RECUPERO

LE ESPRESSIONI CON LE FRAZIONI ALGEBRICHE

1 **COMPLETA**

Semplifica la seguente espressione:

$$\left(x+1+\frac{2x+2}{x-1}\right)\cdot\left(\frac{x}{x^2+x}\right).$$

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

$$=\left(\frac{x+1}{\dots}+\frac{2x+2}{x-1}\right)\cdot\frac{x}{x(\dots+1)}=$$

Scomponi il denominatore x^2+x e scrivi $x+1$ come frazione.

Campo di esistenza:

Determina le C.E. delle frazioni che compaiono.

$x-1\neq 0\rightarrow x\neq\dots;\quad x\neq 0;\quad x+1\neq 0\rightarrow x\neq\dots$

$$=\left[\frac{(x+1)(\dots)+2x+\dots}{x-1}\right]\cdot\frac{x}{x(\dots+1)}=$$

$$=\frac{x^2-\dots+2x+\dots}{x-1}\cdot\frac{x}{x(\dots+1)}=$$

Calcola i prodotti indicati ed elimina la parentesi tonda.

$$=\frac{x^2+2x+\dots}{x-1}\cdot\frac{x}{x(\dots+1)}=$$

Somma i termini simili nella prima frazione.

$$=\frac{(x+\dots)^{\dots}}{x-1}\cdot\frac{x}{x(\dots+1)}=\frac{x+\dots}{x-1}.$$

Scomponi x^2+2x+1 e semplifica i numeratori con i denominatori.

2 **PROVA TU**

Semplifica la seguente espressione:

$$\frac{a}{a+1}+\frac{1}{a-1}+\frac{2a}{a^2-1}.$$

$$\frac{a}{a+1}+\frac{1}{a-1}+\frac{2a}{a^2-1}=$$

$$=\frac{a}{a+1}+\frac{1}{a-1}+\frac{2a}{(a+\dots)(a-\dots)}=$$

C.E.:

$a+1\neq\dots\rightarrow a\neq\dots$

$a-\dots\neq 0\rightarrow a\neq\dots$

$$=\frac{a(a\dots)+1(a\dots1)+2a}{(a+1)(\dots-1)}=$$

$$=\frac{a^2\dots a+\dots+1+2a}{(a+1)(\dots-1)}=$$

$$=\frac{a^2+2a+1}{(a+1)(\dots-1)}=$$

$$=\frac{(a+\dots)^{\dots}}{(a+1)(\dots-1)}=$$

$$=\frac{a+\dots}{\dots-1}.$$

3 **PROVA TU**

Semplifica la seguente espressione:

$$\left(x-2-\frac{5}{x+2}\right)\cdot\frac{x^2-4}{x-3}.$$

$$\left(x-2-\frac{5}{x+2}\right)\cdot\frac{x^2-4}{x-3}=$$

$$=\left(\frac{x-2}{1}-\frac{5}{x+2}\right)\cdot\frac{(x+\ldots)(x-\ldots)}{x-3}=$$

C.E.:

$x+\ldots\neq 0\rightarrow x\neq\ldots$

$x-3\neq 0\rightarrow x\neq\ldots$

$$=\left[\frac{(x-2)(x+\ldots)-5}{x+2}\right]\cdot\frac{(x+\ldots)(x-\ldots)}{x-3}=$$

$$=\frac{x^2-\ldots-5}{x+2}\cdot\frac{(x+\ldots)(x-\ldots)}{x-3}=$$

$$=\frac{x^2-\ldots}{x+2}\cdot\frac{(x+\ldots)(x-\ldots)}{x-3}=$$

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

$$=(x+\ldots)(x-\ldots).$$

4 **PROVA TU**

Semplifica la seguente espressione:

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

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

$$\left[\frac{(2x-1)^{\cdots}}{(y-1)(y+\ldots)}\right]^{\cdots}\cdot\frac{1}{(2x^2-\ldots)^{\cdots}}\cdot[(y-\ldots)(y^2+y+1)]^{\cdots}=$$

$$=\left[\frac{(2x-1)^{\cdots}}{(y-1)(y+\ldots)}\right]^{\cdots}\cdot\frac{1}{x^{\cdots}(2x-1)^{\cdots}}\cdot(y-\ldots)^{\cdots}(y^2+y+1)^{\cdots}=$$

C.E.: $y\neq\pm\ldots\wedge x\neq\ldots\wedge x\neq\dfrac{1}{\ldots}$

$$=\frac{(2x-1)^{\cancel{\cdots}\cdots}}{\cancel{(y-1)}^{\cdots}(y+\ldots)^{\cdots}}\cdot\frac{1}{x^{\cdots}\cancel{(2x-1)}^{\cdots}}\cdot(y-\ldots)^{\cancel{\cdots}\cdots}(y^2+y+1)^{\cdots}=$$

$$=\frac{(2x-1)^{\cdots}(y-1)(y^2+y+1)^{\cdots}}{x^{\cdots}(y+\ldots)^{\cdots}}$$

Semplifica le seguenti espressioni.

5 $\frac{1}{4b} - \frac{2}{3b} + \frac{1}{12b}$ $\left[-\frac{1}{3b}; b \neq 0\right]$

6 $\frac{b+1}{ab^2} - \frac{a-1}{a^2b}$ $\left[\frac{a+b}{a^2b^2}; a \neq 0 \wedge b \neq 0\right]$

7 $\frac{1}{2a^2b} + \frac{2}{3ab^2}$ $\left[\frac{3b+4a}{6a^2b^2}; a \neq 0 \wedge b \neq 0\right]$

8 $x + \frac{2x+1}{x-1}$ $\left[\frac{x^2+x+1}{x-1}; x \neq 1\right]$

9 $\frac{a}{a-1} + \frac{2}{a-2} - \frac{1}{a-1}$ $\left[\frac{a}{a-2}; a \neq 2 \wedge a \neq 1\right]$

10 $\frac{x+2}{x+1} - \frac{x-1}{x+2} - \frac{1}{x+1}$ $\left[\frac{3}{x+2}; x \neq -2 \wedge x \neq -1\right]$

11 $\left(\frac{1}{2a^2} - \frac{1}{2b^2}\right) : \left(\frac{1}{a} + \frac{1}{b}\right)$ $\left[\frac{b-a}{2ab}; a \neq 0 \wedge b \neq 0 \wedge a \neq -b\right]$

12 $\left(a + 1 + \frac{2-2a}{a-1}\right) \cdot \frac{1}{2a}$ $\left[\frac{a-1}{2a}; a \neq 1 \wedge a \neq 0\right]$

13 $\left(a - \frac{b^2}{a}\right) : \left(1 - \frac{b}{a}\right)$ $[a+b; a \neq 0 \wedge a \neq b]$

14 $\left(1 - \frac{a}{4-a}\right) : \left(\frac{2}{a} - 1\right)$ $\left[\frac{2a}{4-a}; a \neq 0 \wedge a \neq 4 \wedge a \neq 2\right]$

15 $\left(\frac{a^2+4}{a+4} - a\right) \cdot \frac{a+4}{1-a}$ $[4; a \neq -4 \wedge a \neq 1]$

16 $\left(\frac{1}{a} + \frac{1}{a+1}\right) \cdot \left(1 - \frac{a}{2a+1}\right)$ $\left[\frac{1}{a}; a \neq 0 \wedge a \neq -1 \wedge a \neq -\frac{1}{2}\right]$

17 $\left(a - \frac{a}{a+1}\right) : \left(1 - \frac{2a}{a-1}\right) \cdot \left(\frac{1}{a^2} + \frac{2}{a} + 1\right)$ $[1-a; a \neq \pm 1 \wedge a \neq 0]$

18 $\left(\frac{1}{4x^2} - \frac{1}{4y^2}\right) : \left(\frac{1}{2x} + \frac{1}{2y}\right) \cdot 4xy$ $[2(y-x); x \neq 0 \wedge y \neq 0 \wedge x \neq -y]$