

06. 12. 2016

Mathematical Method of Physics

Problem 2

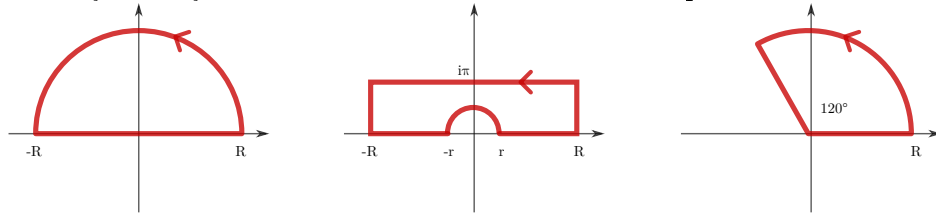
2.1 Evaluate each of the following integrals:

a) $\int_{-\infty}^{+\infty} dx \frac{1}{(x^2 + a^2)^3}$, for $a > 0$,

b) $\int_{-\infty}^{+\infty} dx \frac{e^{ax} - e^{bx}}{1 - e^x}$,

c) $\int_0^{+\infty} dx \frac{1}{x^3 + 1}$.

Hint: you may want to choose from the contours presented below.



2.2 Evaluate each of the following integrals:

a) $\int_{-\infty}^{+\infty} dx \frac{x^2}{(x^2 + a^2)^2}$, for $a > 0$,

b) $\int_{-\infty}^{+\infty} dx \frac{e^{kx}}{1 + e^x}$, for $k \in (0, 1)$,

c) $\int_0^{+\infty} dx \frac{\sin x}{x(a^2 + x^2)}$.

Hint: you may want to choose from the contours presented below.

