

Explain why each integral is improper, determine if the integral converges or diverges, and for those that do converge, find the value of the integral.

1.  $\int_1^{\infty} \frac{1}{x^3} dx$

5.  $\int_0^1 \frac{1}{x^3} dx$

2.  $\int_1^{\infty} \frac{1}{x} dx$

6.  $\int_0^1 \frac{1}{\sqrt{x}} dx$

3.  $\int_1^{\infty} \frac{1}{\sqrt{x}} dx$

7.  $\int_0^1 \frac{1}{x} dx$

4.  $\int_1^{\infty} \frac{1}{x^2 + 1} dx$

8.  $\int_0^{\pi/2} \tan(x) dx$