

Calculus 2 Workbook

Improper integrals



■ 1. Evaluate the improper integral.

$$\int_{1}^{\infty} \frac{5}{x^3} \ dx$$

2. Evaluate the improper integral.

$$\int_3^\infty \frac{7}{(x-2)^2} \ dx$$

■ 3. Evaluate the improper integral.

$$\int_0^\infty 2e^{-2x}\ dx$$

$$\int_0^\infty \frac{3x}{2+2x^2} \ dx$$

■ 1. Evaluate the improper integral.

$$\int_{-\infty}^{0} e^{3x} dx$$

■ 2. Evaluate the improper integral.

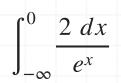
$$\int_{-\infty}^{1} x e^{x^2} dx$$

■ 3. Evaluate the improper integral.

$$\int_{-\infty}^{-2} \frac{2}{x-1} - \frac{2}{x+1} \, dx$$

■ 4. Evaluate the improper integral.

$$\int_{-\infty}^{3} \frac{3}{x^2 + 9} \ dx$$



$$\int_{-\infty}^{0} 4e^{-4x} dx$$



■ 1. Evaluate the improper integral.

$$\int_{-\infty}^{\infty} 2xe^{-x^2} dx$$

2. Evaluate the improper integral.

$$\int_{-\infty}^{\infty} \frac{3 \ dx}{x^2 + 1}$$

■ 3. Evaluate the improper integral.

$$\int_{-\infty}^{\infty} x^2 + 7x + 1 \, dx$$

$$\int_{-\infty}^{\infty} 3x^2 e^{-x^3} dx$$

■ 1. Evaluate the improper integral.

$$\int_{-\frac{\pi}{2}}^{0} \frac{3\cos x}{2\sin x} \, dx$$

■ 2. Evaluate the improper integral.

$$\int_{-8}^{0} \frac{e^x \, dx}{e^x - 1}$$

■ 3. Evaluate the improper integral.

$$\int_{-9}^{0} \frac{e^{\sqrt{-x}} dx}{\sqrt{-x}}$$

■ 4. Evaluate the improper integral.

$$\int_{1}^{3} \frac{2x - 3}{\sqrt{3x - x^2}} \ dx$$

$$\int_0^{2\sqrt{2}} \frac{x}{\sqrt{8-x^2}} \, dx$$

$$\int_{1}^{3} \frac{x-1}{x^2 - 4x + 3} \ dx$$



■ 1. Evaluate the improper integral.

$$\int_0^2 \frac{3}{\sqrt[3]{x}} \, dx$$

2. Evaluate the improper integral.

$$\int_{-1}^{5} \frac{3}{\sqrt{x+1}} \ dx$$

■ 3. Evaluate the improper integral.

$$\int_{3}^{7} \frac{5}{x-3} \ dx$$

■ 4. Evaluate the improper integral.

$$\int_0^6 \frac{9}{5\sqrt[4]{x^3}} \ dx$$

$$\int_{-1}^{7} \frac{x^2}{x^3 + 1} \ dx$$

$$\int_{-4}^{4} \frac{x+4}{x^2+8x+16} \ dx$$



■ 1. Evaluate the improper integral.

$$\int_{-2}^{2} \frac{3}{2\sqrt[5]{x^3}} \, dx$$

2. Evaluate the improper integral.

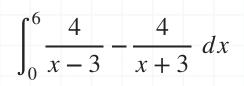
$$\int_0^4 \frac{7 \ dx}{2(x-2)^2}$$

■ 3. Evaluate the improper integral.

$$\int_{-27}^{8} \frac{3 dx}{\sqrt[3]{x}}$$

■ 4. Evaluate the improper integral.

$$\int_{-3}^{3} \frac{x+2}{x^2-4} \ dx$$





COMPARISON THEOREM

■ 1. Use the Comparison Theorem to say whether the integral converges or diverges.

$$\int_{1}^{\infty} \frac{1}{2 + 2x^2} \ dx$$

■ 2. Use the Comparison Theorem to say whether the integral converges or diverges.

$$\int_{1}^{\infty} \frac{1}{5x + e^{x}} \ dx$$

 \blacksquare 3. Can we use the harmonic series 1/x as a comparison series to say whether or not the integral converges?

$$\int_{1}^{\infty} \frac{x}{x^2 + 1} \ dx$$





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