## INTEGRATION OF EXPONENTIAL FUNCTION

$$1. \int e^u du = e^u + c$$

$$2. \int a^{u} du = \frac{a^{u}}{\ln a} + c$$

## **Example**

$$1. \int \frac{dx}{e^{2x}}$$

Solution

2. 
$$\int e^{\sin 4x} \cos 4x \, dx$$
  $= \int e^{x} \, dx = e^{x} + c$ 

$$n\zeta = \frac{1}{4}$$

$$\frac{1}{4} \left( e^{\sin 4x} + \cos 4x \right) = 0 + 1$$

Jusinu = cosuda

3. 
$$\int \frac{(e^x - 4e^{-x})}{e^x} dx$$

$$\int (e^{x} - 4e^{-x})e^{-x} dx$$

$$\int (e^{x} - 4e^{-x} - 4e^{-x}) dx$$

$$0$$
,  $0$  =  $0$   $1$ 

$$\int (e^{0} - 4e^{-2x}) dx$$

$$\int (1 - 4e^{-2x}) dx$$

$$\int dx - 4 \int e^{-2x} dx = 1e + u = -2x$$

$$\int dx - 4 \left(-\frac{1}{2}\right) \int e^{-2x} dx = 1e + u = -2x$$

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$$\int dx + 2 \left[ e^{-2x} - 2dx \right]$$

$$1 + 2 e^{-2x} + ($$

$$4. \int 2^{4x} dx$$

$$\frac{1}{100} = 4x$$

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$$\frac{1}{100} = \frac{1}{100}$$

$$\int a^{\prime\prime} du = \frac{a^{\prime\prime}}{\ln a} + C$$

$$\frac{1}{4} \int_{2}^{4x} 4 dx = b + c$$

Note:
 $\frac{1}{4} \int_{10}^{4x} 4 dx = b + c$ 
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$$\frac{2}{4 \ln n} + 0$$

$$\frac{4 \ln 2}{4 \times 10^{2}} + 0 = 0$$

$$\frac{2}{\ln 2} + 0$$

$$\frac{2}{\ln 2} + 0$$

$$\frac{2}{\ln 2} + 0$$

$$5. \int \sqrt[3]{4^{2x}} \ dx$$

$$= \int \left( \frac{2x}{3} \right) dx$$

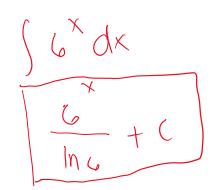
$$= \int \left( \frac{2x}{3} \right) dx \qquad \Rightarrow 0 \quad \Rightarrow \frac{3}{2} \int \left( \frac{2x}{3} \right) \frac{2}{3} dx$$

$$|e|_{u=\frac{2x}{3}} = \frac{1}{3} \left[ \frac{4^{\frac{2x}{3}}}{2} \right] + 1$$

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6. 
$$\int 3^x 2^x dx$$

$$a^{m} b^{m} = (ab)^{m}$$



## INTEGRATION OF HYPERBOLIC FUNCTION

- 1.  $\int \cosh u \, du = \sinh u + c$
- 2.  $\int$  sinh u du = cosh u + c
- $3. \int \operatorname{sech}^2 u \, du = \tanh u + c$
- $4. \int csch^2 u \, du = -coth \, u + c$
- 5.  $\int$  sech u tanh u du = -sech u + c
- 6.  $\int \operatorname{csch} u \operatorname{coth} u du = -\operatorname{csch} u + c$
- 7.  $\int \tanh u \, du = \ln|\cosh u| + c$
- 8.  $\int \coth u \, du = \ln|\sinh u| + c$

## **EXAMPLE**

1. 
$$\int SIN h \left( 3x - 1 \right) dx = 0 \quad \frac{1}{3} \int SIN h \left( 3x - 1 \right) dx$$
  
Let  $u = 3x - 1$   
 $du = 3 dx$   
 $n = \frac{1}{3} \int SIN h \left( 3x - 1 \right) dx$ 

2. 
$$\int (\cosh 4x + \sinh 2x) dx$$
  
 $\int \cosh 4x dx + \int \sinh 2x dx$   
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 $\int \cosh 4x + \int \sinh 2x dx$ 

$$\frac{1}{4} \sinh 4x + \frac{1}{2} \cos h 2x + C$$

3. 
$$\int \operatorname{sech} \frac{1}{4} \times \operatorname{tan} h \frac{1}{4} \times dx = 4 \int \operatorname{sech} \frac{1}{4} \times \operatorname{tanh} \frac{1}{4} \times dx$$

let  $u = \frac{1}{4} \times dx$ 

$$hf = 4$$

3.  $\int \operatorname{sech} \frac{1}{4} \times \operatorname{tanh} \frac{1}{4} \times dx = -4 \int \operatorname{sech} \frac{1}{4} \times \operatorname{tanh} \frac{1}$