COMPLEX ANALYSIS, HW # 7

Chapter 4, problem 55, and these problems:

Problem 1.

Evaluate the integral

$$\int_0^{2\pi} \frac{\cos^2 3\theta}{5 - 4\cos 2\theta} d\theta$$

Problem 2.

Evaluate the integral

$$\int_{\partial D(0,1)} \frac{\cos^3 z}{z^3} dz$$

Problem 3.

$$\int_{-\infty}^{+\infty} \frac{\sin^3 x}{x^3} dx$$

Problem 4.

Evaluate

$$\int_{-\infty}^{+\infty} \frac{dx}{1 + x^{2n}}$$

where n is a positive integer.

Problem 5.

$$\int_0^{+\infty} \frac{\log x}{(x^2 + 1)(x^2 + 4)} dx$$

Problem 6.

Prove that for any $b > 0$

$$\int_0^{\infty} e^{-x^2} \cos(2bx) dx = \frac{1}{2}\sqrt{\pi} e^{-b^2}$$