7ª lista de exercícios - CM068 Variáveis Complexas - 08/06/2016

1. Seja γ a circunferência $|z| = 2$, orientada positivamente. Calcule

   (a) $\displaystyle\int_\gamma \operatorname{tg} z\, dz$

   (b) $\displaystyle\int_\gamma \frac{dz}{\operatorname{senh} 2z}$

   (c) $\displaystyle\int_\gamma \frac{\operatorname{senh} z}{z(z^2+1)}\, dz$

2. Classifique as singularidades das funções abaixo

   (a) $f(z) = z^3 \operatorname{sen}\left(\dfrac{1}{z}\right)$

   (b) $f(z) = \dfrac{\operatorname{sen} z}{z^3}$

   (c) $f(z) = e^{1/z^2}$

3. Calcule o resíduo de

   (a) $f(z) = e^{z+1/z}$ em $z_o = 0$

   (b) $f(z) = z\cos(1/z)$ em $z_o = 0$

   (c) $f(z) = e^z \operatorname{cosec}^2 z$ em $z = n\pi$

4. Calcule

   (a) $\displaystyle\int_{|z|=1} \frac{(1-z^4)e^{2z}}{z^5}\, dz$

   (b) $\displaystyle\int_{|z|=2} \frac{e^z}{\operatorname{sen} z}\, dz$

   (c) $\displaystyle\int_0^\infty \frac{dx}{x^6+1}$

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

   (e) $\displaystyle\int_{-\pi}^{\pi} \frac{\cos\theta}{5+4\cos\theta}\, d\theta$

   (f) $\displaystyle\int_{-\pi}^{\pi} \frac{d\theta}{2+\operatorname{sen}^2\theta}\, d\theta$

   (g) $\displaystyle\int_0^\infty \frac{x^3 \operatorname{sen} x}{x^4+1}$

   (h) $\displaystyle\int_0^\infty \frac{\cos ax}{x^2+1}\, dx$, $a > 0$.