

1. Determine if the following integral is convergent. If so, evaluate: $\int_0^{\infty} \frac{\tan^{-1} x}{1+x^2} dx$
2. Determine if the following integral is convergent. If so, evaluate: $\int_1^{\infty} \frac{dx}{\sqrt{x}}$
3. Determine if the following integral is convergent. If so, evaluate: $\int_0^1 \frac{dx}{\sqrt[3]{x}}$
4. Determine if the following integral is convergent. If so, evaluate: $\int_0^{\infty} \frac{x}{x^4+1} dx$
5. Does the integral $\int_1^{\infty} \frac{3+\sin 2x}{x} dx$ converge or diverge?
6. Does the improper integral $\int_0^{\infty} \frac{1}{e^x+1} dx$ converge?
7. Does the integral $\int_0^1 \frac{3+\sin 2x}{\sqrt{x}} dx$ converge or diverge?
8. Does the integral $\int_0^{\infty} \frac{x^2}{x^5+7} dx$ converge or diverge?
9. Does the integral $\int_0^1 \frac{e^x}{x^2} dx$ converge or diverge?
10. $\int_{-1}^0 \frac{1}{x^2+2x+1} dx$
11. $\int_{-\infty}^{\infty} x e^{-x^2} dx$
12. $\int_{-1}^1 \frac{1}{\sqrt[3]{x}} dx$