Trovare l'insieme di definizione

8/11/2021

119 $\sqrt{\dfrac{1}{x}-\dfrac{2}{x-1}}$ $\quad [x \leq -1 \vee 0 < x < 1]$

120 $\sqrt{-\left|\dfrac{x+1}{x}\right|}$ $\quad [x = -1]$

119) $\dfrac{1}{x}-\dfrac{2}{x-1} \geq 0 \qquad \dfrac{x-1-2x}{x(x-1)} \geq 0 \qquad \dfrac{-x-1}{x(x-1)} \geq 0$

$$\frac{\overbrace{x+1}^{N_1}}{\underbrace{x}_{D_1}\underbrace{(x-1)}_{D_2}} \leq 0$$

$N_1 \quad x+1>0 \quad x>-1$

$D_1 \quad x>0 \quad x>0$

$D_2 \quad x-1>0 \quad x>1$

		-1		0		1	
N_1	$-$	0	$+$		$+$		$+$
D_1	$-$		$-$	$\nexists$	$+$		$+$
D_2	$-$		$-$		$-$	$\nexists$	$+$
	$-$	0	$+$	$\nexists$	$-$	$\nexists$	$+$

$$\boxed{x \leq -1 \quad \vee \quad 0 < x < 1}$$

120) $\sqrt{-\left|\dfrac{x+1}{x}\right|}$

$$-\left|\frac{x+1}{x}\right| \geq 0 \qquad \left|\frac{x+1}{x}\right| \leq 0 \Rightarrow \frac{x+1}{x} = 0 \Rightarrow \boxed{x=-1}$$

perché un modulo è sempre ≥ 0

137 $\dfrac{1}{\sqrt{x^2+1}} + \dfrac{1}{\sqrt{-x^2+3x}}$ $\qquad [0 < x < 3]$

$$\begin{cases} x^2+1 > 0 \\ -x^2+3x > 0 \end{cases} \qquad \begin{cases} x \in \mathbb{R} \\ x^2-3x < 0 \end{cases} \qquad \begin{cases} x \in \mathbb{R} \\ x(x-3) < 0 \end{cases}$$

$$\underbrace{x}_{N_1}\underbrace{(x-3)}_{N_2} < 0$$

$N_1 : x > 0$

$N_2 : x-3 > 0 \Rightarrow x > 3$

		0		3	
N_1	$-$	0	$+$		$+$
N_2	$-$		$-$	0	$+$
	$+$	0	$\ominus$	0	$+$

$$\begin{cases} x \in \mathbb{R} \\ 0 < x < 3 \end{cases} \Rightarrow \boxed{0 < x < 3}$$

PRODOTTO DI RADICALI

le due radici devono avere lo stesso indice

246 $\sqrt{18} \cdot \sqrt{2} = \sqrt{18 \cdot 2} = \sqrt{36} = 6$

Infatti:

$$\left(\sqrt{18} \cdot \sqrt{2}\right)^2 = \left(\sqrt{18}\right)^2 \cdot \left(\sqrt{2}\right)^2 = 18 \cdot 2 = 36$$

$$\Downarrow$$

$$\sqrt{18} \cdot \sqrt{2} = \sqrt{36}$$

251 $\sqrt[3]{\frac{2}{5}} \cdot \sqrt[3]{\frac{25}{8}} = \sqrt[3]{\frac{\cancel{2}^{1}}{\cancel{5}_{1}} \cdot \frac{\cancel{25}^{5}}{\cancel{8}_{4}}} = \sqrt[3]{\frac{5}{4}}$

DIVISIONE DI RADICALI

anche qui l'indice delle radice dev'essere lo stesso

262 $\sqrt[4]{12} : \sqrt[4]{3} = \sqrt[4]{12 : 3} = \sqrt[4]{4} =$

$$= \sqrt[\cancel{4}\,2]{2^{\cancel{2}\,1}} = \sqrt{2}$$

271 $\sqrt{\frac{x-2}{x+3}} : \sqrt{\frac{x^2-4}{x+3}} = \sqrt{\frac{x-2}{x+3} : \frac{x^2-4}{x+3}} =$

$$= \sqrt{\frac{\cancel{x-2}}{\cancel{x+3}} \cdot \frac{\cancel{x+3}}{(x+2)\cancel{(x-2)}}} = \sqrt{\frac{1}{x+2}}$$

E se l'indice è diverso?

277 $\sqrt{2}\cdot\sqrt[3]{2}$ $= \sqrt[6]{2^3}\cdot\sqrt[6]{2^2} = \sqrt[6]{2^3\cdot 2^2} = \sqrt[6]{2^5} = \sqrt[6]{32}$

calcolo il m.c.m.
degli indici e porto
le due radici allo
stesso indice

284 $\sqrt[3]{\dfrac{1}{2}}\cdot\sqrt[4]{\dfrac{2}{3}}$ $= \sqrt[12]{\dfrac{1^4}{2^4}}\cdot\sqrt[12]{\dfrac{2^3}{3^3}} = \sqrt[12]{\dfrac{1}{2^{\cancel{4}\,1}}\cdot\dfrac{\cancel{2^3}}{3^3}} =$

$= \sqrt[12]{\dfrac{1}{54}}$

292 $\sqrt{x^9y^3}:\sqrt[3]{x^5y}$ $\left[\sqrt[6]{x^{17}y^7}\right]$

293 $\sqrt{x^2y^5}\cdot\sqrt[3]{xy}$ $\left[\sqrt[6]{x^8y^{17}}\right]$

292) $\sqrt{x^9y^3}:\sqrt[3]{x^5y} = \sqrt[6]{x^{27}y^9}:\sqrt[6]{x^{10}y^2} =$

$= \sqrt[6]{\dfrac{x^{\cancel{27}\,17}\,y^{\cancel{9}\,7}}{\cancel{x^{10}}\;\cancel{y^2}}} = \sqrt[6]{x^{17}y^7}$

293) $\sqrt{x^2y^5}\cdot\sqrt[3]{xy} = \sqrt[6]{x^6y^{15}}\cdot\sqrt[6]{x^2y^2} = \sqrt[6]{x^8y^{17}}$

295 $\sqrt{a^4b^6} : \sqrt[6]{a^9b^3} =$

$$= \sqrt[6]{a^{12}b^{18}} : \sqrt[6]{a^9b^3} = \sqrt[\cancel{6}^{\,2}]{a^{\cancel{3}^{\,1}}b^{\cancel{15}^{\,5}}} = \sqrt{ab^5}$$