

Universidade de São Paulo  
Escola Superior de Agricultura "Luiz de Queiroz"  
Departamento de Ciências Exatas  
LCE 0220 - Cálculo II

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Lista de Exercício: Integrais Impróprias

1. Calcular as seguintes integrais, classificando-as em convergente ou divergente.

(a)  $\int_1^{+\infty} \frac{dx}{\sqrt{x}}$

(b)  $\int_0^{+\infty} \frac{\arctan x}{x^2+1} dx$

(c)  $\int_{-\infty}^0 e^{10x} dx$

(d)  $\int_1^{+\infty} \ln x dx$

(e)  $\int_0^5 \frac{xdx}{\sqrt{25-x^2}}$

(f)  $\int_{-1}^1 \frac{dx}{x^2}$

(g)  $\int_{-\infty}^0 xe^{-x^2} dx$

(h)  $\int_0^{+\infty} \frac{e^{-\sqrt{x}} dx}{\sqrt{x}}$

(i)  $\int_0^1 \sqrt{x(1-x)^3} dx$

(j)  $\int_0^{\pi/4} \sin^3(2x) \cos^5(2x) dx$

(k)  $\int_0^1 \frac{dx}{\sqrt{1-x}}$

(l)  $\int_{\pi/4}^{\pi/2} \sec x dx$

(m)  $\int_0^{+\infty} x^5 e^{-x} dx$

(n)  $\int_0^{+\infty} x^{3/2} e^{-x} dx$

(o)  $\int_0^1 \sqrt{1-x} dx$

(p)  $\int_{-\infty}^{+\infty} \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}x^2} dx$

(q)  $\int_{-\infty}^{+\infty} \frac{dx}{9+x^2}$

(r)  $\int_0^1 x(1-x)^{3/2} dx$

(s)  $\int_0^{\pi/2} \cos^2 x dx$

(t)  $\int_0^{+\infty} x^2 dx$

Respostas:

1. (a)  $\infty$

(b)  $\pi^2/8$

(c)  $1/10$

(d)  $\infty$

(e)  $5$

(f)  $\infty$

(g)  $-\frac{1}{2}$

(h)  $2$

(i)  $\pi/16$

(j)  $1/48$

(k)  $2$

(l)  $\infty$

(m)  $120$

(n)  $3\sqrt{\pi}/4$

(o)  $2/3$

(p)  $1$

(q)  $\pi/3$

(r)  $4/35$

(s)  $\pi/4$

(t)  $\infty$

Notas de aula do Professor Idemauro Antônio Rodrigues de Lara.