

Math 423/823 Exercise Set 6

Due Thursday, Mar. 8

22. [BC#4.42.4, p.119] The integral $\int_0^\pi e^{(1+i)x} dx$ is, technically, equal to

$$\int_0^\pi e^x \cos x dx + i \int_0^\pi e^x \sin x dx$$

Evaluate these two integrals $\int_0^\pi e^x \cos x dx$ and $\int_0^\pi e^x \sin x dx$ by applying the Fundamental Theorem of Calculus (p.118, top) directly to the top integral and equating the real and imaginary parts.

23. Find a parametrization of the curve which follows the circle of radius 2 counterclockwise from $z = 2$ to $z = 2i$, followed by the line segment that runs from $z = 2i$ to $z = -1$.

[Note: there are literally an infinite number of ways to answer this question (correctly!); take pity on your poor instructor when choosing your parametrization....]

24. [BC#4.46.1(part), p.132] Find the integrals $\int_C \frac{z+2}{z} dz$, where

(a): C is the semicircle $z = 2e^{i\theta}$, $0 \leq \theta \leq \pi$

(c): C is the circle $z = 2e^{i\theta}$, $0 \leq \theta \leq 2\pi$