Lista 7

① $\int_0^1 (x+1)^2 - x^2 = \int_0^1 x^2 + \int_0^1 2x + \int_0^1 1 = \frac{x^3}{3}\Big|_0^1 + 2\frac{x^2}{2}\Big|_0^1 + x\Big|_0^1$

$\frac{1}{3} + \frac{2}{2} + 1 = \frac{1+3+3}{3} = \frac{7}{3}$ UVA

② $\int_0^2 (x^2+1) = \int_0^2 x^4 + 2x^2 + 1 = \frac{x^5}{5}\Big|_0^2 + 2\frac{x^3}{3}\Big|_0^2 + x\Big|_0^2$

$\frac{32}{5} + \frac{2\cdot 8}{3} + 2 = \frac{96+80+30}{15} = \frac{206}{15}$ UVA

③ $\int_0^1 (x^2)^2 - (x^3)^2 = \int_0^1 x^4 - x^6 = \frac{x^5}{5}\Big|_0^1 - \frac{x^7}{7}\Big|_0^1$

não soube terminar pois faltaro os limites.

④ $\int_0^{\frac{\pi}{4}} (\cos x)^2 - (\sin x)^2 = \int_0^{\frac{\pi}{4}} \cos(2x) = \frac{1}{2}\int_0^{\frac{\pi}{4}} \cos(u) = \frac{1}{2}\sin u\Big|_0^{\frac{\pi}{2}}$

$\frac{\pi}{2}(1-0) = \frac{\pi}{2}$ UV

⑤ $\int_{-1}^{1} x^6 = \frac{x^7}{7}\Big|_{-1}^{1} = \frac{1}{7} + \frac{1}{7} = \frac{2}{7}$ UV

⑥ Não soube passar, $\ln x = y$ para $x = \ldots$

$\int_{1}^{2} (?)^2 - 0^2$

⑦ $\int_{0}^{1} (x^3)^2 + (x^2)^2 = \frac{x^7}{7}\Big|_0^1 + \frac{x^5}{5}\Big|_0^1$

também não soube resolver, pois não estamos definido os limites no eixo X

⑧ $\int_{-2}^{2} (y^2+1)^2 - \frac{1}{4} = \int_{-2}^{2} y^4 + 2y^2 + \frac{8}{4} - \frac{1}{4} = \int_{-2}^{2} y^4 + \int_{-2}^{2} 2y^2 + \int_{-2}^{2} \frac{7}{4}$

$\frac{y^5}{5}\Big|_{-2}^{2} + 2\frac{y^3}{3}\Big|_{-2}^{2} + \frac{7}{4}x\Big|_{-2}^{2} = \left(\frac{32}{5} + \frac{32}{5}\right) + 2\left(\frac{8}{3} + \frac{8}{3}\right) + \frac{7}{4}(4)$

$\frac{64}{5} + \frac{32}{3} + 7 = \frac{192+160+105}{15} = \frac{457}{15}$ πUV

⑨ $\int_{1/4}^{4} \left(\frac{1}{x}\right)^2 = \int_{1/4}^{4} 1x^{-2} = \frac{x^{-1}}{-1}\Big|_{1/4}^{4} = -\frac{1}{x}\Big|_{1/4}^{4}$ $\frac{-1}{16} - \ln$

$\left(-\frac{1}{4} + \frac{1}{1/4}\right) = \left(\frac{-1}{4} + 4\right) = \frac{15}{4}$ πUV

(10) $\int_{\frac{-5\pi}{2}}^{\frac{5\pi}{2}} (3+\sin x)^2 = \int 9 + 6\int \sin x + \int \sin^2 x$

$\pi\left(45\pi + 0 + \frac{5\pi}{2}\right) = \frac{95\pi^2}{2}$ UV