

$$49. \ln(x\sqrt{x^2-1})$$

$$\ln x + \ln(x^2-1)^{1/2}$$

$$\ln x + \frac{1}{2}\ln(x^2-1)$$

$$\frac{1}{x} + \frac{1}{2} \cdot \frac{1}{x^2-1} \cdot 2x$$

$$\frac{1}{x} + \frac{x}{x^2-1}$$

$$55. \ln(\ln x^2)$$

$$\ln(2 \ln x)$$

$$u = 2 \ln x \quad y = \ln u$$

$$du = \frac{2}{x} \quad dy = \frac{1}{u}$$

$$\frac{2}{x} \cdot \frac{1}{2 \ln x} = \frac{1}{x \ln x}$$

$$\frac{(\ln x)^2 + 3}{x}$$

$$\begin{array}{l} 71a. \quad 3x^2 - \ln x \\ \quad \quad 6x - \frac{1}{x} \end{array} \quad (1,3)$$

## 5.2A. Integrals

WCID? I can use logs to integrate functions

$$A. \int x^{-1} dx = \ln|x| + C$$

$$\int \frac{1}{x} dx = \ln|x| + C$$

$$\text{Ex. } \int \frac{1}{7x-11} dx = \frac{1}{7} \int \frac{1}{u} du$$

$$u = 7x - 11$$

$$du = 7 dx$$

$$\frac{1}{7} \ln|u| + C$$

$$\frac{1}{7} \ln|7x-11| + C$$

$$\text{Ex. } \int \frac{x^2}{x^3+5} dx = \frac{1}{3} \int \frac{1}{u} du$$

$$u = x^3 + 5$$

$$du = \underline{3x^2 dx}$$

$$= \frac{1}{3} \ln|u| + C$$

$$= \frac{1}{3} \ln|x^3+5| + C$$

$$\text{Ex. } \int \frac{5(2x+3)}{x^2+3x+8} dx = 5 \int \frac{1}{u} du$$

$$u = x^2 + 3x + 8$$

$$du = (2x + 3) dx$$

$$5 \ln|u| + C$$

$$5 \ln|x^2 + 3x + 8| + C$$



$$\text{Ex. } \int \frac{x^2 + x + 1}{x^2 + 1} dx = \int 1 + \frac{1x}{x^2 + 1} dx$$

$$x^2 + 0x + 1 \overline{) x^2 + x + 1} \quad \begin{array}{l} 1 \\ \hline x^2 + x + 1 \\ \hline - (x^2 + 0x + 1) \\ \hline 1x \end{array} \quad x + \frac{1}{2} \ln|x^2 + 1| + C$$

$u = x^2 + 1$   
 $du = 2x dx$

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