

$$E(x) = \left[ \left( \frac{x^2 - x}{x^2 + 1} + \frac{2x^2}{x^3 - x^2 + x - 1} \right) : \frac{x^2}{x^2 - 1} \right] : \frac{5x^2 + 12x + 7}{2x^2 + 3x}$$

P.c.  $x^2 + 1 \neq 0 \Leftrightarrow x^2 \neq -1$  (A)  $(\forall) x \in \mathbb{R}$ , dov'  $x^2 \geq 0 \Rightarrow x^2 = -1$  (impossibile)

$$x^3 - x^2 + x - 1 \neq 0 \Leftrightarrow x^2(x-1) + 1 \cdot (x-1) \neq 0 \Leftrightarrow (x-1)(x^2+1) \neq 0 \Leftrightarrow$$

$$x-1 \neq 0 \text{ o } x^2+1 \neq 0 \text{ (A)}$$

$$x \neq 1$$

$$x^2 - 1 \neq 0 \Leftrightarrow x^2 \neq 1 \Leftrightarrow \sqrt{x^2} \neq \sqrt{1} \Leftrightarrow |x| \neq 1 \Rightarrow \begin{cases} x \neq 1 \\ \text{e} \\ x \neq -1 \end{cases}$$

$$x^2 \neq 0 \Leftrightarrow x \neq 0 \quad 5x^2 + 12x + 7 \neq 0 \Leftrightarrow$$

$$5x^2 + 5x + 7x + 7 \neq 0 \Leftrightarrow 5x(x+1) + 7(x+1) \neq 0 \Leftrightarrow$$

$$(x+1)(5x+7) \neq 0 \Rightarrow x \neq -1 \text{ o } x \neq -\frac{7}{5}$$

$$2x^2 + 3x \neq 0 \Leftrightarrow x \cdot (2x+3) \neq 0 \Leftrightarrow x \neq 0 \text{ o } x \neq -\frac{3}{2}$$

$$x \in \mathbb{R} \setminus \left\{ 0, -\frac{3}{2}, 1, -1, -\frac{7}{5} \right\}$$

$$E(x) = \left( \frac{x^2 - x}{x^2 + 1} + \frac{2x^2}{(x-1)(x^2+1)} \right) \cdot \frac{(x-1)(x+1)}{x^2} \cdot \frac{x(2x+3)}{(x+1)(5x+7)}$$

$$E(x) = \frac{x^3 - x - x^2 + x + 2x^2}{(x+1)(x^2+1)} \cdot \frac{(x+1)(2x+3)}{x \cdot (5x+7)}$$

$$E(x) = \frac{x(x^2+1)}{x^2+1} \cdot \frac{2x+3}{x(5x+7)} \Rightarrow E(x) = \frac{2x+3}{5x+7}$$

$$F(x) = \frac{x^2 + 3x - 4}{x-1} - \frac{x-1}{x+1} \left\{ \begin{array}{l} \text{P.c. } x-1 \neq 0 \Rightarrow x \neq 1 \\ x+1 \neq 0 \Rightarrow x \neq -1 \end{array} \right.$$

$$x^2 + 3x - 4 = x^2 + 4x - x - 4 =$$

$$= x(x+4) - 1 \cdot (x+4) = (x+4)(x-1)$$

$$F(x) = \frac{(x+4)(x+1)}{x-1} - \frac{x-1}{x+1} = \frac{x+4}{1} - \frac{x-1}{x+1} = \frac{x^2 + 4x + x + 4}{x+1} - \frac{x-1}{x+1}$$

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

Effectuati:  $x^{-1}$

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

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