

chapter 2: Basic Approaches

Integration by Parts

① Basic Integration Formulas.

$$1) \int k dx = kx + c$$

$$2) \int x^n dx = \frac{x^{n+1}}{n+1} + c$$

$$3) \int (ax+b)^n dx = \frac{(ax+b)^{n+1}}{(n+1)(a)} + c$$

$$4) \int \sin x dx = -\cos x + c$$

$$5) \int \cos x dx = \sin x + c$$

$$6) \int \sec^2 x dx = \tan x + c$$

$$7) \int \csc^2 x dx = -\cot x + c$$

$$8) \int \sec ax \tan ax dx = \frac{\sec ax}{a} + c$$

$$9) \int \csc ax \cot ax dx = \frac{\csc ax}{a} + c$$

$$10) \int e^{ax} dx = \frac{e^{ax}}{a} + c$$

$$11) \int \frac{1}{x} dx = \ln|x| + c \rightarrow \text{if } \frac{x^0}{0}$$

$$12) \int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1} \frac{x}{a} + c$$

$$13) \int \frac{x}{a^2 + x^2} dx = \frac{1}{a} + \tan^{-1} \frac{x}{a} + c$$

$$14) \int \frac{1}{x \sqrt{x^2 - a^2}} dx = \frac{1}{a} \sec^{-1} \left| \frac{x}{a} \right| + c$$

$$15) \int \frac{1}{mx+n} dx = \frac{1}{m} \cdot \ln|mx+n| + c$$

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