

$$(a-b)(a+b) = a^2 - b^2$$

Lezione 41

$$\begin{aligned}
 & (x-1)^8 : (x-1)^6 \cdot x \left[ (x-1)^8 : (x-1)^5 - (x-1)^3 + 1 \right] \cdot \frac{(x-1)(x+1) + x^3}{x^3} = \\
 & = (x-1)^2 + x \frac{(x-1)^3 - (x^3 - 1 - 3x^2 + 3x) + 1}{x^3} \cdot [x^2 - 1] + x^3 = \\
 & = x^2 + 1 - 2x + x \frac{1}{x^3} \cdot (x^2 - 1) + x^3 = \\
 & = x^2 + 1 - 2x + x \frac{x^2 - 1}{x^3} + x^3 = \\
 & = x^2 + 1 - 2x + \frac{x^3}{x^3} + \frac{x^2 - 1}{x^2} + x^3 = \\
 & = x^2 + 1 - 2x + 1 + \frac{x^2 - 1}{x^2} + x^3 = \boxed{x^2 - x + 1} \quad \begin{matrix} (a+b)(a-b) \\ = a^2 - b^2 \end{matrix}
 \end{aligned}$$

$$\begin{aligned}
 & (x-3y) \cdot (x+3y) (x^2+9y^2) - 9(x^4-9y^4) = \\
 & = (x^2-9y^2)(x^2+9y^2) - 9x^4 + 81y^4 = \\
 & = (x^2)^2 - (9y^2)^2 - 9x^4 + 81y^4 = \\
 & = x^4 - 81y^4 - 9x^4 + 81y^4 = x^4 - 9x^4 = (1-9)x^4 = \\
 & = \underline{-8x^4}
 \end{aligned}$$

$$(a+b)(a-b) - a(a-2b) =$$

$$= \cancel{a^2} - b^2 - \cancel{a^2} + 2ab = \underline{2ab - b^2}$$

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$$(p^2+1)(p+1)(p-1) - p^3(p-1) + \underbrace{(1-p)(p^2+p+1)}_{\substack{1 \\ \text{DIFFERENZA} \\ \text{DI CUBI}}} =$$

$$= (p^2+1)(p^2-1) - p^4 + p^3 + 1^3 - p^3 =$$

$$= \cancel{p^4} - 1 - \cancel{p^4} + \cancel{p^3} + 1 - \cancel{p^3} = 0$$

$$\boxed{a^3 - b^3 = (a-b)(a^2 + ab + b^2)}$$

$$\begin{aligned}
& \sqrt{(3 - \sqrt{5})} \cdot \sqrt{(3 + \sqrt{5})} \cdot \sqrt{(6 - 4\sqrt{2})} \cdot \sqrt{(6 + 4\sqrt{2})} \\
&= \sqrt{\underbrace{(3 - \sqrt{5})}_{(a-b)} \cdot \underbrace{(3 + \sqrt{5})}_{(a+b)}} \cdot \sqrt{\underbrace{(6 - 4\sqrt{2})}_{(a-b)} \cdot \underbrace{(6 + 4\sqrt{2})}_{(a+b)}} = \\
&= \sqrt{(9 - 5)} \cdot \sqrt{(36 - 32)} \\
&= \sqrt{4} \cdot \sqrt{4} = \underline{2} \cdot \underline{2} = 4
\end{aligned}$$

$$\textcircled{A} \left( \frac{1}{3+\sqrt{3}} \right) - \textcircled{B} \left( \frac{1}{3-\sqrt{3}} \right) - \sqrt{3}$$

$$\textcircled{A} \frac{1}{\cancel{3} + \cancel{\sqrt{3}}} \cdot \frac{\cancel{3} - \cancel{\sqrt{3}}}{\cancel{3} - \cancel{\sqrt{3}}} = \frac{3-\sqrt{3}}{9-3} = \boxed{\frac{3-\sqrt{3}}{6}}$$

$$\textcircled{B} \frac{1}{\cancel{3} - \cancel{\sqrt{3}}} \cdot \frac{\cancel{3} + \cancel{\sqrt{3}}}{\cancel{3} + \cancel{\sqrt{3}}} = \frac{3+\sqrt{3}}{9-3} = \boxed{\frac{3+\sqrt{3}}{6}}$$

$$= \frac{3-\sqrt{3}}{6} - \frac{3+\sqrt{3}}{6} - \frac{\sqrt{3}}{1} =$$

$$= \frac{3-\sqrt{3} - (3+\sqrt{3}) - 6\sqrt{3}}{6} = \frac{\cancel{3} - \sqrt{3} - \cancel{3} - \sqrt{3} - 6\sqrt{3}}{6} =$$

$$= \frac{-4\sqrt{3}}{6} = \boxed{-\frac{4\sqrt{3}}{3}}$$