Corso di laurea in Geologia
Istituzioni di matematiche
Esercizi n. 1516/28

Regole di integrazione:

$$\int (f(x)+g(x))\,dx = \int f(x)\,dx + \int g(x)\,dx,$$

$$\int a\cdot f(x)\,dx = a\cdot\int f(x)\,dx, \qquad \int x^n\,dx = \frac{1}{n+1}x^{n+1}+C,$$

$$\int \sin(x)\,dx = -\cos(x)+C, \qquad \int \cos(x)\,dx = \sin(x)+C,$$

$$\int \frac{1}{\cos^2(x)}\,dx = \tan(x)+C, \qquad \int \frac{1}{x}\,dx = \log(|x|)+C,$$

$$\int e^x\,dx = e^x+C, \qquad \int \log(x)\,dx = x\log(x)-x+C,$$

$$\int x^a\,dx = \frac{1}{a+1}x^{a+1}+C,\ a\neq -1, \qquad \int \sqrt{x}\,dx = \frac{2}{3}x\sqrt{x}+C,$$

$$\int \frac{1}{\sqrt{1-x^2}}\,dx = \arcsin(x)+C, \qquad \int \frac{1}{1+x^2}\,dx = \arctan(x)+C,$$

$$\int \frac{f'(x)}{f(x)}\,dx = \log(|f(x)|)+C, \qquad \int f(x)^n\cdot f'(x)\,dx = \frac{1}{n+1}f(x)^{n+1}+C$$

Formula di integrazione per parti:

$$\int f(x)\cdot g'(x)\,dx = f(x)\cdot g(x) - \int f'(x)\cdot g(x)\,dx$$

Usando le regole di integrazione sopra scritte, calcolare i seguenti integrali:

$$\int (3x^4+2x+1)\,dx, \qquad \int (6x^5+3x^2+9)\,dx,$$

$$\int \frac{4x+2}{x^2}\,dx, \qquad \int (3\sin(x)+2\cos(x))\,dx,$$

$$\int 2\sqrt{x}\,dx, \qquad \int \sqrt[3]{x^2}\,dx,$$

$$\int (e^x+\cos(x))\,dx, \qquad \int \frac{3}{\sqrt{1-x^2}}\,dx,$$

$$\int \frac{x}{\sqrt{x^2-1}}\,dx, \qquad \int \frac{1}{x^2+1}\,dx,$$

$$\int \sin^3(x)\cos(x)\,dx, \qquad \int \sin(x)\cos(x)\,dx,$$

$$\int \frac{\sin(x)}{\cos(x)}\,dx, \qquad \int \frac{\log(x)}{x}\,dx,$$
$$\int \frac{\log^3(x)}{x}\,dx, \qquad \int \frac{\sin(x)}{\cos^3(x)}\,dx.$$

Usando la regola di integrazione per parti, calcolare:

$$\int xe^x\,dx, \qquad \int x^2 e^x\,dx,$$
$$\int x\sin(x)\,dx, \qquad \int x^2\cos(x)\,dx,$$
$$\int \sin^2(x)\,dx, \qquad \int \log(x)\,dx$$
$$\int x^2\log(x)\,dx, \qquad \int (x^4+x^2+1)(x+2)\,dx$$

Calcolare i seguenti integrali definiti:

$$\int_0^2 (x^2+3x)\,dx, \quad \int_0^\pi \sin(x)\,dx, \quad \int_0^{\pi/2} x\cos(x)\,dx$$