Math Formulas: Integrals of Exponential Functions

1. $$\int e^{cx}\,dx = \frac{1}{c}e^{cx}$$

2. $$\int a^{cx}\,dx = \frac{1}{c \cdot \ln a}a^{cx}, (\text{for } a > 0, a \neq 1)$$

3. $$\int x \cdot e^{cx} = \frac{e^{cx}}{c^2}(cx - 1)$$

4. $$\int x^2 \cdot e^{cx} = e^{cx}\left(\frac{x^2}{c} - \frac{2x}{c^2} + \frac{2}{c^3}\right)$$

5. $$\int x^n \cdot e^{cx}\,dx = \frac{1}{c}x^n e^{cx} - \frac{n}{c}\int x^{n-1}e^{cx}\,dx$$

6. $$\int \frac{e^{cx}}{x}\,dx = \ln|x| + \sum_{i=1}^{\infty}\frac{(cx)^i}{i \cdot i!}$$

7. $$\int \frac{e^{cx}}{x^n} = \frac{1}{n-1}\left(-\frac{e^{cx}}{x^{n-1}} + c \cdot \int \frac{e^{cx}}{x^{n-1}}\,dx\right)$$

8. $$\int e^{cx} \cdot \ln x\,dx = \frac{1}{c}e^{cx}\ln|x| + E_i(cx)$$

9. $$\int e^{cx} \cdot \sin(bx)\,dx = \frac{e^{cx}}{c^2 + b^2}(c \cdot \sin(bx) - b \cdot \cos(bx))$$

10. $$\int e^{cx} \cdot \cos(bx)\,dx = \frac{e^{cx}}{c^2 + b^2}(c \cdot \sin(bx) + b \cdot \cos(bx))$$

11. $$\int e^{cx} \cdot \sin^n x\,dx = \frac{e^{cx} \cdot \sin^{n-1}x}{c^2 + n^2}(c \cdot \sin x - n \cdot \cos(bx)) + \frac{n(n-1)}{c^2 + n^2}\int e^{cx}\sin^{n-2}\,dx$$

12. $$\int e^{cx} \cdot \cos^n x\,dx = \frac{e^{cx} \cdot \cos^{n-1}x}{c^2 + n^2}(c \cdot \sin x + n \cdot \cos(bx)) + \frac{n(n-1)}{c^2 + n^2}\int e^{cx}\cos^{n-2}\,dx$$