UNIT 8: **Indefinite Integration**

Specific Objectives:

1. To perform indefinite integration as the reverse process of differentiation.
2. To learn standard formulae for indefinite integration.
3. To find indefinite integrals using substitution.

Detailed Content	Time Ratio	Notes on Teaching
8.1 Indefinite integration	2	The idea of primitive function is helpful and the relation $\int f(x)\,\mathrm{d}x = F(x) + C$ should be stressed while the meaning of C be explained.
8.2 Some formulae for indefinite integration	3	Treating indefinite integration as the reverse process of differentiation, students should be able to find the following standard integrals: $\int x^n\,\mathrm{d}x$, when $n \neq -1$ $\int e^x\,\mathrm{d}x$ It should be noted that $\int \frac{1}{x}\,\mathrm{d}x = \ln\lvert x\rvert + c$ Theorems on the following integrals should be taught: $\int kf(x)\,\mathrm{d}x = k\int f(x)\,\mathrm{d}x$ $\int [f(x) \pm g(x)]\,\mathrm{d}x = \int f(x)\,\mathrm{d}x \pm \int g(x)\,\mathrm{d}x$
8.3 Integration by substitution	4	The following integrals may be used as examples in introducing the topic: $\int (2x+1)^5\,\mathrm{d}x$ and $\int 2x\sqrt{x^2+1}\,\mathrm{d}x$. Different methods of evaluating the same integral may lead to different results, but these can only differ by a constant. e.g. $\int (x+1)\,\mathrm{d}x = \frac{(x+1)^2}{2} + C_1$ $\int (x+1)\,\mathrm{d}x = \frac{x^2}{2} + x + C_2$ It should be noted that integration by parts is not required.
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