Tutorial 4

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 intergals

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