

Question 1: (Substitution Method)

(a) Determine $\int \frac{(\ln x)^2}{x} dx$.

[2]

(b) Determine $\int \frac{1+x}{1+x^2} dx$.

[3]

(c) Evaluate $\int_1^2 \frac{e^{1/x}}{x^2} dx$.

[2]

(d) Determine $\int_1^2 x\sqrt{x-1} dx$.

[3]

Question 2: (Integration by Parts)

(a) Determine $\int_0^{1/2} x \cos(\pi x) dx$.

[5]

(b) Determine $\int (\ln x)^2 dx$.

[5]

Question 3: (Trigonometric Integral)

Determine $\int \tan^5 x \, dx$

[5]

Question 4: (Integral with irreducible quadratic)

Determine $\int \frac{5}{x^2 + 6x + 13} \, dx$

[5]

Question 5: (Trigonometric Substitution) Determine

$$\int \frac{1}{\sqrt{x^2 + 25}} dx$$

Question 6: (Partial Fractions) Determine

$$\int \frac{4x^2 + 3x + 29}{(x + 1)(x^2 + 9)} dx$$