SIMULAZIONE 1 (sulle frazioni algebriche) – CORREZIONE

1)

$$\frac{\frac{1}{a-b}-\frac{1}{a+b}}{\frac{1}{a-b}+\frac{1}{a+b}}-\frac{b}{a}=\frac{\frac{\cancel{a}+b\cancel{-a}+b}{(a-b)(a+b)}}{\frac{a\cancel{+b}+a\cancel{-b}}{(a-b)(a+b)}}-\frac{b}{a}=\frac{\cancel{2}b}{\cancel{(a-b)(a+b)}}\cdot\frac{\cancel{(a-b)(a+b)}}{\cancel{2}a}-\frac{b}{a}=\frac{b}{a}-\frac{b}{a}=0$$

2)

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

3)

$$\frac{\frac{k-2}{k+2}+\frac{k+2}{k-2}+2}{\frac{k-2}{k+2}+\frac{k+2}{k-2}-2}-\left(\frac{k}{2}\right)^2=\frac{\frac{(k-2)^2+(k+2)^2+2(k+2)(k-2)}{(k+2)(k-2)}}{\frac{(k-2)^2+(k+2)^2-2(k+2)(k-2)}{(k+2)(k-2)}}-\frac{k^2}{4}=$$

$$=\frac{\frac{k^2\cancel{-4k}\cancel{+4}+k^2\cancel{+4k}\cancel{+4}+2k^2\cancel{-8}}{(k+2)(k-2)}}{\frac{\cancel{k^2}\cancel{-4k}+4\cancel{+k^2}\cancel{+4k}+4\cancel{-2k^2}+8}{(k+2)(k-2)}}-\frac{k^2}{4}=\frac{\cancel{4}k^2}{\cancel{(k+2)(k-2)}}\cdot\frac{\cancel{(k+2)(k-2)}}{\cancel{16}\,4}-\frac{k^2}{4}=\frac{k^2}{4}-\frac{k^2}{4}=0$$

4)

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

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

5)

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

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

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

6)

$$\left[\frac{x+2y}{x^2-5xy+6y^2}+\frac{x-2y}{(x+2y)(3y-x)}\right]\cdot(4y^2-x^2)=\left[\frac{x+2y}{(x-2y)(x-3y)}-\frac{x-2y}{(x+2y)(x-3y)}\right]\cdot(2y+x)(2y-x)=$$

$$=\frac{(x+2y)^2-(x-2y)^2}{\cancel{(x+2y)}\cancel{(x-2y)}(x-3y)}\cancel{(2y+x)}\overset{-1}{\cancel{(2y-x)}}=-\frac{\cancel{x^2}+4xy\cancel{+4y^2}\cancel{-x^2}+4xy\cancel{-4y^2}}{x-3y}=-\frac{8xy}{x-3y}$$

7)

$$\frac{x^3+4x^2+4x+1}{x^3+8x^2+8x+1}=\frac{\cancel{(x+1)}(x^2+3x+1)\ \textit{(Ruffini)}}{\cancel{(x+1)}(x^2+7x+1)\ \textit{(Ruffini)}}=\frac{x^2+3x+1}{x^2+7x+1}$$