

Geometria B

Foglio di Esercizi n.7

23 Maggio 2017

Esercizio 1. Calcola i seguenti integrali

- i. $\int_{\partial[-1,1] \times [-1,1]} e^{\frac{1}{z}} dz;$
- ii. $\int_{|z|=1} e^{\frac{1}{z^2}} dz;$
- iii. $\int_{|z|=5} \frac{z^3}{z^4 + 1} dz;$
- iv. $\int_{|z|=2\sqrt{\pi}} z \sin^2\left(\frac{1}{z}\right) dz;$
- v. $\int_{|z|=2} \frac{3z + 1}{z(z - 1)^3} dz;$
- vi. $\int_{|z|=3/2} \frac{(z + 1)^2}{z \sin(\pi z)} dz;$
- vii. $\int_{|z|=4} \frac{e^{\frac{1}{z-1}}}{z - 2} dz;$
- viii. $\int_{|z|=2} \frac{1}{\sinh(2z)} dz;$
- ix. $\int_{|z|=2} \operatorname{tg}(z) dz;$
- x. $\int_{|z|=2} \frac{z^2}{(5 + z^2)(z - 3i)} dz;$

Esercizio 2. Calcola i seguenti integrali reali

- i. $\int_{-\infty}^{\infty} \frac{dx}{(x^2 + 1)^2};$
- ii. $\int_0^{\infty} \frac{x^2}{(x^2 + 9)(x^2 + 4)^2} dx;$
- iii. $\int_{-\infty}^{\infty} \frac{x \sin(x)}{x^2 + 4} dx;$
- iv. $\int_{-\infty}^{\infty} \frac{3x^2 - x + 2}{(4x^2 - 24x + 37)(x^2 + 2x + 5)} dx;$
- v. $\int_{-\infty}^{\infty} \frac{x \cos(x)}{x^2 - 2x + 10} dx;$
- vi. $\int_0^{\infty} \frac{x^2 + 2}{x^4 + 10x^2 + 9} dx;$
- vii. $\int_{-\infty}^{\infty} \frac{\cos(x)}{x^2 + 9} dx;$
- viii. $\int_0^{\infty} \frac{\cos^2(ax) - \frac{1}{2}}{(x^2 + 1)^2} dx, \text{ con } a \in \mathbb{R} \text{ e } a \geq 0;$

Esercizio 3. Calcola i seguenti integrali reali

- i. $\int_0^{2\pi} \frac{d\vartheta}{3 + \sin(\vartheta)};$
- ii. $\int_0^{2\pi} \frac{d\vartheta}{5 - 3 \sin(\vartheta)};$
- iii. $\int_0^{2\pi} \frac{d\vartheta}{(2 - \cos(\vartheta))^2};$
- iv. $\int_0^{2\pi} \frac{\cos^2(\vartheta)}{2 + \sin(\vartheta)} d\vartheta;$
- v. $\int_0^{2\pi} \frac{\cos(\vartheta) - \sin(\vartheta)}{1 + \sin^2(2\vartheta) + \cos^2(\vartheta/2)} d\vartheta;$
- vi. $\int_0^{\pi} \frac{1 - \sin(4\vartheta)}{2 \cos^2(\vartheta) + 3} d\vartheta;$