2.- $\displaystyle\int x^2 \operatorname{Sen}(x^3+5) \operatorname{Cos}^9(x^3+5)\, dx$

$u = x^3+5$ $\qquad = \dfrac{1}{3}\displaystyle\int \operatorname{Sen} u \operatorname{Cos}^9 u \, du$

$du = 3x^2 dx$

$\dfrac{du}{3} = x^2 dx$

$\qquad = \dfrac{1}{3}\left(-\displaystyle\int w^9 dw\right)$

$w = \operatorname{Cos} u$

$du = -\operatorname{Sen} u \, du$ $\qquad = -\dfrac{1}{3} \dfrac{w^{10}}{10} + C$

$-dw = \operatorname{Sen} u \, du$

$\qquad = -\dfrac{w^{10}}{30} + C$

$\qquad = -\dfrac{\operatorname{Cos}^{10}(x^3+5)}{30} + C$ //

3.- $u = \operatorname{Cos}(\ln(x)) \Rightarrow du = -\dfrac{1}{x} \operatorname{Sen}(\ln(x))\, dx$

$dv = dx \Rightarrow v = x$

$\Rightarrow \displaystyle\int \operatorname{Cos}(\ln(x))\, dx = x \operatorname{Cos}(\ln(x)) + \int \operatorname{Sen}(\ln(x))\, dx$

$\Big(u = \operatorname{Sen}(\ln(x))$ $\qquad = x \operatorname{Cos}(\ln(x)) + x \operatorname{Sen}(\ln(x))$

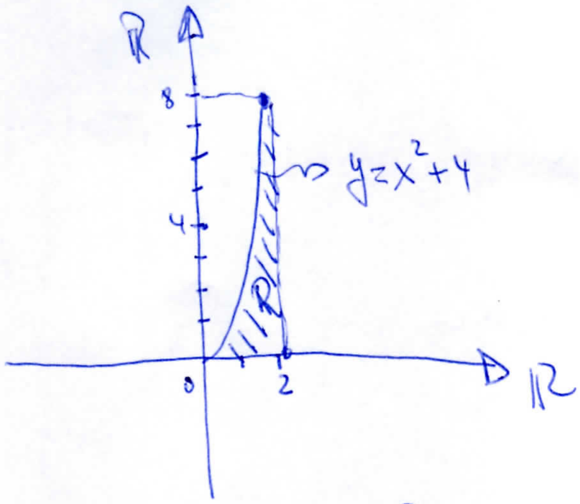
$du = \dfrac{\operatorname{Cos}(\ln x)}{x}$ $\qquad - \displaystyle\int \operatorname{Cos}(\ln(x))\, dx$

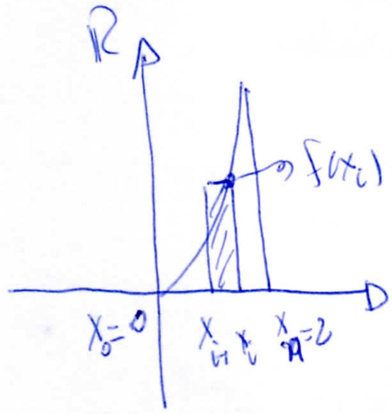
$dv = dx \Rightarrow v = x \Big)$

$\therefore \displaystyle\int \operatorname{Cos}(\ln(x))\, dx$

$= \dfrac{x}{2}\left(\operatorname{Cos}(\ln(x)) + \operatorname{Sen}(\ln(x))\right) + C$ /

1)





f é cont. em $[0,2]$ $\therefore$ basta calcular uma soma de Riemann

$\Delta x_i = \frac{2-0}{n} = \frac{2}{n}$

$$x_0=0,\ x_1=\frac{2}{n},\ x_2=2\left(\frac{2}{n}\right),\dots,\ x_i=i\left(\frac{2}{n}\right),\dots,\ x_n=2$$

$$\sum_{i=1}^{n} \Delta x_i f(x_i) = \sum_{i=1}^{n} \frac{2}{n}\left(\left(\frac{2i}{n}\right)^2+4\right)$$

$$= \sum_{i=1}^{n} \frac{2}{n}\left(\frac{4i^2}{n^2}+4\right)$$

$$= \sum_{i=1}^{n}\left(\frac{8}{n^3}i^2+\frac{8}{n}\right)$$

$$= \frac{8}{n^3}\sum_{i=1}^{n} i^2 + \frac{8}{n}\sum_{i=1}^{n} 1$$

$$= \frac{8}{\cancel{n^3}\,n^2}\left[\frac{\cancel{n}(n+1)(2n+1)}{6}\right] + \frac{8}{n}\cdot n$$

$$= \frac{8}{6}\left(1+\frac{1}{n}\right)\left(2+\frac{1}{n}\right)+8 = \%$$

$$\therefore \int_0^2 (x^2+4)\,dx = \lim_{n\to\infty} \% = \frac{8}{6}(1+0)(2+0)+8 = \frac{8}{3}+8 = \frac{32}{3}$$