Universidade Federal de Pelotas
Disciplina de Cálculo II - Turma T1
Prof. Dr. Maurício Zahn
Lista 05 de Exercícios
(Substituição trigonométrica e integrais trigonométricas)

1. Calcule cada integral indefinida a seguir:

(a) $\displaystyle\int \frac{2dx}{x^2+9}$ (b) $\displaystyle\int \frac{dx}{1-2x^2}$ (c) $\displaystyle\int \frac{dx}{\sqrt{4-x^2}}$

(d) $\displaystyle\int \frac{2dx}{x^2\sqrt{4-x^2}}$ (e) $\displaystyle\int \frac{dx}{4x^2+4x-6}$ (f) $\displaystyle\int \frac{5dx}{\sqrt{x^2+7x-13}}$

(g) $\displaystyle\int \sqrt{4x^2+9}dx$ (h) $\displaystyle\int \sqrt{2x^2-4}dx$ (i) $\displaystyle\int \frac{\sqrt{x^2+9}}{x^3}dx$

(j) $\displaystyle\int \frac{dx}{1-x-x^2}$ (k) $\displaystyle\int \frac{dx}{\sqrt{x^2+4x+5}}$ (ℓ) $\displaystyle\int \frac{dx}{\sqrt{1+2x+3x^2}}$

(m) $\displaystyle\int \cos^7 x dx$ (n) $\displaystyle\int \operatorname{sen}^9 x dx$ (o) $\displaystyle\int \operatorname{sen}^6 x \cos^5 x dx$

(p) $\displaystyle\int \operatorname{sen}^3 x \cos^9 x dx$ (q) $\displaystyle\int \cos^4 x dx$ (r) $\displaystyle\int \operatorname{sen}^3 4x \cos^3 4x dx$

(s) $\displaystyle\int \sec^3 x dx$ (t) $\displaystyle\int \tan^4 x \sec^6 x dx$ (u) $\displaystyle\int \tan^4 x dx$

(v) $\displaystyle\int \operatorname{sen} 5x \cdot \cos 9x\, dx$ (w) $\displaystyle\int \cos x \cdot \cos 4x\, dx$ (x) $\displaystyle\int \operatorname{sen}\frac{3x}{5} \cdot \cos\frac{2x}{5}\, dx$

2. Verifique as seguintes integrações:

(a) $\displaystyle\int \sqrt{25-9x^2}dx = \frac{x}{2}\sqrt{25-9x^2} + \frac{25}{6}\ \operatorname{arcsen}\frac{3x}{5} + c$

(b) $\displaystyle\int \sqrt{10-4x+4x^2}dx = \frac{2x-1}{4}\sqrt{10-4x+4x^2} + \frac{9}{4}\ln|2x-1+\sqrt{10-4x+4x^2}| + c$

(c) $\displaystyle\int \frac{\operatorname{sen}^5 t dt}{\sqrt{\cos t}} = -2\sqrt{\cos t}\left(1-\frac{2}{5}\cos^2 t + \frac{1}{9}\cos^4 t\right) + c$

(d) $\displaystyle\int \operatorname{sen}^4 ax dx = \frac{3x}{8} - \frac{\operatorname{sen} 2ax}{4a} + \frac{\operatorname{sen} 4ax}{32a} + c$

(e) $\displaystyle\int \frac{xdx}{\sqrt{9-x^2}} = \frac{9}{2}\operatorname{arcsen}(\frac{x}{3}) - \frac{x}{2}\sqrt{9-x^2} + c$

(f) $\displaystyle\int \cos^6 x\, dx = \frac{5x}{16} + \frac{\operatorname{sen} 2x}{4} - \frac{\operatorname{sen}^3 2x}{48} + \frac{3\operatorname{sen} 4x}{64} + c$