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12.3: Integrals of Exp. & Logs.

$$\frac{d}{dx} e^{u(x)}$$

$$\int e^{u(x)} \cdot u'(x) dx$$

Ex 1: $\int 4e^x dx$

$$\int 250e^{-\frac{1}{2}x} dx$$

$$\int \frac{x^3 dx}{e^{4x^4}}$$

Ex 3: Long Division.

$$\int \frac{x^3 - x^2 + 1}{x - 1} dx$$

$$\int \frac{x^4 - 2x^2 + x}{x^2 - 2} dx$$

$$\frac{d}{dx} \ln[u(x)]$$

$$\int \frac{u'(x)}{u(x)} dx.$$

why the abs?

Ex 2: $\int \frac{3x^2}{x^3 + 4} dx$

$$\int \frac{x^2 dx}{x^3 - 9}$$

$$\int \frac{4x^3 + 2x}{x^4 + x^2} dx$$

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Review.

Ex 1: a) $\int \left(3x^3 + \frac{4}{x^2} - \frac{5}{\sqrt[3]{x}} \right) dx$

b) $\int \frac{5x^3 dx}{(x^4 - 8)^3}$

c) $\int \frac{x^2 + 1}{\sqrt{x^3 + 3x + 10}} dx$

d) $\int \left(x e^{3x^2} - \frac{5}{e^{x/3}} \right) dx$

e) $\int \frac{(x+2)}{x^2 + 4x - 9} dx$

Ex 2: (long div) $\int \frac{x^4 - 2x^2 + x}{x^2 - 2} dx$