

Improper Integrals and Comparison Test

Determine whether the following improper integrals converge.

1) $\int_1^{\infty} \sin\left(\frac{\pi x}{2}\right) dx$

2) $\int_{-\infty}^{\infty} x e^{-x^2} dx$

3) $\int_0^2 \frac{1}{(x-1)^2} dx$

4) $\int_0^4 \frac{dx}{\sqrt{x}}$

$$5) \int_{-\infty}^{\infty} \frac{1}{x^2} dx$$

Use comparison test (and the p -test) to determine whether the following improper integrals converge

$$6) \int_1^{\infty} \frac{dx}{\sqrt[3]{x^5 + x}}$$

$$7) \int_0^{\frac{1}{2}} \frac{dx}{\sqrt{x - x^5}}$$