UNIVERSIDADE FEDERAL DA GRANDE DOURADOS
Cálculo 2 — Lista 3
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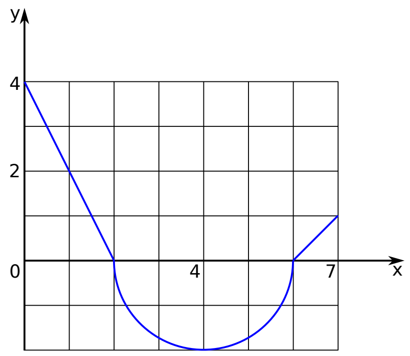
(1) O gráfico de g consiste em duas retas e um semicírculo. Use-o para calcular cada integral

(a) $\displaystyle\int_0^2 g(x)\,dx$ (b) $\displaystyle\int_2^6 g(x)\,dx$ (c) $\displaystyle\int_0^6 g(x)\,dx$



(2) Calcule as integrais interpretando-as em termos de áreas.

(a) $\displaystyle\int_{-1}^2 1-x\,dx$ (b) $\displaystyle\int_{-1}^2 |x|\,dx$

(3) Apenas analisando o gráfico das funções, calcule as seguintes integrais

(a) $\displaystyle\int_{-1}^1 x\,dx$ (b) $\displaystyle\int_{-1}^1 |t|\,dt$ (c) $\displaystyle\int_{-1}^1 y^2\,dy$ (d) $\displaystyle\int_{-\pi}^{\pi} \sin\theta\,d\theta$ (e) $\displaystyle\int_{-\pi}^{\pi} \cos\phi\,d\phi$

(4) Encontre a antiderivada mais geral para as funções abaixo:

(a) $f(x) = x-3$

(b) $f(x) = \dfrac{1}{2}+\dfrac{3}{4}x^2-\dfrac{4}{5}x^3$

(c) $f(x) = (x+1)(2x-1)$

(d) $f(x) = \dfrac{1+x+x^2}{\sqrt{x}}$

(e) $f(x) = 2\,\mathrm{sen}\,x - \sec^2 x$

(5) Encontre f tal que:

(a) $f''(x) = 20x^3-12x^2+6x$

(b) $f'(x) = 1+3\sqrt{x}$, $f(4) = 25$

(c) $f'(x) = \sqrt{x}(6+5x)$, $f(1) = 10$

(d) $f''(x) = 2+\cos x$, $f(0) = -1$, $f(\pi/2) = 0$

(6) Use o Teorema Fundamental do Cálculo para encontrar a derivada das funções abaixo

(a) $g(x) = \displaystyle\int_1^x \frac{1}{t^3+1}\,dt$

(b) $G(x) = \displaystyle\int_x^1 \cos(\sqrt{t})\,dt$

(c) $h(x) = \displaystyle\int_{2x}^{3x} \frac{u^2-1}{u^2+1}\,du$ (dica: use as propriedades de integrais e a regra da cadeia.)

(7) Calcule as integrais definidas:

(a) $\displaystyle\int_1^2 \frac{3}{t^4}\ dt$

(b) $\displaystyle\int_0^1 (u+2)(u-3)\ du$

(c) $\displaystyle\int_0^{\pi/4} \sec\theta\ \tan\theta\ d\theta$

(d) $\displaystyle\int_{-1}^1 e^{u+1}\ du$

(e) $\displaystyle\int_1^9 \frac{x-1}{\sqrt{x}}\ dx$

(f) $\displaystyle\int_0^1 x^e + e^x\ dx$

(g) $\displaystyle\int_0^{\pi} f(x)\ dx$, onde $f(x) = \begin{cases} \operatorname{sen} x, & \text{se } 0 \leq x < \frac{\pi}{2} \\ \cos x, & \text{se } \frac{\pi}{2} \leq x \leq \pi \end{cases}$

(8) Calcule as integrais indefinidas:

(a) $\displaystyle\int x^2 + x^{-2}\ dx$

(b) $\displaystyle\int (u+4)(2u+1)\ du$

(c) $\displaystyle\int \frac{x^2 - 2\sqrt{x}}{x}\ dx$

(d) $\displaystyle\int \frac{4+6u}{\sqrt{u}}\ du$

(e) $\displaystyle\int \sqrt{t}(1+t)\ dt$

(f) $\displaystyle\int |x-3|\ dx$