

## Assignment : Improper Integral

Type -1

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

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

9.  $\int_0^1 \frac{1}{\sqrt{x}} dx$

12.  $\int_0^{25} \frac{1}{\sqrt{x}} dx$

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

6.  $\int_0^{\infty} x e^{-5x} dx$

10.  $\int_0^1 \ln x dx$

13.  $\int_1^2 \frac{1}{\sqrt{2-x}} dx$

3.  $\int_{10}^{\infty} \frac{1}{x \ln x} dx$

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

11.  $\int_{-1}^4 \frac{x}{x^2-9} dx$

14.  $\int_0^5 \frac{1}{\sqrt[3]{2-x}} dx$

4.  $\int_0^{\infty} e^{-5x} dx$

8.  $\int_0^1 \frac{1}{x} dx$

Type-II

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

6.  $\int_0^1 \frac{1}{\sqrt[3]{x}} dx$

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

16.  $\int_2^{\infty} \frac{1}{x\sqrt{x^2-1}} dx$

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

7.  $\int_5^{\infty} \frac{1}{x \ln x} dx$

12.  $\int_0^{\pi/2} \tan x dx$

17.  $\int_1^2 \frac{1}{(x-1)(x^2+1)} dx$

3.  $\int_2^{\infty} e^{-5x} dx$

8.  $\int_0^1 \frac{1}{x \ln x} dx$

13.  $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$

4.  $\int_0^1 \frac{1}{x} dx$

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

14.  $\int_0^1 \frac{x}{\sqrt{1-x^2}} dx$

18.  $\int_2^{\infty} \frac{1}{(x-1)(x^2+1)} dx$

5.  $\int_0^1 \frac{1}{x^2} dx$

10.  $\int_1^2 \frac{x^2}{x^3-8} dx$

15.  $\int_1^2 \frac{1}{x\sqrt{x^2-1}} dx$

19.  $\int_0^1 \frac{1}{\sqrt[3]{x}} dx$

## Answers - Type-I

- 1.)  $\frac{1}{3}$    2.)  $\infty$    3.)  $\infty$    4.)  $\frac{1}{5}$    5.)  $\frac{1}{2}$    6.)  $\frac{1}{25}$    7.)  $\pi$    8.)  $\infty$    9.) 2   10.) -1
- 11.) undefined   12.) 10   13.) 2   14.)  $-\frac{3}{2}(\sqrt[3]{9} - \sqrt[3]{4})$

## Answers - Type-II

- 1.)  $\infty$    2.) 1   3.)  $\frac{1}{5e^{10}}$    4.)  $\infty$    5.)  $\infty$    6.)  $\frac{3}{2}$    7.)  $\infty$    8.)  $-\infty$    9.)  $\frac{1}{4}$    10.)  $-\infty$
- 11.)  $\frac{\pi\sqrt{3}}{9}$    12.)  $\infty$    13.)  $\frac{\pi}{2}$    14.) 1   15.)  $\frac{\pi}{3}$    16.)  $\frac{\pi}{6}$    17.)  $\infty$
- 18.)  $\frac{1}{4} \ln 5 - \frac{\pi}{4} + \frac{1}{2} \tan^{-1} 2 \approx 0.1705357$    19.)  $\frac{3}{2}$