

Improper Integrals

Evaluate if possible:

<ul style="list-style-type: none">• $\int_0^{\infty} e^{-2x} dx$• $\int_0^{\infty} e^{2x} dx$• $\int_0^{\infty} x^p dx$• $\int_1^{\infty} \frac{6 \ln 4x}{x} dx$• $\int_0^{\infty} \frac{dx}{4x^2 + 4x + 5}$• $\int_1^{\infty} \frac{\ln x}{x^4} dx$• $\int_e^{\infty} \frac{dx}{x \ln x}$	<ul style="list-style-type: none">• $\int_0^1 \frac{1}{x} dx$• $\int_0^1 \frac{1}{x-1} dx$• $\int_{-1}^1 \frac{1}{x} dx$• $\int_2^5 \frac{1}{\sqrt{x-2}} dx$• $\int_0^{\pi/2} \sec x dx$• $\int_0^4 \frac{1}{(x-3)^3} dx$
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In the exercises below, determine whether the integrals converge or diverge.

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

2. $\int_2^{\infty} \frac{x^3}{x^4 - 1} dx$

3. $\int_1^{\infty} \frac{x^2 + 1}{x^3 + 3x + 2} dx$

4. $\int_1^{\infty} \frac{1}{x^2 + 5x + 1} dx$

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

6. $\int_1^{\infty} \frac{x^2 - 6x + 1}{x^2 + 4} dx$

7. $\int_1^{\infty} \frac{5x + 2}{x^4 + 8x^2 + 4} dx$

8. $\int_1^{\infty} \frac{1}{e^{5t} + 2} dt$