

## Lista de exercício #5 – Integrais indefinidas e definidas

1ª Questão: Calcule as integrais indefinidas abaixo utilizando a técnica de integração por partes:

$$\int x e^{3x} dx \qquad \int (x^2 + 2x + 1) e^{7x} dx$$

$$\int x \sin(5x) dx \qquad \int \arctan(x) dx$$

$$\int x^2 \ln(x) dx \qquad \int \sin^5(x) dx$$

$$\int x^2 e^{-5x} dx \qquad \int x^2 \operatorname{arccot}(x) dx$$

$$\int x^2 \cos(3x) dx \qquad \int e^{9x} \cos(2x) dx$$

2) Calcule as seguintes integrais indefinidas utilizando a técnica de substituição.

1.  $\int x^2 e^{-4x^3} dx$

2.  $\int \cos^3(x) \sin(x) dx$

3.  $\int \frac{x^2}{7 - x^3} dx$

4.  $\int x^3 \cos(5x^4) dx$

5.  $\int \frac{\sin(x)}{2 + \cos(x)} dx$

6.  $\int \frac{1}{25 + x^2} dx$

7.  $\int (3x + 4)^{100} dx$

8.  $\int \frac{\cos(x)}{1 + \sin^2(x)} dx$

9.  $\int \frac{(2 - \sqrt{x})^5}{\sqrt{x}} dx$

3) Calcule as integrais definidas utilizando a técnica da substituição

1. (a)  $\int_0^3 \sqrt{y+1} dy$

(b)  $\int_{-1}^0 \sqrt{y+1} dy$

2. (a)  $\int_0^1 r\sqrt{1-r^2} dr$

(b)  $\int_{-1}^1 r\sqrt{1-r^2} dr$

3. (a)  $\int_0^{\pi/4} \operatorname{tg} x \sec^2 x dx$

(b)  $\int_{-\pi/4}^0 \operatorname{tg} x \sec^2 x dx$

4. (a)  $\int_0^{\pi} 3 \cos^2 x \operatorname{sen} x dx$

(b)  $\int_{2\pi}^{3\pi} 3 \cos^2 x \operatorname{sen} x dx$

5. (a)  $\int_0^1 t^3(1+t^4)^3 dt$

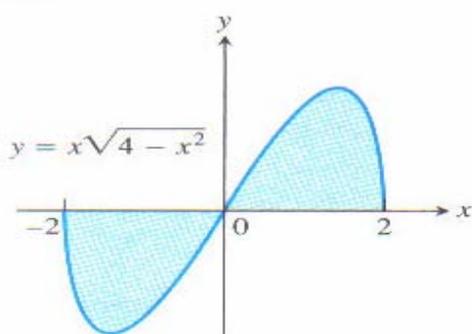
(b)  $\int_{-1}^1 t^3(1+t^4)^3 dt$

15.  $\int_0^1 \sqrt{t^5+2t}(5t^4+2) dt$

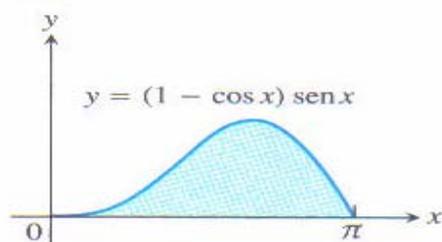
21.  $\int_0^1 (4y-y^2+4y^3+1)^{-2/3} (12y^2-2y+4) dy$

4) Determine as áreas totais das regiões sombreadas abaixo:

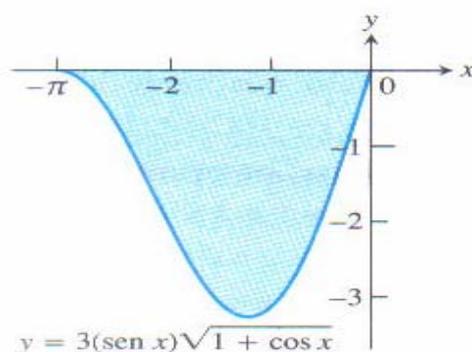
47.



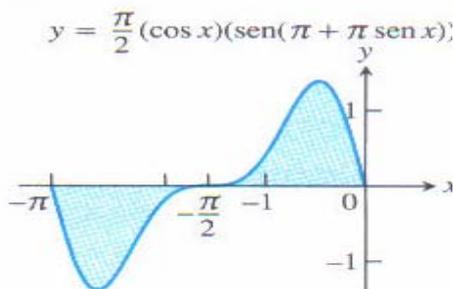
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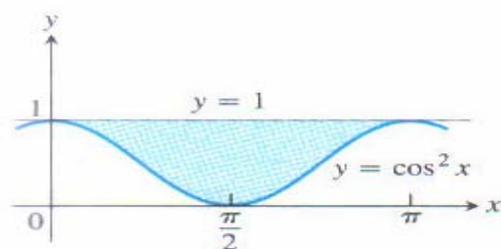
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50.



51.



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