Pag 614 n 232

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

$$\left(\frac{1}{2}\right)^{2x} - 4 = 3\left(\frac{1}{2}\right)^x \qquad d=\left(\frac{1}{2}\right)^x$$

$$d^2-3d-4=0 \qquad (d-4)(d+1)=0$$

$$d=4 \qquad \left(\frac{1}{2}\right)^x = 4 \rightsquigarrow 2^{-x}=2^2 \overset{inj}{\rightsquigarrow} x=-2$$

$$d=-1 \qquad \left(\frac{1}{2}\right)^x = -1$$ Impossibile

n 235

$$\frac{\sqrt{3\cdot\sqrt{9^x}}}{81^{x-1}} = 9^{2x+3}$$

$$\frac{\left[3\cdot\left(3^{\cancel{2}x}\right)^{\cancel{\frac{1}{2}}}\right]^{\frac{1}{2}}}{3^{4(x-1)}} = 3^{2(2x+3)}$$

$$3^{\frac{x+1}{2}-4x+4} = 3^{4x+6} \overset{inj}{\rightsquigarrow}$$

$$x+1-8x+8 = 8x+12$$

$$-3=15x \rightsquigarrow x=-\frac{1}{5}$$

n. 237

$$\sqrt[x+2]{25^x}\cdot\sqrt[x]{5^4} = 125$$

C.E. $\begin{cases} x+2>0 \\ x>0 \end{cases} \rightsquigarrow \boxed{x>0}$

$$\left[5^{2x}\right]^{\frac{1}{x+2}}\cdot 5^{\frac{4}{x}} = 5^3 \overset{inj}{\rightsquigarrow}$$

$$\frac{2x}{x+2}+\frac{4}{x}=3 \leadsto \frac{2x^2+4x+8}{x\cancel{(x+2)}}=\frac{3x^2+6x}{x\cancel{(x+2)}}$$ C.E. $x\neq 0$

$$x^2+2x-8=0 \qquad (x+4)(x-2)=0$$

$x=-4$ Non Accettabile per C.E.

$x=2$

<u>n 251</u>: $$\frac{5^x}{5^x+1}-\frac{1}{\underbrace{25^x-1}_{5^{2x} \quad v^2-1}}=1$$ $5^x=v$

$$\frac{v}{v+1}-\frac{1}{(v+1)(v-1)}=1 \leadsto \frac{\cancel{v^2}-v-\cancel{1}}{\cancel{(v+1)}(v-1)}=\frac{\cancel{v^2}-\cancel{1}}{(v-1)\cancel{(v+1)}}$$

C.E. $v\neq\pm1$

$v=0 \leadsto 5^x=0$ Impossibile perché la funzione esponenziale è sempre positiva

<u>n 250</u>:

$$\left(\frac{2}{5}\right)^{x-1}-\left(\frac{5}{2}\right)^{\frac{x-1}{x}}=0$$

Bravo Valerio

BV

C.E.: $x\neq 0$

$$\left(\frac{5}{2}\right)^{-(x-1)}-\left(\frac{5}{2}\right)^{\frac{x-1}{x}}=0 \;\boxed{\leadsto}\; \left(\frac{5}{2}\right)^{1-x}=\left(\frac{5}{2}\right)^{\frac{x-1}{x}} \overset{inj}{\leadsto}$$

$$1-x=\frac{x-1}{x} \leadsto \cancel{x}-x^2=\cancel{x}-1 \leadsto x^2=1$$

$x=\pm1$

<u>Pag 616 n 304</u>

Divido per 5^{x+2}

$$\frac{3^{x+2}}{25}<5^x \leadsto 3^{x+2}<5^{x+2} \leadsto \left(\frac{3}{5}\right)^{x+2}<1$$

$$\left(\frac{3}{5}\right)^{x+2} < \left(\frac{3}{5}\right)^{0} \overset{\text{inj}}{\rightsquigarrow} \quad x+2 \boxed{>} 0$$

↳ Dato che la base è $\frac{3}{5}$ e $0 < \frac{3}{5} < 1$, si inverte il segno poiché funz. exp decrescente

$x > -2$

n 302:

$$4 \cdot 2^{3x} - 4^{x+2} < 0$$

$$4 \cdot 2^{3x} - 2^{2x+4} < 0$$

$$2^{3x+2} - 2^{2x+4} < 0 \quad \overset{\text{BV}}{\rightsquigarrow} \quad 2^{3x+2} < 2^{2x+4} \quad \overset{\text{inj}}{\rightsquigarrow}$$

$$3x+2 < 2x+4 \quad \rightsquigarrow \quad x < 2$$

n 311:

$$\overbrace{2^{x+5}}^{2^3 \cdot 2^{x+2}} \cdot 3^{x+2} \leq 8 \cdot 6^{\frac{3x-1}{x}}$$

$$\cancel{2^3}\, 6^{x+2} \leq \cancel{8} \cdot 6^{\frac{3x-1}{x}} \quad \overset{\text{inj / cresc.}}{\rightsquigarrow}$$

$$x+2 \leq \frac{3x-1}{x}$$

$$\frac{3x-1-x^2-2x}{x} \geq 0 \quad \rightsquigarrow \quad \frac{-x^2+x-1}{x} \geq 0$$

$$\frac{x^2-x+1}{x} \leq 0$$

$N \geq 0 \qquad x^2-x+1 \geq 0 \qquad \Delta = 1-4 = -3 < 0$

$D > 0 \qquad x > 0$

$\forall x \in \mathbb{R}$

		0	
N	+		+
D	−	0	+
	−		+

$\rightsquigarrow \quad x < 0$

N 335:

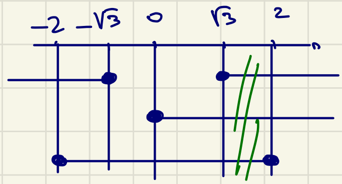
$$\left(\frac{1}{2}\right)^{\sqrt{x^2-3}} \cdot \sqrt[x]{4} - 1 \geq 0$$

$$2^{-\sqrt{x^2-3}} \quad 2^{\frac{2}{x}} - 2^0 \geq 0 \quad \overset{BV}{\rightsquigarrow} \quad 2^{\frac{2}{x}-\sqrt{x^2-3}} \geq 2^0 \quad \overset{\text{inj/cres.}}{\rightsquigarrow}$$

$$\frac{2}{x} - \sqrt{x^2-3} \geq 0 \qquad \boxed{\frac{2-x\sqrt{x^2-3}}{x} \geq 0}$$

N: $2-x\sqrt{x^2-3} \geq 0 \qquad x\sqrt{x^2-3} \leq 2$

$$\begin{cases} x^2-3 \geq 0 \\ x \geq 0 \\ x^2(x^2-3) \leq 4 \quad \text{III)} \end{cases} \qquad \begin{cases} x \leq -\sqrt{3} \ \vee \ x \geq \sqrt{3} \\ x \geq 0 \\ -2 \leq x \leq 2 \end{cases}$$



III) $x^4 - 3x^2 - 4 \leq 0$

$(x^2-4)(x^2+1) \leq 0$

$(x-2)(x+2)(x^2+1) \leq 0$

$\rightsquigarrow$ Sol. Num: $\sqrt{3} \leq x \leq 2$

i) $x-2 \geq 0 \qquad x \geq 2$

ii) $x+2 \geq 0 \qquad x \geq -2$

iii) $x^2+1 \geq 0 \qquad \forall x \in \mathbb{R}$

		-2		2	
i)	$-$		$-$		$+$
ii)	$-$		$+$		$+$
iii)	$+$		$+$		$+$
	$+$		$-$		$+$

$-2 \leq x \leq 2$

D: $x > 0$

		0		$\sqrt{3}$		2	
N	$-$		$-$		$+$		$-$
D	$-$		$+$		$+$		$+$
	$+$		$-$		$+$		$-$

$\rightsquigarrow \quad x < 0 \quad \vee$

$\sqrt{3} \leq x \leq 2$

Warning: Ci sono delle C.E. che rimangono sempre che sono

- $x^2 - 3 \geq 0 \quad \rightsquigarrow \quad x \leq -\sqrt{3} \quad \vee \quad x \geq \sqrt{3}$
- $x > 0 \quad$ Poiché compare $\sqrt[x]{4}$

Con queste la soluzione finale esce: $\sqrt{3} \leq x \leq 2$

n 334:

$$\frac{5}{3^x-3}+\frac{2\cdot 3^x}{3^x+3}\geq\frac{18-2\cdot 9^x}{9^x-9}$$

$3^x = t$

$$\frac{5}{t-3}+\frac{2t}{t+3}\geq\frac{18-2t^2}{t^2-9}$$

$$\frac{5t+15+2t^2-6t-18+2t^2}{(t-3)(t+3)}\geq 0$$

$$\frac{4t^2-t-3}{(t-3)(t+3)}\geq 0$$

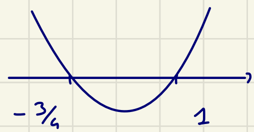
Trin. molto speciale

N: $4t^2-t-3\geq 0$ $\quad$ $4t^2-4t+3t-3\geq 0$

$4t(t-1)+3(t-1)\geq 0$

$(4t+3)(t-1)\geq 0$

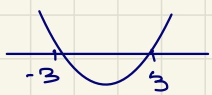
$t=1 \quad t=-\frac{3}{4}$



$t\leq -\frac{3}{4} \vee t\geq 1$

D: $(t-3)(t+3)>0$

$t=3,\ t=-3$



$\rightsquigarrow \quad t<-3 \vee t>3$

		-3		$-3/4$		1		3	
N	+		+	●	−	●	+		+
D	+	○	−		−		−	○	+
	+		−		+		−		+

i) $t<-3$

ii) $-\frac{3}{4}\leq t\leq 1$

iii) $t>3$

i) $3^x<-3$ Mai vero perché exp sempre positive

ii) $-\frac{3}{4}\leq 3^x\leq 1=3^0$ $\overset{inj}{\rightsquigarrow}$ $x\leq 0$

iii) $3^x>3$ $\overset{inj}{\rightsquigarrow}$ $x>1$