1. Determine a natureza dos seguintes integrais

$$a)\int_1^\infty \frac{x^3+2x^2}{x^6+1}dx \qquad b)\int_1^\infty \frac{x\sqrt{x^2+1}}{3x^4+2x+1}dx \qquad c)\int_0^\infty \frac{3x^7+\sqrt{x}}{e^{\frac{x}{2}}}dx$$

$$d)\int_{-\infty}^{-1} \frac{e^x}{x}dx \qquad e)\int_{-\infty}^\infty \frac{(x^3+x^2)\sqrt[3]{x^2+5}}{x^6+1}dx \qquad f)\int_0^\infty \frac{2+\sin(x)}{x^2+5}dx$$

$$g)\int_1^\infty \frac{\sin^2(x)+\cos^2(\sqrt{x})}{x^2}dx \qquad h)\int_1^\infty \frac{e^{-x^2}\log(x)}{x+e^{-x}}dx \qquad i)\int_1^\infty \frac{\sin\left(\frac{1}{x}\right)}{-x}dx$$

$$j)\int_2^\infty \frac{1}{x\log(x)}dx$$

2. Use o teorema dos resíduos para calcular os seguintes integrais:

$$a)\quad \int_{-\infty}^\infty \frac{dx}{(x^2+1)(x^2+9)} \qquad b)\quad \int_0^\infty \frac{\cos(3x)}{(x^2+1)^2}dx \qquad c)\quad \int_0^{2\pi} \frac{dt}{2+\sin(t)}$$

$$d)\quad \int_0^{2\pi} \frac{dt}{1+a\cos(t)} \quad a\in]-1,1[$$