

KEMENTERIAN RISET TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS BRAWIJAYA MALANG
FAKULTAS MIPA JURUSAN MATEMATIKA

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Bacalah dengan seksama dan kemudian selesaikan semua soal berikut.

1. Show that if m and n are integers $\int_0^{2\pi} e^{im\theta} e^{-in\theta} d\theta = 0$ when $m \neq n$, and $\int_0^{2\pi} e^{im\theta} e^{-im\theta} d\theta = 2\pi$ when $m = n$.
2. Let C and C_0 denote the circles $z = Re^{i\theta} (0 \leq \theta \leq 2\pi)$ and $z = z_0 + Re^{i\theta} (0 \leq \theta \leq 2\pi)$, respectively. Use these parametric representations to show that

$$\int_C f(z) dz = \int_{C_0} f(z - z_0) dz$$

when f is piecewise continuous on C .

3. Show that if C is the boundary of the triangle with vertices at the points $0, 3i$, and -4 , oriented in the counterclockwise direction, then

$$\left| \int_C f(e^z - \bar{z}) dz \right| \leq 60.$$

4. Let C_R be the circle $|z| = R (R > 1)$, described in counterclockwise direction. Show that

$$\left| \int_{C_R} \frac{\log z}{z^2} dz \right| \leq 2\pi \left(\frac{\pi + \ln R}{R} \right).$$

SELESAI, Selamat Mengerjakan, Semoga Senantiasa Bermanfaat