/ /

$$\int_0^1 \int_2^4 x^2 \cdot y^3 \cdot dx$$

$$\int_0^1 x^2 \cdot dx \int_2^4 y^3 \cdot dy$$

$$\int_0^1 x^2 \cdot dx \left[\frac{y^4}{4} \right]_2^4$$

$$\int_0^1 x^2 \, dx \left[\frac{4^4}{4} \right] - \left[\frac{2^4}{4} \right] =$$

$$\int_0^1 x^2 \cdot dx \left[60 \right]$$

$$60 \int_0^1 \frac{x^3}{3} \quad \int \frac{1^3}{3} - [0]$$

$$\int \frac{60}{3} = 20$$

3)

3) $\int_2^4 \int_0^1 x^2 \cdot y^3 \cdot dx \cdot dy$

$\int_2^4 y^3 \cdot dy \int_0^1 x^2 \cdot dx$

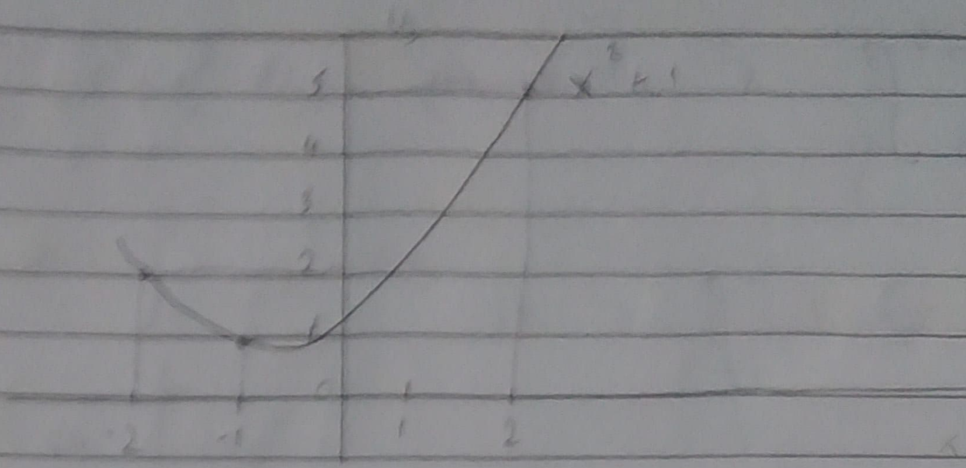
$\int_0^1 \frac{x^3}{3} \Big]_0^1 = \frac{1}{3} \cdot 0$

$\int_2^4 y^3 \cdot dy \Big] \cdot \frac{1}{3}$

$\frac{1}{3} \int_2^4 \frac{y^4}{4} = \frac{1}{3} \cdot \left[\frac{4^4}{4} \right] - [4]$

$\frac{1}{3} \cdot 60 = 20$

4) Área limitada pela região $y = x^2 + 1$ e as retas $x = -1$, $x = 2$, $y = 0$.



$$\iint_D (x+2y)\, dA \quad \begin{array}{l} dx\,dy \\ dy\,dx \end{array}$$

$$\int_{-1}^{2}\int_{0}^{x^2+1} (x+2y)\, dy\, dx$$

$$\int_{-1}^{2} dx \int_{0}^{x^2+1} (x+2y)\, dy$$

$$\int_{-1}^{2} dx \left[xy + \frac{2y^2}{2} \right]_{0}^{x^2+1} \qquad (x^2+1)(x^2+1)$$

$$\int_{-1}^{2} dx \left[x(x^2+1) + (x^2+1)^2 \right] - [0]$$

$$\int_{-1}^{2} dx \left[x^3 + x + x^4 + x^2 + x^2 + 1 \right]$$

$$\int_{-1}^{2} dx \left[x^3 + x + (x^4 + 2x + 1) \right] + /$$

$$\int_{-1}^{2} dx \left[x^3 + x + x^4 + 2x^2 + 1 \right]$$

$$\int_{-1}^{2} \left[\frac{x^4}{4} + \frac{x^2}{2} + \frac{x^5}{5} + \frac{2x^3}{3} + x \right]_{-1}^{2}$$

$$\int \left[\frac{2^4}{4} + \frac{2^2}{2} + \frac{2^5}{5} + \frac{2\,2^3}{3} + 2 \right] - \left[\frac{(-1)^4}{4} + \frac{(-1)^2}{2} + \frac{(-1)^5}{5} + \frac{2(-1)^3}{3} + (-1) \right]$$

$$\left[4 + 2 + \frac{32}{5} + \frac{16}{3} + 2 \right] - \left[\frac{+1}{4} + \frac{1}{2} \frac{-1}{5} \frac{-2}{3} - 1 \right]$$

$$\left[9 + \frac{33}{5} + \frac{18}{3} \frac{1}{4} - \frac{1}{2} \right]$$

$$15 + \frac{33}{5} - \frac{1}{4} - \frac{1}{2} = \frac{300 + 132 - 5 - 10}{20} = \frac{417}{20} = \boxed{20,85}$$

5) $f(x, y) = x^3, \quad 0 \leq x \leq 2, \quad x^2 \leq y \leq 4$

$$\iint_D f(x,y)\, dy \cdot dx$$

$$\int_0^2 dx \int_{x^2}^4 x^3 \cdot dy \quad \Bigg| \quad \int_0^2 \int_{x^2}^4 x^3\, dy \cdot dx$$

$$\int_0^2 x^3\, dx \int_{x^2}^4 1\, dy$$

$$\int x^3 \cdot dx \; [y]_{x^2}^4$$

$$\int_0^2 x^3 \cdot dx \; [4 - x^2]$$

$$\int_0^2 x^3 \cdot [4 - x^2]\, dx$$

$$\int_0^2 4x^3 - x^5 \cdot dx$$

$$\int_0^2 \frac{4x^4}{4} - \frac{x^6}{6}$$

$$\left.\frac{4 \cdot 2^4}{4} - \frac{2^6}{6}\right] - [0]$$

$$16 - \frac{64}{6} \qquad 16 - 10{,}666 = \boxed{5{,}333}$$