

1. Show carefully that $\int_0^\infty \frac{dx}{\sqrt{x^6+1}}$ is convergent.
2. How big does a have to be so that $\int_a^\infty \frac{dx}{\sqrt{x^6+1}} < 0.00005$?
3. Determine whether $\int_1^\infty \frac{\sqrt{1+\cos^2(x)}}{x} dx$ is convergent or divergent. Justify your answer carefully.