

(1) Evaluate the integral.

- $\int x \cos x \, dx$
- $\int \ln x \, dx$
- $\int x^2 \ln x \, dx$
- $\int \sin x \ln(\cos x) \, dx$
- $\int \sin^{-1} x \, dx$
- $\int \tan^{-1} x \, dx$
- $\int \tan^5 x \, dx$
- $\int \tan^6 x \, dx$
- $\int \sec^3 x \, dx$
- $\int \tan^5 x \sec^4 x \, dx$
- $\int \tan^4 x \sec^4 x \, dx$
- $\int \tan^3 x \sec^4 x \, dx$
- $\int \cot^3 x \, dx$
- $\int \cot^4 x \, dx$
- $\int \cot^5 x \csc^4 x \, dx$
- $\int \frac{1}{1 + \sin x} \, dx$
- $\int \frac{1}{2 + \cos x} \, dx$
- $\int \frac{1}{3 + 2 \cos x} \, dx$

(2) Determine whether the integral converges or diverges.

- $\int_0^{\infty} \frac{1}{(x+2)^2} \, dx$
- $\int_0^{\infty} \frac{x}{3+x^2} \, dx$
- $\int_{-\infty}^{\infty} \frac{1}{2+x^2} \, dx$