

SIMULAZIONE 1 (sulle frazioni algebriche) – CORREZIONE

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

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

$$3) \quad \frac{\frac{k-2}{k+2} + \frac{k+2}{k-2} + 2}{\frac{k-2}{k+2} + \frac{k+2}{k-2} - 2} - \left(\frac{k}{2}\right)^2 = \frac{(k-2)^2 + (k+2)^2 + 2(k+2)(k-2)}{(k+2)(k-2)} - \frac{k^2}{4} =$$

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

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

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

$$5) \quad \frac{1}{2} \cdot \left(\frac{1}{t^3 + t^2 - t - 1} - \frac{1}{t^3 + 3t^2 + 3t + 1} \right) (t^2 - 1)^2 = \frac{1}{2} \cdot \left[\frac{1}{t^2(t+1) - (t+1)} - \frac{1}{(t+1)^3} \right] (t^2 - 1)^2 =$$

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

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

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

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

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