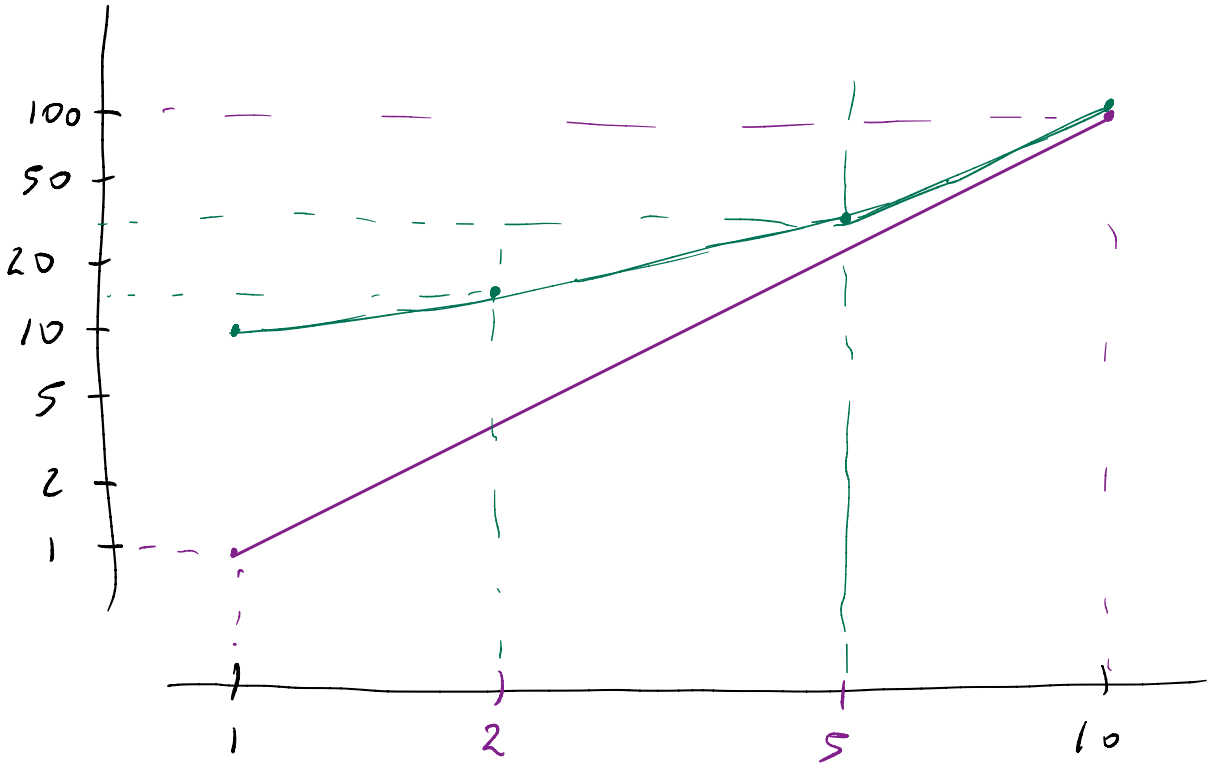
$$f(5) = 5.5$$

Esercizio C

retta!

Rappresenta le funzioni $f(x) = x^2$ e $g(x) = 10 + x^2$ sul medesimo diagramma bi-logaritmico, per $1 \leqslant x \leqslant 10$.

x	1	2	5	10
f	1			100
g	11	14	35	110



$d(1,35) : d(1,10) = \log_{10} \frac{35}{1} : \log_{10} \frac{10}{1}$

7.7 quad 5 quad. 1.54 1

Esercizio A

La quantità X decade esponenzialmente di un fattore 10 ogni sette giorni. Sapendo che X vale $X_0 = 95$ al tempo t_0, dopo quanto tempo assume il valore $X_1 = 20$, espresso in giorni e ore correttamente arrotondate?

Rappresenta l'andamento di X, $X + 1$, e X^2 in un periodo di quattro settimane a partire da t_0, per mezzo di un grafico semi-logaritmico.