Assignment

1. $Y = \dfrac{\left[(x+1)^2 (x-2)^{1/2}\right]}{\left[(2x+1)(x+3)^{3/2}\right]}$

$\ln y = \ln (x+1)^2 + \ln \left(\sqrt{x-2}\right) - \{($

$\left(\frac{1}{y}\right) \frac{dy}{dx} = \frac{1}{(x+1)^2} \cdot 2(x+1) + \frac{1}{\sqrt{x-2}}$

$\cdot \frac{3}{2} (x+3)^{1/2}$

$\frac{1}{y} \cdot \frac{dy}{dx} = \frac{2}{(x+1)} + \frac{1}{2(\sqrt{x-2})} (\sqrt{x-}$

$\frac{dy}{dx} = y \left(\frac{2}{x+1} + \frac{1}{2(\sqrt{x-2})} \cdot \cancel{(\sqrt{x-2})}\right)$

$\frac{dy}{dx} = \frac{(x+1)^2 (x-2)^{1/2}}{(2x-1)(x+3)^{3/2}} \left[\frac{2}{x+1}\right.$

2. $Y = \dfrac{3e^x \sin 2x}{x^{5/2}}$

$\ln y = \ln (3e^x) + \ln (\sin 2x) - \ln$

$\frac{1}{y} \cdot \frac{dy}{dx} = \frac{1}{3e^x} + \frac{1}{\sin 2x} \cdot 2c$

$\frac{1}{y} \cdot \frac{dy}{dx} = 1 + \frac{2\cos 2x}{\sin 2x} - \frac{5}{2}$

$\frac{dy}{dx} = y \left[1 + \frac{2\cos 2x}{\sin 2x} - 5\right.$

* $4\int \sec^2(u)\, du/3$

$\frac{4}{3}\int \sec^2(u)\, du$

$\frac{4}{3}\tan u + c$

$\Rightarrow \frac{4}{3}\tan(3w+1) + c$

4. $\int 2t\,(3t^2-1)^{1/2}\, dt$

$u = \sqrt{3t^2-1}$

$u^2 = 3t^2-1$

$3t^2 = u^2+1$

$t^2 = \frac{u^2+1}{3}$

$t = \sqrt{\frac{u^2+1}{3}}$

$\frac{dt}{du} = \frac{1}{2}\left(\frac{u^2+1}{3}\right)^{-1/2} \cdot \frac{2u}{3}$

$\frac{dt}{du} = \frac{u}{3}\left(\frac{u^2+1}{3}\right)^{-1/2}$

$dt = \frac{u\,du}{3}\left(\frac{u^2+1}{3}\right)^{-1/2}$

$$u = \sqrt{4x^2 - 1}$$

$$u^2 = 4x^2 - 1$$

$$4x^2 = u^2 + 1$$

$$x^2 = \frac{u^2+1}{4}$$

$$x = \sqrt{\frac{u^2+1}{4}}$$

$$dx/du = \frac{1}{2}\left(\frac{u^2+1}{4}\right)^{-1/2} \cdot \frac{u}{2}$$

$$dx/du = \frac{u}{4}\left(\frac{u^2+1}{4}\right)^{-1/2}$$

$$\cancel{dx/du} = \frac{u\,du}{4}\left(\frac{u^2+1}{4}\right)^{-1/2}$$

$$\int \cancel{x}^{1}\left(\frac{u^2+1}{4}\right)^{1/2} \cdot \frac{u\,du}{\cancel{4}\,2}\left(\frac{u^2}{}\right.$$

$$\frac{1}{2}\int\left(\frac{u^2+1}{}\right|^{1/2 - 1/2} du$$