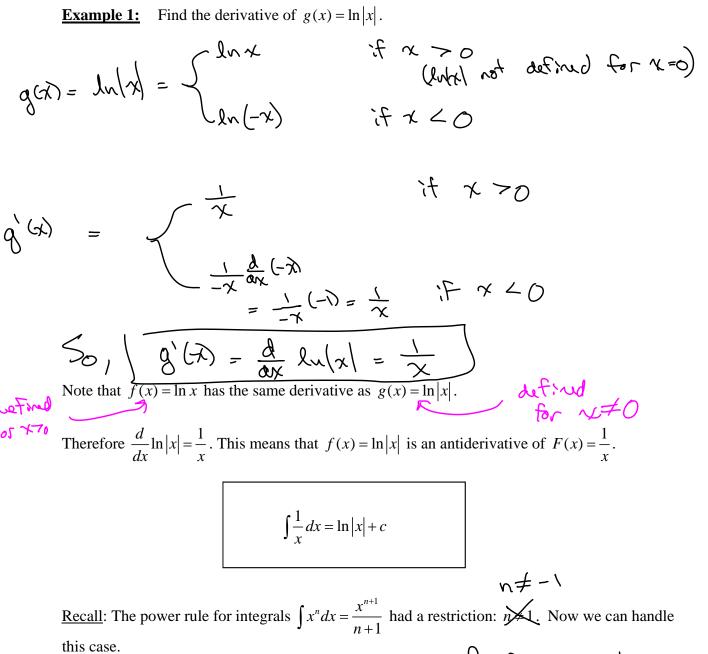
Using the derivative of the natural logarithmic function to obtain an antiderivative:



$$\frac{E_{x}}{\sqrt{x^{2}}} \int \frac{x^{3} + 5x}{x^{2}} dx = \int \left(\frac{x^{3}}{x^{2}} + \frac{5x}{x^{2}}\right) dx$$
$$= \int \left(x + \frac{5}{x}\right) dx = \frac{x}{2} + 5 \int \frac{1}{x} dx$$
$$= \int \frac{x^{2}}{2} + 5 \int \frac{1}{x} dx$$

Example 2: Determine
$$\int \frac{x^2}{x^3+4} dx$$
.

$$\int \frac{x^2}{x^3+4} dx = \int \sqrt{2} - (x^3+4)^2 dx = \frac{1}{3} \int \frac{1}{u} du$$

$$= \frac{1}{3} \int \frac{1}{u} du$$

$$= \frac{1}{3} \sqrt{2} - \frac{1}{x^3} dx$$

$$= \frac{1}{3} \int \frac{1}{u} du$$

$$= \frac{1}{3} \sqrt{2} - \frac{1}{x^3} dx$$

Example 4: Determine $\int_2^5 \frac{1}{3x} dx$.

Example 5: Determine
$$\int \frac{x^7 - x + 3x^4}{x^5} dx$$
.

Example 6: Find
$$\int \frac{(\ln x)^4}{x} dx$$
.

$$\int \frac{1}{\sqrt{x}} \left(\ln x \right)^4 dx = \int u^4 du = \frac{u^5}{5} + C$$

$$\int \frac{1}{\sqrt{x}} \left(\ln x \right)^4 dx = \int u^4 du = \frac{u^5}{5} + C$$

$$= \left(\frac{(\ln x)^5}{5} + C \right)$$

$$= \left(\frac{(\ln x)^5}{5} + C \right)$$

$$= \left(\frac{(\ln x)^5}{5} + C \right)$$

$$= \frac{1}{5} \left(\frac{(\ln x)^5}{4x} - \frac{1}{5} + C \right)$$

$$= \frac{1}{5} \left(\frac{(\ln x)^5}{4x} - \frac{1}{5} + C \right)$$

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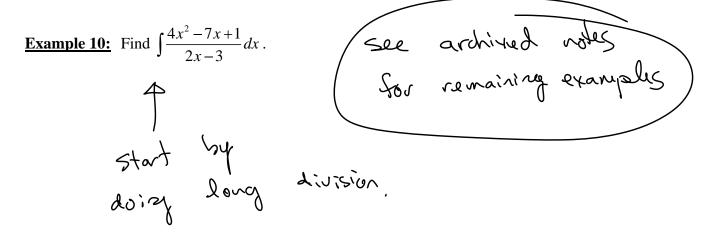
$$= \frac{1}{5} \left(\frac{(\ln x)^5}{4x} - \frac{1}{5} + C \right)$$

$$= \frac{1}{5} \left(\frac{(\ln x)^5}{4x} - \frac{1}{5} + C \right)$$

$$= \frac{1}{5} \left(\frac{(\ln x)^$$

Example 9: Find
$$\int \frac{4x^2 - 5x - 12}{x^2 - 3} dx$$
.

$$\int \frac{4x^2 - 5x - 12}{x^2 - 3} dx = \int (4 + \frac{-5x}{x^2 - 3}) dx = \int (4 + \frac{-5x}{x^2 - 3}) dx = -(4x^2 - 6x - 12) -(5x + 0) -(5x + 0)$$



Integrating the remaining trigonometric functions:

Example 11: Determine
$$\int \tan x dx$$
.

$$\int \tan x dx = \int \frac{\sin x}{\cos x} dx = \int \left(\frac{1}{\cos x}\right) \frac{\sin x}{\cos x} dx$$

$$= \int \frac{1}{u} du = -\ln|u| + c$$

$$= \left(-\ln|\cos x| + c\right) = \int \ln|x| \sec x + c$$

$$= \int \frac{1}{u} du = -\ln|u| + c$$

$$= \left(-\ln|\cos x| + c\right) = \int \ln|x| \sec x + c$$

$$= \int \frac{1}{u} du = -\ln|u| + c$$

$$= \int \frac{1}{u} \cos x + c$$

$$= \int \frac{1}{u} du$$

$$= \int \frac{1}{u} \sin x + c$$

du = corr dic

•

Example 13: Determine $\int \sec x \, dx$.

Example 15: Determine jectral.

$$\int Secry dry = \int Secry \left(\frac{Secry + tanx}{Secry + tanx} \right) dy$$

$$= \int \frac{Sec^2 x + Secry + tanx}{Secry + tanx} dx$$

$$= \int \frac{1}{Secry + secry + tanx} dx$$

$$= \int \frac{1}{Secry + tanx} \frac{1}{Secry + tanx} dx$$

$$= \int \frac{1}{Secry + tanx} \frac{1}{Secry + tanx} \frac{1}{Secry + tanx} \frac{1}{Secry + tanx}$$

$$= \int \frac{1}{Secry + tanx} \frac{1}{Secry + tanx} \frac{1}{Secry + tanx} \frac{1}{Secry + tanx} \frac{1}{Secry + tanx}$$

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$$= \int \frac{1}{Secry + tanx} \frac{1}{Secry + tanx}$$

Homework probes from 5.2 $\# 35 \int (\cos(3\theta) - 1) d\theta$ U=30 $\frac{du}{d\theta} = 3$ $du = 3d\theta$ $\frac{1}{3}du = d\theta$ $= \int \cos(3\theta) d\theta - \int (d\theta)$ $=\frac{1}{3}\int \cos(u)du - \Theta + C$ $=\frac{1}{3}\sin(u)-\Theta+c$ Check: $\frac{d}{d\theta} \left(\frac{1}{2} \sin 3\theta - \theta \right)$ $\frac{d}{d\theta} \left(-\frac{1}{2} \sin 3\theta - \theta \right)$ $= -\frac{1}{2} \left(\cos 3\theta \right) (3) - 1$ = = = = = = (30) - 0 + C