



## Tutorial 3

### Question 1

Use partial fraction decomposition to evaluate

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



## Question 2

Evaluate the following integrals

1.  $\int \frac{\sqrt{x}dx}{x-4},$

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



### Question 3

Determine the convergence or divergence the following improper integrals. If the integral is convergent, then find its value.

1.  $\int_0^{12} \frac{9}{\sqrt{12-x}} dx,$

2.  $\int_0^{\infty} \frac{e^x}{1+e^x} dx$



### Question 4

Use partial fraction decomposition to evaluate

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



## Question 5

Evaluate the following integrals

1.  $\int \frac{dx}{2\sqrt{x} + 2x},$

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



### Question 6

Determine the convergence or divergence the following improper integrals. If the integral is convergent, then find its value.

1.  $\int_0^{\infty} \frac{x}{1+x^2} dx,$

2.  $\int_{-2}^{14} \frac{dx}{\sqrt[4]{x+2}}$



### Question 7

Evaluate the integral

$$\int \frac{x-3}{x^3+3x} dx$$



### Question 8

Evaluate the integral

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





## Question 9

Determine convergence or divergence of the following improper integrals

$$(1) \int_1^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx \quad (2) \int_1^9 \frac{dx}{(x-1)^{2/3}}$$