

Merit Worksheet: More on Improper Integral and Comparison Method

February 15, 2022

1. Investigate $\int_0^1 \frac{1}{x} dx$
2. For what value k with $k \neq 1, k > 0$ does $\int_0^1 \frac{1}{x^k} dx$ converges?
3. Evaluate $\int_0^{\pi/2} \frac{\sin x dx}{\sqrt{1-\cos x}}$

4. Determine whether $\int_0^1 \frac{dx}{x^2 + \sqrt{x}}$ converges

5. Determine whether $\int_0^\infty \cos x dx$ converges

6. Determine whether $\int_0^\infty \frac{x dx}{x^4 + 1}$ converges without calculating the integral

7. Determine whether $\int_0^\infty \frac{dx}{x^2 + 6x + 10}$ converges, again, don't calculate!!