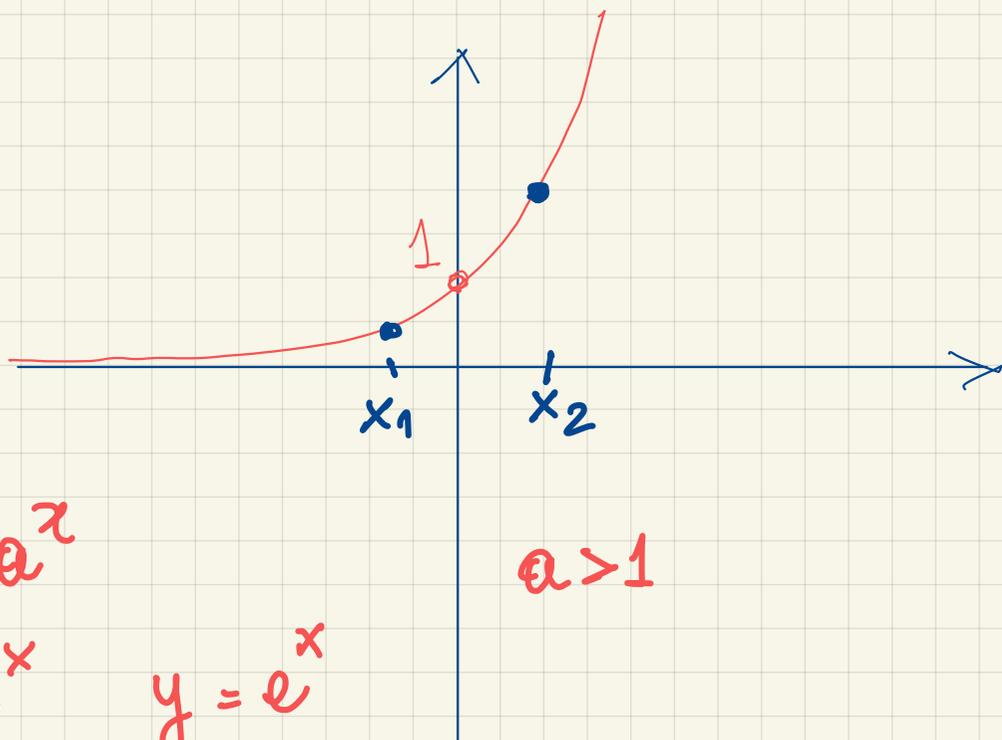


DISEQUAZIONI ESPONENZIALI

M3050



LA FUNZIONE $y = a^x$

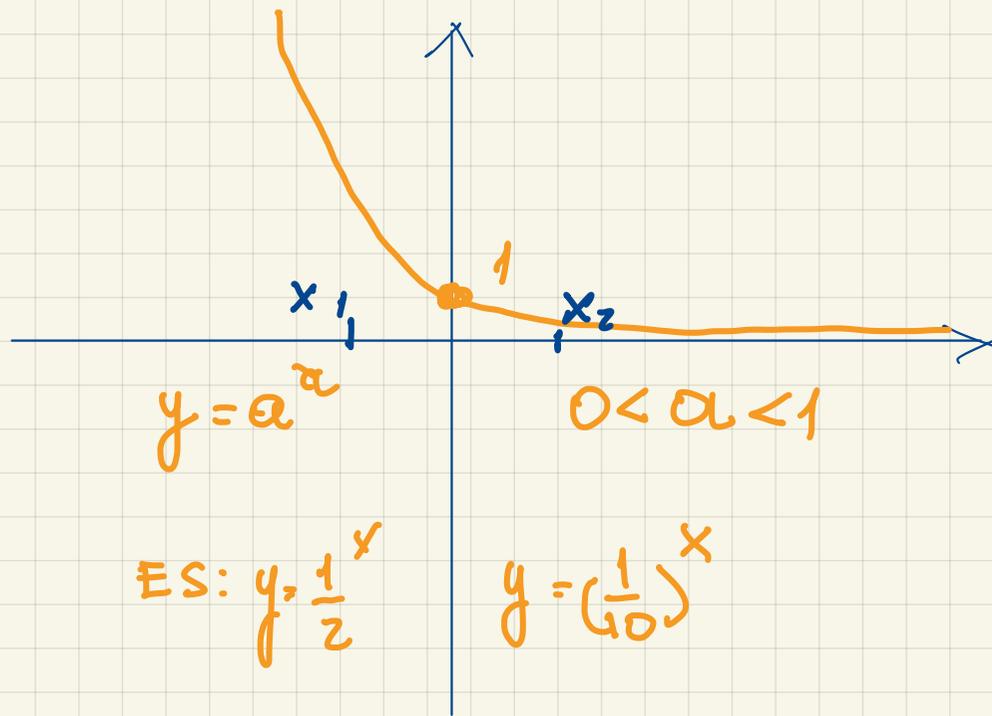


$$y = a^x$$

$$y = 2^x$$

$$y = e^x$$

$$a > 1$$



$$y = a^x$$

$$0 < a < 1$$

$$\text{ES: } y = \frac{1}{2}^x$$

$$y = \left(\frac{1}{10}\right)^x$$

e = numero di EULERO costante $e = 2,7 \dots$

$$1) \quad 4^x \leq 32 \quad 2^{2x} \leq 2^5 \quad \text{base} > 1$$

conservo il verso:

$$2x \leq 5 \quad x \leq \frac{5}{2}$$

$$2) \quad \left(\frac{3}{2}\right)^x < \frac{27}{8} \quad \left(\frac{3}{2}\right)^x < \left(\frac{3}{2}\right)^3 \quad \text{base } \frac{3}{2} > 1$$

conservo il verso

$$x < 3$$

$$3) \quad \left(\frac{3}{2}\right)^x < \frac{8}{27} \quad \left(\frac{3}{2}\right)^x < \left(\frac{3}{2}\right)^{-3} \quad \text{base} > 1 \rightarrow x < -3$$

$$4) \quad 3^{2x+2} < \frac{1}{3} \quad 3^{2x+2} < 3^{-1} \quad \text{base} > 1 \quad 2x+2 < -1 \rightarrow x < -\frac{3}{2}$$

$$5) \quad \left(\frac{1}{4}\right)^{x-1} < 64 \rightarrow \left(\frac{1}{2}\right)^{2(x-1)} < \left(\frac{1}{2}\right)^{-6}$$

NON CONSERVO

$$2(x-1) > -6$$

base $0 < a < 1$ Δ

$$2x-2 > -6 \quad x > -2$$

1)	$4^x \leq 32$	$\left[x \leq \frac{5}{2}\right]$
2)	$\left(\frac{3}{2}\right)^x < \frac{27}{8}$	$[x < 3]$
3)	$\left(\frac{3}{2}\right)^x < \frac{8}{27}$	$[x < -3]$
4)	$3^{2x+2} < \frac{1}{3}$	$\left[x < -\frac{3}{2}\right]$
5)	$\left(\frac{1}{4}\right)^{x-1} < 64$	$[x > -2]$
6)	$0,1^x \leq 100$	$[x \geq -2]$

$$6) 0,1^x \leq 100$$

$$\left(\frac{1}{10}\right)^x \leq 100$$

$$10^{-x} \leq 10^2$$

$$-x \leq 2$$

$$+x \geq -2$$

$$7) \frac{9 \cdot 3^{-x}}{9^x + 3^{2x}} > \frac{27}{2} \quad \left[x < -\frac{1}{3} \right]$$

$$\frac{9 \cdot 3^{-x}}{3^{2x} + 3^{2x}} > \frac{27}{2} \rightarrow \frac{9 \cdot t^{-1}}{t^2 + t^2} > \frac{27}{2}$$

$$3^x = t$$

$$\textcircled{*} \quad \frac{9}{t} \cdot \frac{1}{2t^2} > \frac{27}{2} \quad \frac{9}{2t^3} > \frac{27}{2} \rightarrow \frac{9}{2t^3} > \frac{27t^3}{2t^3}$$

$$N \quad \frac{9 - 27t^3}{2t^3} > 0$$

D

$$N > 0$$

$$9 - 27t^3 > 0$$

$$-27t^3 > -9$$

$$27t^3 < 9$$

$$t^3 < \frac{9}{27}$$

$$t^3 < \frac{1}{3} \rightarrow (3^x)^3 < 3^{-1}$$

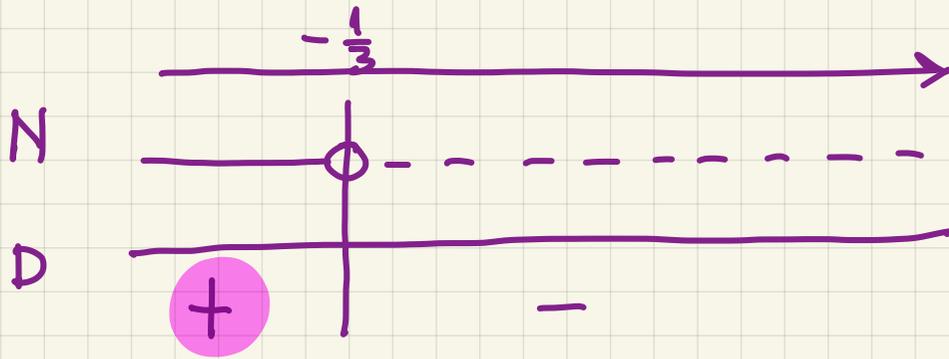
$$3^{3x} < 3^{-1}$$

$$3x < -1$$

$$\textcircled{N} \quad x < -\frac{1}{3}$$

$$D > 0 \quad 2t^3 > 0 \quad t^3 > 0 \quad 3^{3x} > 0 \quad \forall x \in \mathbb{R}$$

UN ESPONENZIALE È SEMPRE POSITIVO



$$x < -\frac{1}{3}$$

⊗ $\frac{9t^{-1}}{2t^2} > \frac{27}{2}$ come gestire $9t^{-1}$

$$\frac{9 \cdot \frac{1}{t}}{2t^2} \Rightarrow \frac{\frac{9}{t}}{2t^2} = \frac{9}{t} \cdot \frac{1}{2t^2} \rightarrow \frac{9}{2t^3}$$

The diagram shows the fraction $\frac{9 \cdot \frac{1}{t}}{2t^2}$ being simplified. The numerator $\frac{9}{t}$ is circled and labeled 'num' with an arrow. The denominator $2t^2$ is circled and labeled 'denom' with an arrow. The result is shown as $\frac{9}{t} \cdot \frac{1}{2t^2} \rightarrow \frac{9}{2t^3}$.