1.

Determine as seguintes primitivas:

1)

$$\int (x^2 - 4x + \frac{5}{x})dx$$
$$= \frac{x^3}{3} - \frac{4x^2}{2} - 5\ln|x| + C$$

2)

$$\int \frac{2x+1}{x^2+x+3}dx$$
$$= \ln|x^2+x+3| + C$$

3)

$$\int \frac{3}{2x-1}dx$$
$$= \frac{3}{2}\int \frac{2}{2x-1}dx$$
$$= \frac{3}{2}\ln|2x-1| + C$$

4)

$$\int \frac{1}{x}\cos(\ln x)dx$$
$$= \sin(\ln x) + C$$

5)

$$\int \frac{\sqrt{1+2\ln x}}{x}dx$$
$$= \int \frac{1}{x}(1+2\ln x)^{\frac{1}{2}}dx$$
$$= \frac{1}{2}\int \frac{2}{x}(1+2\ln x)^{\frac{1}{2}}dx$$
$$= \frac{1}{2}\frac{(1+2\ln x)^{\frac{3}{2}}}{\frac{3}{2}} + C$$
$$= \frac{(1+2\ln x)^{\frac{3}{2}}}{3} + C$$

6)

$$\int \sin x cos^4 x dx$$

$$= -\frac{1}{5}\cos^5 x$$

2.

Recorrendo à primitivação por partes, determine as seguintes primitivas:

1)

$$\int x \sin 2x dx$$

$$f' = \sin 2x \qquad f = -\frac{1}{2}\cos 2x$$

$$g = x \qquad g' = 1$$

$$= -\frac{x}{2}\cos 2x - \int \cos 2x dx$$

$$= -\frac{x}{2}\cos 2x + \frac{1}{2}\int \cos 2x dx$$

$$= -\frac{x}{2}\cos 2x + \frac{1}{4}\sin 2x + C$$

2)

$$\int (2x^2-1)e^x dx$$

$$f' = e^x \qquad f = e^x$$

$$g = 2x^2-1 \qquad g' = 4x$$

$$= (2x^2-1)e^x - \int e^x 4x dx$$

$$= (2x^2-1)e^x - 4\int e^x x dx$$

$$f' = e^x \qquad f = e^x$$

$$g = x \qquad g' = 1$$

$$= (2x^2-1)e^x - 4e^x x + 4e^x$$

$$= e^x(2x^2-4x+3) + C$$

3)

$$\int \arctan x dx$$
$$\int 1 \cdot \arctan x dx$$
$$f' = 1 \qquad f = x$$
$$g = \arctan x \qquad g' = \frac{1}{x^2+1}$$
$$= x \arctan x - \int \frac{x}{x^2+1} dx$$
$$= x \arctan x - \frac{1}{2} \int \frac{2x}{x^2+1} dx$$
$$= x \arctan x - \frac{1}{2} \ln |x^2+1| + C$$

3.

Recorde que $\cos^2 x = \frac{\cos 2x+1}{2}$ **e determine** $\int \cos^2 x dx$**.**

$$\int \cos^2 x dx = \int \frac{\cos 2x + 1}{2} dx$$
$$= \frac{1}{2}(\frac{1}{2} \sin 2x + x)$$
$$= \frac{1}{4} \sin 2x + \frac{x}{2} + C$$

1.

Determine as seguintes primitivas:

1)

$$\int \ln x dx$$
$$\int 1 \cdot \ln x dx$$
$$f' = 1 \qquad f = x$$
$$g = \ln x \qquad g' = \frac{1}{x}$$
$$= x \ln x - \int 1 dx$$
$$= x \ln x - x$$
$$= x(\ln x - 1) + C$$

2)

$$\int \frac{e^{\arctan x}}{1+x^2}dx$$
$$= \int \frac{1}{1+x^2}e^{\arctan x}dx$$
$$= e^{\arctan x} + C$$

3)

$$\int \frac{-3}{x \ln^3 x}dx$$
$$= -3\int \frac{1}{x}(\ln^{-3} x)dx$$
$$= \frac{3}{2}(\ln^{-2} x)$$
$$= \frac{3}{2\ln^2 x} + C$$

4)

$$\int -3x^2 \cos x dx$$
$$-3\int x^2 \cos x dx$$
$$f' = \cos x \qquad f = \sin x$$
$$g = x^2 \qquad g' = 2x$$
$$= -3(x^2 \sin x - \int \sin x 2x dx)$$
$$= -3(x^2 \sin x - 2\int \sin x x dx)$$
$$f' = \sin x \qquad f = -\cos x$$
$$g = x \qquad g' = 1$$
$$= -3(x^2 \sin x - 2(-x\cos x + \sin x))$$
$$= -3(x^2 \sin x + 2x\cos x - 2\sin x)$$
$$= -3x^2 \sin x - 6x\cos x + 6\sin x + C$$

5)

$$\int \frac{\sin x}{\sqrt{1+\cos x}} dx$$

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

$$= -\int -\sin x \frac{(1+\cos x)^{\frac{1}{2}}}{\frac{1}{2}}$$

$$= -2(1+\cos x)^{\frac{1}{2}}$$

$$= -2\sqrt{1+\cos x} + C$$

6)

$$\int \arcsin x dx$$

$$\int 1 \cdot \arcsin x dx$$

$$f' = 1 \qquad f = x$$

$$g = \arcsin x \qquad g' = \frac{1}{\sqrt{1-x^2}}$$

$$= x \arcsin x - \int \frac{x}{\sqrt{1-x^2}} dx$$

$$= x \arcsin x - \int x(1-x^2)^{-\frac{1}{2}} dx$$

$$= x \arcsin x + \frac{1}{2} \int -2x(1-x^2)^{-\frac{1}{2}} dx$$

$$= x \arcsin x + \frac{1}{2}(\frac{(1-x^2)^{\frac{1}{2}}}{\frac{1}{2}})$$

$$= x \arcsin x + \sqrt{(1-x^2}$$