

Determine whether each of the following improper integrals converges or diverges.

1. $\int_2^{\infty} \frac{1}{x^3 + 2} dx$

2. $\int_5^{\infty} \frac{1}{\sqrt{x} - 2} dx$

3. $\int_2^{\infty} \frac{2}{\sqrt{x} + x^2} dx$

4. $\int_0^2 \frac{2}{\sqrt{x} + x^2} dx$

5. $\int_0^{\infty} \frac{2}{\sqrt{x} + x^2} dx$

Let $I = \int_2^{\infty} \frac{3}{x^5 + x^2 + 1} dx$.

1. Show that I converges.

2. Find an upper bound for $I_2 = \int_{10}^{\infty} \frac{3}{x^5 + x^2 + 1} dx$.

3. Approximate $I_1 = \int_2^{10} \frac{3}{x^5 + x^2 + 1} dx$ using M_{100} .

How close is this approximation to I_1 ?

4. How close is your value for M_{100} to the actual value of I ?