Avaliação Final - Cálculo II
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① $y = x^2 \qquad x = \sqrt[3]{y}$

$\quad y = x^2 \qquad y = x^3$

$\int_0^1 (x)^2 - \int (x^3)^2 \qquad \left(\frac{x^7}{7}\right)_0' = \frac{1}{7}$

$\qquad\qquad\qquad\qquad \frac{1}{5} - \frac{1}{7} = \frac{7-5}{35} = \frac{2\pi}{35}$

$\left(\frac{x^5}{5}\right)_0' = \frac{1}{5}$

② $x = y^2 + 1 \qquad x = \frac{1}{2}$
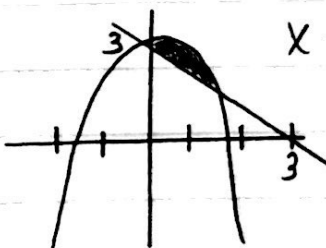
$\int_{-2}^2 (y^2+1)^2 \, dy - \int_{-2}^2 \frac{1}{2} \, dy$

$= \int_{-2}^2 y^2 \, dy + \int_{-2}^2 2y^2 \, dy + \int_{-2}^2 dy - \frac{1}{2}\int_{-2}^2 dy$

$= \frac{y^5}{5} + \frac{2y^3}{3} + y - \frac{1}{2}y \Big|_{y=-2}^{y=2} = \left(\frac{32}{5} + \frac{16}{9} + 2 - 1\right)$

$\dfrac{108 + 80 + 30 - 15 + 108 + 80 + 30 - 15}{15} = \dfrac{406\pi}{15}$

③

$x + y = 3$

$y = 3 - x$

$y = 3 - x^2$

$\int_0^1 3 - x^2 \, dx$

$3\int_0^1 dx - \int_0^1 x^2 \, dx$

$3x - \frac{x^3}{3} \Big|_{x=0}^{x=1}$

$\left[\frac{3(1)\cdot(1)^3}{3}\right] - \left[\frac{3(0)-(0)^3}{3}\right] =$

$3 - \frac{1}{3} - 0 = \frac{8}{3}$

④ a) $\dfrac{df}{dx} = y\,2x + 0 = 2yx \qquad$ b) $\dfrac{df}{dx} = 2x(e^{x^2 y}) = 2xe^{x^2 y}$

$\dfrac{df}{dy} = x^2 1 + 32y = x^2 + 6y \qquad \dfrac{df}{dy} = 1(e^{x^2 y}) = e^{x^2 y}$