

Use residue to evaluate each improper integral

1. 
$$\int_0^\pi \frac{\cos(2\theta)}{1 - 2a \cos(\theta) + a^2} d\theta, \quad (-1 < a < 1)$$

2. 
$$\int_0^\pi \frac{1}{(a + \cos\theta)^2} d\theta, \quad (a > 1)$$