Integrali impropri

MV 10/11

A] Stabilire quali tra i seguenti integrali impropri sono convergenti:

1] $\displaystyle\int_1^{+\infty} \frac{dx}{x^4+3}$

2] $\displaystyle\int_1^{+\infty} \frac{dx}{x^4-3}$

3] $\displaystyle\int_2^{+\infty} \frac{dx}{x^4-3}$

4] $\displaystyle\int_0^{\pi} \frac{dx}{\sqrt{e^x-1}}$

5] $\displaystyle\int_0^{\pi} \frac{dx}{\sqrt{1+\cos x}}$

6] $\displaystyle\int_0^{\pi} \tan\left(\frac{x}{2}\right)\, dx$

7] $\displaystyle\int_0^{3} \frac{2-\sqrt{x}}{3-\sqrt{8x+x^2}}\, dx$

8] $\displaystyle\int_3^{+\infty} \frac{2-\sqrt{x}}{3-\sqrt{8x+x^2}}\, dx$

9] $\displaystyle\int_1^{+\infty} \frac{dx}{\sqrt{x^3+1}}$

10] $\displaystyle\int_1^{+\infty} \frac{dx}{\sqrt{x^3-1}}$

11] $\displaystyle\int_1^{+\infty} \frac{dx}{\sqrt[3]{x^2-1}}$

12] $\displaystyle\int_1^{+\infty} \frac{\arcsin\left(\dfrac{x-2}{x^2}\right)}{1+\log^2 x}\, dx$

13] $\displaystyle\int_e^{+\infty} \frac{1+x\left(e^{-1/x}-1\right)}{\log x}\, dx$

B] Calcolare il valore dei seguenti integrali impropri:

1] $\displaystyle\int_0^{1} \log\left(\frac{1+x}{x}\right)\, dx$

2] $\displaystyle\int_4^{8} \frac{dx}{\sqrt{|7-x|}}$

3] $\displaystyle\int_{-1}^{1} \frac{\arcsin x}{\sqrt{x+1}} dx$

4] $\displaystyle\int_2^{+\infty} \frac{4x}{x^4-1} dx$

Soluzioni (in ordine crescente): $\sqrt{2}\,(\pi-4)\,;\ \log(5/3)\,;\ \log 4;\ 2\left(1+\sqrt{3}\right).$