Verona, 29 dicembre 2010

Esercizi di analisi 1

$\diamondsuit$ Calcolare i seguenti integrali:

$$\int \frac{2x+3}{2x+1}dx \qquad \int \frac{x^2+1}{x-1}dx \qquad \int \frac{x}{(x+1)^2} \qquad \int \frac{3x+1}{\sqrt{5x^2+1}}dx \qquad \int \frac{5^{\sqrt{x}}}{\sqrt{x}}dx$$

$$\int \frac{1}{3\cos(5x-\pi/4)}dx \qquad \int \frac{x}{\cos^2 x^2}dx \qquad \int \frac{3^{\tanh x}}{\cosh^2 x}dx \qquad \int \left(2+\frac{x}{2x^2+1}\right)\frac{dx}{2x^2+1}$$

$$\int \frac{\sqrt[3]{1+\ln x}}{x}dx \qquad \int \frac{e^{\arctan x}+x\ln(1+x^2)+1}{1+x^2}dx \qquad \int \frac{(1+x)^2}{x(1+x^3)}dx \qquad \int \frac{dx}{x\ln^2 x}$$

$$\int e^{\sin^2 x}\sin 2x dx \qquad \int \frac{dx}{\sin^2 x\cos^2 x} \qquad \int \frac{\cos 2x}{4+\cos^2 2x}dx \qquad \int \frac{dx}{x(4-\ln^2 x)}$$

$$\int \sqrt{\frac{\ln\left(x+\sqrt{x^2+1}\right)}{1+x^2}}dx \qquad \int \frac{\sin x\cos x}{\sqrt{2-\sin^4 x}}dx$$

$\diamondsuit$ Dire per quali $x \in \mathbb{R}$ le seguenti serie convergono:

$$\sum_{n=1}^{\infty}\frac{x^n}{1+x^{2n}} \qquad \sum_{n=1}^{\infty}x^n\ln x^n \qquad \sum_{n=1}^{\infty}\ln(1+n|x|^n) \qquad \sum_{n=0}^{\infty}\frac{n\sin x^n}{n+x^{2n}}$$

$$\sum_{n=0}^{\infty}\frac{\sqrt{1+x^n}}{x^n} \qquad \sum_{n=0}^{\infty}nx^{n!} \qquad \sum_{n=0}^{\infty}x^{x^n} \qquad \sum_{n=0}^{\infty}\frac{x^{n^2}}{n} \qquad \sum_{n=1}^{\infty}\frac{1}{(\ln x)^{\ln n}}$$

$$\sum_{n=0}^{\infty}x^{n-\sqrt{n}} \qquad \sum_{n=1}^{\infty}\left(\frac{x^{2n}}{n}+\frac{n^{2x}}{x}\right) \qquad \sum_{n=1}^{\infty}\frac{\arctan\frac{1}{n}-\frac{1}{n}}{n^x\left(1-\cosh\frac{1}{\sqrt{n}}\right)}$$

$$\sum_{n=1}^{\infty}\left[\tan\left(a+\frac{1}{n}\right)\right]^n \textit{ al variare del parametro } a\in\left]-\frac{\pi}{2},\frac{\pi}{2}\right[$$

$$\sum_{n=1}^{\infty}\frac{9^n}{2n+1}x^{2n+1} \textit{(stabilirne convergenza semplice e assoluta al variare di } x\in\mathbb{R}\textit{)}$$