Análise Matemática I

folha 4 — 2011'12

1. Usando somas de Riemann, sendo $f[a,b] \longrightarrow \mathbb{R}$ dada por $f(x) = c$, c constante, calcule

$$\int_a^b f(x)\,dx.$$

2. Calcule:

(a) $\int (3x^2 - 2x^5)\,dx$;

(b) $\int (\sqrt{x} + 2)^2\,dx$;

(c) $\int (2x + 10)^{20}\,dx$;

(d) $\int x^2 e^{x^3}\,dx$;

(e) $\int x^4 (x^5 + 10)^9\,dx$;

(f) $\int \dfrac{2x+1}{x^2+x+3}\,dx$;

(g) $\int \sqrt{2x+1}\,dx$;

(h) $\int \dfrac{x}{3-x^2}\,dx$;

(i) $\int \dfrac{1}{4-3\,x}\,dx$;

(j) $\int \dfrac{1}{e^{3x}}\,dx$;

(k) $\int \dfrac{-7}{\sqrt{1-5x}}\,dx$;

(l) $\int \dfrac{\sqrt{1+3\,\ln x}}{x}\,dx$;

(m) $\int x\ \operatorname{sen} x^2\,dx$;

(n) $\int \dfrac{1}{x(\ln^2 x + 1)}\,dx$;

(o) $\int \left(\dfrac{2}{x} - 3\right)^2 \dfrac{1}{x^2}\,dx$;

(p) $\int \operatorname{sen}(\pi - 2\,x)\,dx$;

(q) $\int \operatorname{th} x\,dx$;

(r) $\int \operatorname{sen} x\ \cos x\,dx$;

(s) $\int \operatorname{sen}(2x)\ \cos x\,dx$;

(t) $\int \operatorname{sen}^2 x\,dx$.

3. Calcule:

(a) $\int \operatorname{sen}^2 \frac{x}{2}\ \cos^2 \frac{x}{2}\,dx$;

(b) $\int \cos^3 x\,dx$;

(c) $\int \dfrac{x}{x^2-1}\,dx$;

(d) $\int \dfrac{x}{\sqrt{x^2-1}}\,dx$;

(e) $\int \dfrac{1}{x}\ \operatorname{sen}(\ln x)\,dx$;

(f) $\int \dfrac{-3}{x\,(\ln x)^3}\,dx$;

(g) $\int \dfrac{e^x}{1+e^{2x}}\,dx$;

(h) $\int \dfrac{e^x}{1-2e^x}\,dx$;

(i) $\int \dfrac{1}{\cos^2(7x)}\,dx$;

(j) $\int \left(\sqrt{2x-1} - \sqrt{1+3x}\right)\,dx$;

(k) $\int \dfrac{1}{x}\ \left(1 + \ln^2 x\right)\,dx$;

(l) $\int \dfrac{2\ +\ \sqrt{\operatorname{arctg}(2x)}}{1+4x^2}\,dx$;

(m) $\int \dfrac{e^{\operatorname{arctg}\ x}}{1+x^2}\,dx$;

(n) $\int \dfrac{\operatorname{sen} x}{\sqrt{1+\cos x}}\,dx$.