

Evaluation of Real Integrals Using Residues

1. Evaluate the real integral $\int_0^{2\pi} \frac{1}{3-2 \cos \theta} d\theta$ using suitable contour.

2. Evaluate $\int_0^\pi \frac{4 \cos 2\theta}{4-4 \cos \theta +1} d\theta$, using suitable contour.

3. Evaluate the integral $\int_{-\infty}^{\infty} \frac{x^2+1}{1+x^4} dx$, using suitable contour.

4. Evaluate $\int_0^\infty \frac{x^2}{(1+x^4)(x^2+1)} dx$, using suitable contour.

Answers:

1. $2\pi/\sqrt{5}$

2. $2\pi/3$

3. $\sqrt{2} \pi$

4. $\pi/6$