[Ex da 72 a 82 pag. 171] $\Rightarrow$ INTEGRALI DEFINITI

DEFINITO $\Rightarrow f(x) = \int_a^b f'(x)$ b/a = ESTREMI

$[f(b) - f(a)$ $x=2$ $x=0$

$\quad\; 2 \qquad\; 0$

72 $\int_{-2}^{2\sqrt{3}} \frac{1}{\underbrace{(x^2+4)}_{t}} dx$ COMPOSTO → NO SOST. → PARTI $\left[\frac{7\pi}{24}\right]$ → PAG. 171 ES. 72

⇓ (RISOLVI PER x)

$t = x^2 + 4 \qquad t - 4 = x^2 \qquad x = \sqrt{t-4}$

$x = (t-4)^{1/2}$

$f(x) = \int x \to \frac{x^2}{2}$ $dx = \frac{1}{2}(t-4)^{1/2-1}$

$\to f(x) = x^2 \quad f'(x) = 2x^{2-1}$ $= \frac{1}{2}(t-4)^{-\frac{1}{2}}$

$\int_{-2}^{2\sqrt{3}} \frac{1}{x^2+4} dx = \frac{1}{2} \int_{-2}^{2\sqrt{3}} \frac{1}{t} (t-4)^{-1/2}$

COMPLICATO ... → NO!

→ $\int \frac{1}{x^2+1} dx = \arctan x + c$ (IMMEDIATO)

$\int \frac{1}{x^2+4} \to$ $\int \frac{dx}{x^2+a^2} = \frac{1}{a}\arctan\left(\frac{x}{a}\right) + C$ $= \left[\frac{1}{2}\arctan\left(\frac{x}{2}\right)\right]_{-2\,(a)}^{2\sqrt{3}\,(b)}$

$(2)^2$ RISULTATO TROVI IL RISULTATO

POI SOSTITUISCI a e b $\left[\; = f(2\sqrt{3}) - f(-2)\right.$

$= \left[\frac{1}{2}\arctan\left(\frac{2\sqrt{3}}{2}\right) - \frac{1}{2}\arctan\left(-\frac{2}{2}\right)\right]$

$\frac{1}{2}\arctan\sqrt{3} - \frac{1}{2}\arctan(1) \sim \frac{7\pi}{24}$

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73 $\int_1^8 \frac{1}{\sqrt[3]{x}}dx$ $\int_1^8 x^{-1/3}$ $\left[\frac{9}{2}\right]$

$\Rightarrow \left[\frac{x^{+1/3}}{+1/3}\right]_1^8 = \left[\frac{+3}{\sqrt[3]{x}}\right]_1^8$

$= \left[\frac{+3}{\sqrt[3]{8}} - +\frac{3}{\sqrt[3]{1}}\right]$

$2^3 = 8$ $= -\frac{3}{2} - (-3) = -\frac{3}{2} + 3 = \frac{-3+6}{2} = \frac{9}{2}$

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75 $\int_0^2 \frac{1}{x+1}dx$ [ln 3]

$\int_0^2 \frac{1}{x+1} = \left[\ln(x+1)\right]_0^2$

$= \ln(3) - \cancel{\ln(0)}$ 0

$= \ln(3)$

74 **E se?** $\left[\int_0^1 e^{2-x}\,dx\right]$

▶ Cambierebbe la risposta se l'integrale da calcolare fosse $\int_0^1 e^{2-x}\,dt$? $[e^2 - e \text{ sì}, e^{2-x}]$

$\to \int_0^1 e^{2-x}dx = \int_0^1 e^2 \cdot e^{-x}dx$

$= e^2\int_0^1 e^{-x}dx = \left[e^{-x}\right]_0^1$

$\Rightarrow e^2(e^{-1} - \underset{1}{e^0})$ $\frac{e^2(e^{-1}-1)}{e^{2-1}-e}$