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Ejercicios 15 de Mayo.

Ejercicio 1

$$\int_1^2 \frac{x^3\,dx}{1+\sqrt{x}}$$ por simpson 1/3 simple:

$$[a,b] = [1,2]$$

$$x_m = \frac{1+2}{2}$$

$$\int_a^b f(x)\,dx = (b-a)\left[\frac{f(a) + 4f(x_m) + f(b)}{6}\right]$$

i	x_i	$f(x_i)$
0	1	0.5
1	1.5	1.517027882
2	2	3.313708499

$$\int_1^2 \frac{x^3}{1+\sqrt{x}}\,dx = (2-1)\left[\frac{0.5 + 4(1.517027882) + 3.313708499}{6}\right]$$

$$= 1.646970005\ /$$

Ejercicio 2

$$\int_{-1}^{1} \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$$ Simson 1/3 compuesto

6 intervalos

$$h = \frac{b-a}{h} = \frac{1+1}{6} = \frac{2}{6} = \frac{1}{3}$$

i x_i

$[-1, 1]$

i	x_i	$f(x_i)$
0	-1	0.219792028
1	-2/3	0.317392739
2	-1/3	0.378539285
3	0	0.398942 28
4	1/3	0.378592 85
5	2/3	0.317392739
6	1	0.219 79208

x_m	$f(x_m)$
-5/6	0.272417747
-1/2	0.352997686
-1/6	0.393847 85
1/6	0.393847 85
1/2	0.352997686
5/6	0.272417707

$\sum = 2.038526566$

$\sum_{i=1}^{n=1} f(x_m) = 1.790806329$

$$\int_a^b f(x)\,dx = (b-a)\left[\frac{f(x_0) + 4\sum_{i=1}^{n} f(x_{m_i}) + 2\sum_{i=1}^{n} f(x_i) + f(x_n)}{6n}\right]$$

$$= \frac{(2)\left[0.219792028 + 2(1.790806329) + 4(2.038526566) + 0.21979208\right]}{6(6)}$$

$$= 0.676405721$$

Ejercicio 3

$$\int_0^4 \sqrt[3]{x}\, e^x\,dx$$ simpson 3/8 compuesto para 4 intervalos

$[0, 4]$ $h = \frac{b-a}{3} = \frac{4-0}{4} = 1$

0	0	0
1	1	2.718281828
2	2	9.309627318
3	3	28.968357
4	4	86.66916 08

$\sum = 40.996626614$

x_{mi}	$f(x_{mi})$
1/3	0.96766361
2/3	1.7015 02409
4/3	4.154 71798
5/3	6.277 31207
7/3	13.67 76884
8/3	19.95 75 9457
10/3	41.87 368562
11/3	60.32586767
Σ =	148.9567866

$$\int_a^b f(x)\,dx = \frac{b-a}{8n}\left[f(x_0) + 3\sum_{i=1}^{n} f(x_m) + 2\sum_{i=1}^{n-1} f(x_i) + f(x)_n\right]$$

$$= \frac{4}{32}\left[0 + 3(148.9567866) + 2(40.99626614) + 86.6691608\right]$$

$$= 76.94150661$$

Ejercicio 4

$$\int_2^4 (\ln x)^3\,dx \quad \text{por simpson 3/8 simple}$$

$[2,4]$

$$h = \frac{b-a}{3} = \frac{4-2}{3} = \frac{2}{3}$$

$$\int_a^n f(x)\,dx = (b-a)\left[\frac{f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3)}{8}\right]$$

x_i	$f(x_i)$
2	0.33302 4652
8/3	0.94 3583266
10/3	1.74 5219397
4	2.664197216

$$= \frac{(2)}{8}\left[0.33302\,4652 + 3(0.94\,3583266) + 3(0.94\,3583266) + 2.664197216\right]$$

$$= 2.765907764$$