

SIMULAZIONE 2 (sulle frazioni algebriche) – CORREZIONE

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

$$= \frac{2(a-b) + 2(a+b) - 3a}{(a+b)(a-b)} \cdot \frac{(a+b)(a-b)}{a} = \frac{2a - 2b + 2a + 2b - 3a}{a} = \frac{a}{a} = 1$$

$$2) \frac{\frac{b+3}{b-3} - \frac{b-3}{b+3}}{1 - \frac{b-3}{b+3}} - 2 \cdot \frac{b}{b-3} = \frac{\frac{(b+3)^2 - (b-3)^2}{(b-3)(b+3)}}{\frac{b+3-b+3}{b+3}} - \frac{2b}{b-3} = \frac{\cancel{b^2} + 6b + 9 - \cancel{b^2} + 6b - 9}{b+3} - \frac{2b}{b-3} =$$

$$= \frac{12b}{(b-3)(b+3)} - \frac{2b}{b-3} = \frac{12b}{(b-3)(b+3)} - \frac{2b}{b-3} \cdot \frac{b+3}{b+3} = \frac{12b}{(b-3)(b+3)} - \frac{2b(b+3)}{(b-3)(b+3)} = 0$$

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

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

$$4) \quad a^2 + a - 2 = (a+2)(a-1)$$

$$\left(\frac{1}{a^2+a-2} - \frac{1}{2a^2-a-1} \right) \cdot (2a^2+5a+2) = \frac{2a^2-a-1}{2a^2-a-1} - \frac{2a^2-a-1}{2a^2-a-1} = 2a^2 - a - 1 = 2a^2 - 2a + a - 1 = 2a(a-1) + (a-1) = (a-1)(2a+1)$$

$$2a^2 + 5a + 2 = 2a^2 + 4a + a + 2 = 2a(a+2) + (a+2) = (a+2)(2a+1)$$

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

$$5) \left(\frac{1}{x^2+4x-12} - \frac{1}{x^2+12x+36} \right) \cdot \frac{x^2-36}{16} \cdot (2x-4) = \left[\frac{1}{(x+6)(x-2)} - \frac{1}{(x+6)^2} \right] \cdot \frac{(x+6)(x-6)}{16} \cdot \cancel{2}(x-2) =$$

$$= \frac{\cancel{x+6} - \cancel{x+6} + 2}{(x+6)^2(x-2)} \cdot \frac{(x+6)(x-6)}{8} \cdot (x-2) = \frac{2}{(x+6)^2} \cdot \frac{(x+6)(x-6)}{8} \cdot (x-2) = \frac{x-6}{x+6}$$

$$6) \left[\frac{2x-5}{x^3-2x^2-x+2} - \frac{x-1}{(1+x)(2-x)} \right] \cdot \frac{(1-x)^2}{x+2} = \left[\frac{2x-5}{x^2(x-2)-(x-2)} + \frac{x-1}{(x+1)(x-2)} \right] \cdot \frac{(x-1)^2}{x+2} =$$

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

$$= \frac{\cancel{2x}-5+x^2-\cancel{2x}+1}{(x-2)(x+1)(x-1)} \cdot \frac{(x-1)^2}{x+2} = \frac{x^2-4}{(x-2)(x+1)} \cdot \frac{x-1}{x+2} = \frac{(x+2)(x-2)}{(x-2)(x+1)} \cdot \frac{x-1}{x+2} = \frac{x-1}{x+1}$$

$$7) \frac{x^3+2x^2-1}{xy^2+x^2+y^2-1} = \frac{(x+1)(x^2+x-1) \text{ (Ruffini)}}{y^2(x+1)+(x+1)(x-1)} = \frac{\cancel{(x+1)}(x^2+x-1)}{\cancel{(x+1)}(y^2+x-1)} = \frac{x^2+x-1}{y^2+x-1}$$