Calculus I

§ $\int Ae^{ax+b}\mathrm{d}x$, part 2

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2019

Example (Substitution Rule)

Find $\int e^{3x}\mathrm{d}x$.

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Let $u = ?$

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Example (Substitution Rule)

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Let $u = 3x.$

Then $\mathrm{d}u =$ **?**

Example (Substitution Rule)

Find $\int e^{3x}\mathrm{d}x$.

Let $u = 3x$.

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$\mathrm{d}x = \mathbf{?}$

Example (Substitution Rule)

Find $\int e^{3x}\mathrm{d}x$.

Let $u = 3x$.

Then $\mathrm{d}u = 3\mathrm{d}x$

$$\mathrm{d}x = \frac{1}{3}\mathrm{d}u.$$

Example (Substitution Rule)

$$\text{Find} \quad \int e^{3x}\mathrm{d}x.$$

$$\text{Let} \quad u = 3x.$$

$$\text{Then} \quad \mathrm{d}u = 3\mathrm{d}x$$

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$$\text{Substitute:} \quad \int e^{3x}\mathrm{d}x = \int \quad e^{u}\textbf{?}$$

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Then $\mathrm{d}u = 3\mathrm{d}x$

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Substitute: $\int e^{3x}\mathrm{d}x = \int e^{u}$**?**

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$$\begin{aligned} \text{Substitute:} \quad \int e^{3x}\mathrm{d}x &= \int \frac{1}{3}e^{u}\mathrm{d}u \\ &= \frac{1}{3}e^{u} + C \end{aligned}$$

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