

1. (2pts) Separate the following into a sum or difference of logarithms:  $\ln\left(\frac{(x^2-4)^5 \sin(x)}{x^3 \cos^2(x)}\right)$

$$\ln\left(\frac{(x^2-4)^5 \sin(x)}{x^3 \cos^2(x)}\right) = 5\ln(x-2) + 5\ln(x+2) + \ln(\sin(x)) - 3\ln(x) - 2\ln(\cos(x))$$

2. (2pts) Combine the following into a single logarithm:  $\frac{1}{5}\ln(x+1) - \ln(2x-5) + 3\ln(\cos(x))$

$$\frac{1}{5}\ln(x+1) - \ln(2x-5) + 3\ln(\cos(x)) = \ln\left(\frac{(x+1)^{\frac{1}{5}} \cos^3(x)}{2x-5}\right)$$

3. (3pts) Find  $\frac{d}{dx} \ln(6x+5)$ .

$$\frac{d}{dx} \ln(6x+5) = \frac{6}{6x+5}$$

4. (3pts) Find  $\int \frac{t}{5t^2-3} dt$ . Let  $u = 5t^2 - 3$  then  $du = 10t dt$

$$\text{So } \int \frac{t}{5t^2-3} dt = \int \frac{1}{10u} du = \frac{1}{10} \ln|u| + C = \frac{1}{10} \ln|5t^2-3| + C$$