

For the following problems determine if the integral converges or diverges. You do not need to compute the value of the integral if it converges.

1.
$$\int_3^{\infty} \frac{1}{(x-2)^{3/2}} dx$$

2.
$$\int_0^{\infty} \frac{1}{\sqrt[4]{x}} dx$$

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

4.
$$\int_1^{\infty} \frac{1}{(2x+1)^3} dx$$

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

6.
$$\int_0^{\infty} e^{-\sqrt{x}} dx$$

7.
$$\int_0^{\infty} \frac{x}{x^3+1} dx$$

8.
$$\int_0^{\infty} \frac{\arctan x}{2+e^x} dx$$

9.
$$\int_2^{\infty} \frac{1}{x^2} \sin^2 x dx$$

10.
$$\int_1^{\infty} \sin^2\left(\frac{1}{x}\right) dx$$

11.
$$\int_0^{\infty} \cos^2 x e^{-\sin x} dx$$

12.
$$\int_0^{\infty} \frac{3}{x^2+x+4} dx$$