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$$\left(\frac{1}{2}\right)^{x+3} - 4 \cdot 64^x = 0$$

$$2^{-x-3} - 4 \cdot 2^{6x} = 0 \quad \frac{1}{2^3 \cdot 2^x} - 2^2 \cdot 2^{6x} = 0$$

$$\frac{1 - 2^5 \cdot 2^{7x}}{\cancel{2^3} \cdot \cancel{2^x}} = 0$$

$$1 = 2^5 \cdot 2^{7x}$$

$$P.E. = \{x \in \mathbb{R} / 2^x \neq 0\}$$

$$\frac{1}{2^5} = 2^{7x}$$

$$2^{-5} = 2^{7x}$$

$$7x = -5 \quad \boxed{x = -\frac{5}{7}}$$

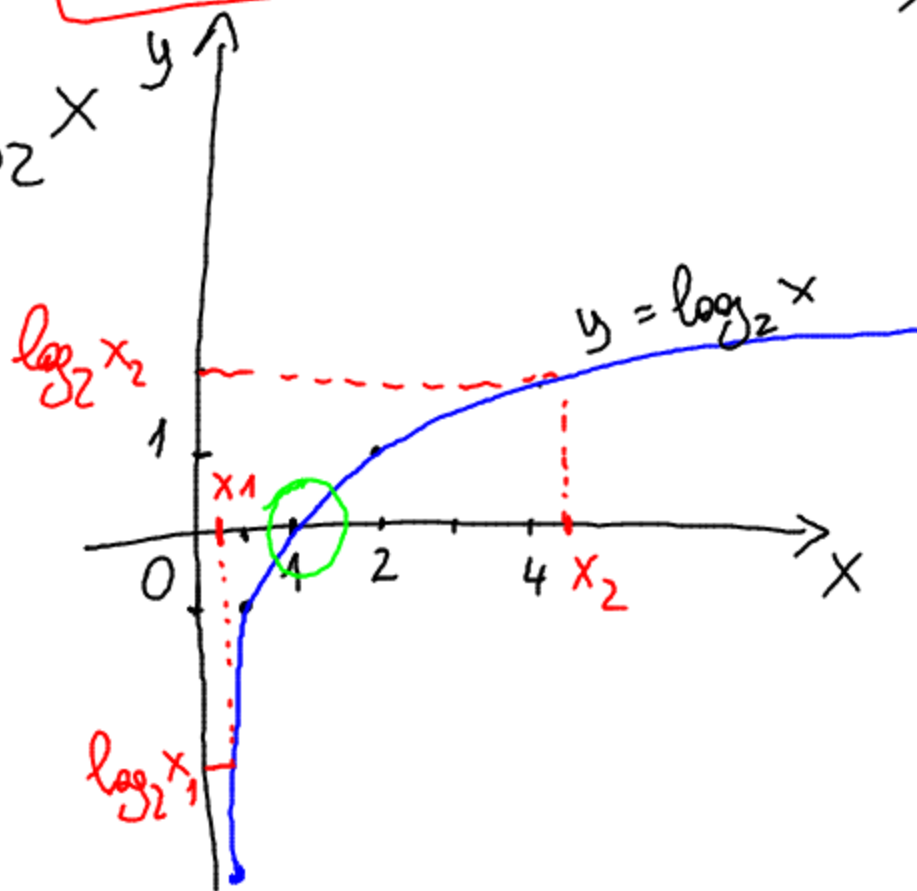
LOGARITMI

$$\log_a b = x \Leftrightarrow a^x = b$$

- 1) $a > 1$
2) $0 < a < 1$

1) $a = 2$

$$y = \log_2 x$$



x	y
1	0
2	1
1/2	-1

$$\log_2 1 = y$$

$$1 = 2^y$$

$$y = 0$$

$$\log_2 2 = y$$

$$2^y = 2$$

$$y = 1$$

$$\log_2 \frac{1}{2} = y$$

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

$$2^y = 2^{-1}$$

$$y = -1$$

CARATTERISTICHE

1) passa per $(1; 0)$

2) $f(x)$ è definita per $x > 0$

3) $f(x) < 0$ per $0 < x < 1$

$f(x) > 0$ per $x > 1$

4) $f(x)$ è crescente: $\forall x_1 < x_2 \Leftrightarrow f(x_1) < f(x_2)$

$$\forall x_1 < x_2 \Leftrightarrow \log_2 x_1 < \log_2 x_2$$

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$$\log_4 x < \frac{1}{2}$$

$$x < 4^{\frac{1}{2}} \quad x < 2$$

$a > 1$

$$\log_a x_1 < \log_a x_2$$

\updownarrow

$$x_1 < x_2$$

$$\frac{1}{2} = \log_4 4^{\frac{1}{2}}$$

$$\log_4 x < \log_4 4^{\frac{1}{2}}$$

$$x < 4^{\frac{1}{2}} \quad \boxed{x < 2}$$

$$2) \quad 0 < a < 1$$

$$a = \frac{1}{2}$$

$$y = \log_{\frac{1}{2}} x$$

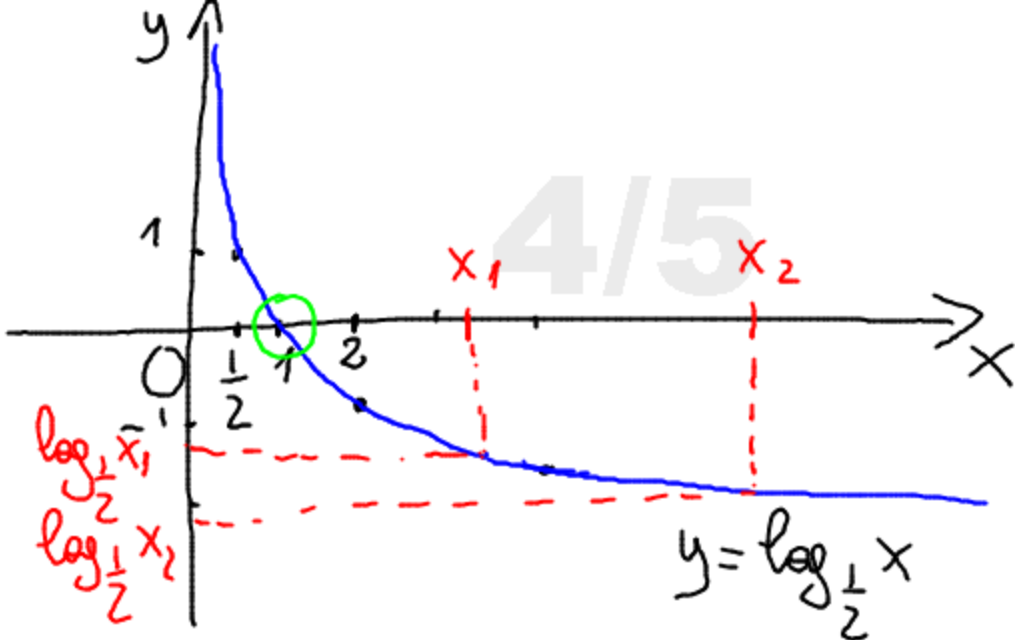
$$P.E = (0, +\infty)$$

X	Y
1	0
$\frac{1}{2}$	1
2	-1

$$\log_{\frac{1}{2}} 1 = y$$

$$\left(\frac{1}{2}\right)^y = 1$$

$$y = 0$$



CARATTERISTICHE

1) $f(x)$ passa per $(1; 0)$

2) $f(x)$ è definita per $x > 0$

3) $f(x)$ è DECRESCENTE: $\forall x_1 < x_2 \Leftrightarrow f(x_1) > f(x_2)$

4) $f(x) > 0$ se $0 < x < 1$
 $f(x) < 0$ se $x > 1$

$$\forall x_1 < x_2 \Leftrightarrow \log_{\frac{1}{2}} x_1 > \log_{\frac{1}{2}} x_2$$

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$$\log_{\frac{1}{2}} x < 4$$

$$x > \left(\frac{1}{2}\right)^4 \quad \boxed{x > \frac{1}{16}}$$

$$4 = \log_{\frac{1}{2}} \left(\frac{1}{2}\right)^4$$

$$\log_{\frac{1}{2}} x < \log_{\frac{1}{2}} \left(\frac{1}{2}\right)^4$$

$$x > \left(\frac{1}{2}\right)^4 \quad \boxed{x > \frac{1}{16}}$$

REGOLA

$$\log_{\frac{1}{2}} x_1 < \log_{\frac{1}{2}} x_2 \Rightarrow x_1 > x_2$$