UNIVERSIDADE FEDERAL DA GRANDE DOURADOS
Cálculo Diferencial e Integral II — Lista 2
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(1) 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.)

(2) 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 $f(x) = \begin{cases} \operatorname{sen} x, & \text{se } 0 \le x < \frac{\pi}{2} \\ \cos x, & \text{se } \frac{\pi}{2} \le x \le \pi \end{cases}$

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