

Integral Calculus (M-106), Serie N: 5

Exercise 1:

Find $f'(x)$ if $f(x)$ is the given expression.

- 1) $\sec^{-1} \sqrt{x^2 - 1}$ 2) $x \arccos \sqrt{4x + 1}$ 3) $\frac{e^{2x}}{\sin^{-1} 5x}$
 4) $3^{\arcsin(x^3)}$ 5) $(\tan x)^{\arctan x}$ 6) $(\tan^{-1}(4x))e^{\tan^{-1} 4x}$

Exercise 2:

a) Find $y'(x)$.

- 1) $x^2 + x \sin^{-1} y(x) = y(x)e^x$ 2) $\ln(x + y(x)) = \tan^{-1}(xy(x))$

b) Evaluate the integral

- 1) $\int \frac{e^x}{\sqrt{4 - e^x}} dx$ 2) $\int \frac{\cos x}{\sqrt{9 - \sin^2 x}} dx$ 3) $\int \frac{\sin x}{\cos^2 x + 1} dx$
 4) $\int \frac{1}{x\sqrt{x^6 - 4}} dx$ 5) $\int \frac{\sec x \tan x}{1 + \sec^2 x} dx$ 6) $\int_{\frac{2}{\sqrt{3}}}^2 \frac{1}{x\sqrt{x^2 - 1}} dx$

Exercise 3:

Find $f'(x)$ if $f(x)$ is the given expression.

$$\begin{array}{lll} 1) \sqrt{\cosh^{-1} x} & 2) \tanh^{-1}(\sin 3x) & 3) \operatorname{sech}^{-1} \sqrt{1-x} \\ 4) \ln \cosh^{-1}(4x) & 5) e^{4x} \sec^{-1} e^{4x} & 6) \frac{1}{x} \tanh \frac{1}{x} \end{array}$$

Exercise 4:

Evaluate the integral

$$\begin{array}{lll} 1) \int \frac{\sin x}{\sqrt{1+\cos^2 x}} dx & 2) \int \frac{1}{\sqrt{16x^2-9}} dx & 3) \int \frac{1}{49-4x^2} dx \\ 4) \int \frac{e^x}{\sqrt{e^{2x}-16}} dx & 5) \int \frac{2}{5-3x^2} dx & 6) \int \frac{x}{\operatorname{sech}(x^2)} dx \\ 7) \int \operatorname{sech}^2(1-2x) dx & 8) \int \frac{x}{\sqrt{25x^2+36}} dx & 9) \int \frac{1}{\sqrt{25x^2+36}} dx \end{array}$$