Mat 1352 Cálculo II - Lista 2

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Regra de substituição

Exercício 1. *Calcule as seguintes integrais:*

1) $\int x^2\sqrt{x^3+1}dx$ *(Resp.:* $(2/9)(x^3+1)^{3/2}+C$*)*

2) $\int \frac{1}{(1-6t)^4}dt$ *(Resp.:* $\frac{1}{18(1-6t)^3}+C$*)*

3) $\int \frac{sec^2(1/x)}{x^2}dx$ *(Resp.:* $-tg(1/x)+C$*)*

4) $\int \frac{dx}{5-3x}dx$ *(Resp.:* $-(1/3)\ln|5-3x|+C$*)*

5) $\int \frac{a+bx^2}{\sqrt{3ax+bx^3}}dx$ *(Resp.:* $(2/3)\sqrt{3ax+bx^3}+C$*)*

6) $\int_0^1 \sqrt[3]{1+7x}dx$ *(Resp.:* $45/28$*)*

7) $\int_1^2 \frac{e^{1/x}}{x^2}dx$ *(Resp.:* $e-\sqrt{e}$*)*

8) $\int_0^{13} \frac{dx}{\sqrt[3]{(1+2x)^2}}$ *(Resp.:* 3*)*

9) $\int_e^{e^4} \frac{dx}{x\sqrt{\ln x}}$ *(Resp.:* 2*)*

10) $\int_e^{e^4} \frac{dx}{x\sqrt{\ln x}}$ *(Resp.:* 2*)*

Integração por partes

Exercício 2. *Calcule as seguintes integrais:*

0) $\int x\cos(5x)dx$ *(Resp.:* $(1/5)x.sen(5x)+(1/25)\cos(5x)+C$*)*

1) $\int \ln(\sqrt[3]{x})dx$ *(Resp.:* $x\ln(\sqrt[3]{x})-(x/3)+C$*)*

1) $\int tg^{-1}(4t)dt$ *(Resp.:* $t.tg^{-1}(4t)-(1/8)\ln(1+16t^2)+C$*)*

3) $\int(\ln(x))^2dx$ *(Resp.:* $x(\ln(x))^2-2x\ln(x)+2x+C$*)*

4) $\int_0^{1/2} x\cos(\pi x)dx$ *(Resp.:* $\frac{1}{2\pi}-\frac{1}{\pi^2}$*)*

5) $\int_0^1 (x^2+1)e^{-x}dx$ *(Resp.:* $-6e^{-1}+3$*)*

6) $\int_4^9 \frac{\ln y}{\sqrt{y}}dy$ *(Resp.:* $6\ln 9-4\ln 4$*)*

6) $\int_1^2 \frac{(\ln x)^2}{x^3}dx$ *(Resp.:* $(-1/8)(\ln 2)^2-(1/8)\ln 2+(3/16)$*)*

Integrais trigonométricas

Exercício 3. *Calcule as seguintes integrais:*

1) $\int \operatorname{sen}^2 x \cos^3(x) dx$ *(Resp.:* $(1/3)\operatorname{sen}^3 x - (1/5)\operatorname{sen}^5 x + C$*)*

2) $\int \operatorname{sen}^2 x \cos^3(x) dx$ *(Resp.:* $(1/3)\operatorname{sen}^3 x - (1/5)\operatorname{sen}^5 x + C$*)*

3) $\int_0^{\pi/2} \operatorname{sen}^7 x \cos^5 x dx$ *(Resp.:* $1/120$*)*

4) $\int_0^{\pi} \cos^4(2t) dt$ *(Resp.:* $3\pi/8$*)*

5) $\int_0^{\pi/2} \operatorname{sen}^2 x \cos^2 x dx$ *(Resp.:* $\pi/16$*)*

6) $\int \operatorname{tg}^2 x dx$ *(Resp.:* $\operatorname{tg} x - x + C$*)*

6) $\int_0^{\pi/3} \operatorname{tg}^5 x \sec^4 x dx$ *(Resp.:* $117/8$*)*

Substituições trigonométricas

Exercício 4. *Calcule as seguintes integrais:*

1) $\int \frac{x^3}{\sqrt{x^2+4}} dx$ *(Resp.:* $(1/3)(x^2+4)^{3/2} - 4\sqrt{x^2+4} + C$*)*

2) $\int \frac{\sqrt{x^2-4}}{x} dx$ *(Resp.:* $\sqrt{x^2-4} - 2\sec^{-1}(x/2) + C$*)*

3) $\int_0^3 \frac{x}{\sqrt{36-x^2}} dx$ *(Resp.:* $6 - 3\sqrt{3}$*)*