Integral Calculus

8/7/24

Derivative Review

1. $y = x^2 \sin x \rightarrow 2x\sin x + x^2 \cos x = y'$
2. $y = \sqrt{\tan x} \rightarrow y' = \frac{1}{2}(\tan x)^{-1/2} \cdot \sec^2 x$
3. $f(x) = 3x\,2^x \rightarrow f'(x) = 3(2^x) + 3x(2^x \cdot \ln(2))$ $\quad \frac{d}{dx} b^x \rightarrow b^x \ln b$
4. $y = \frac{2x+7}{\ln x} \rightarrow y' = \frac{2\ln x - \frac{2x+7}{x}}{(\ln x)^2}$ ~OR~ $y = (2x+7)(\ln x)^{-1} \rightarrow y' = 2(\ln x^{-1}) - (2x+7)(\ln x)^{-2} \cdot \frac{1}{x}$
5. $y = \sqrt{\frac{x^2(\sin x)^{19}\sqrt{x}}{\ln x \cdot e^x}} \rightarrow \ln y = \ln\left(\frac{x^2(\sin x)^{19}\sqrt{x}}{\ln x \cdot e^x}\right)^{1/2} \rightarrow \ln(y) = \frac{1}{2}\left[\ln x^3 + \ln(\sin x)^{19} + \ln(x^{1/2}) - \ln(\ln x) - \ln(e^x)\right]$

$2\ln y = 3\ln x + 19\ln(\sin x) + \frac{1}{2}\ln x - \ln(\ln x) - x \rightarrow 2\frac{y'}{y} = \left(\frac{3}{x} + \frac{19\cos}{\sin} + \frac{1}{2x} - \frac{1}{\ln x}\cdot\frac{1}{x} - 1\right)\frac{y}{2}$