$$\int \frac{2}{x^2-1}\,dx \qquad \text{let } x = \sec\theta$$

$$dx = \sec\theta\tan\theta\,d\theta$$

$$\int \frac{2}{\sec^2\theta - 1}\sec\theta\tan\theta\,d\theta$$

$$\int \frac{2\sec\theta\tan\theta}{\tan^2\theta}\,d\theta$$

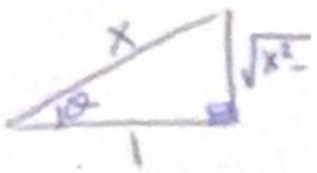
$$2\int \frac{1}{\cos\theta}\cdot\frac{\cos\theta}{\sin\theta}\,d\theta = 2\int \csc\theta\,d\theta$$

$$= 2\int \csc\theta\cdot\frac{\csc\theta+\cot\theta}{\csc\theta+\cot\theta}\,d\theta$$

$$= -2\int \frac{-(\csc^2\theta+\csc\theta\cdot\cot\theta)}{\csc\theta+\cot\theta}\,d\theta$$

$$\int \frac{f'(x)}{f(x)}\,dx = \ln|f(x)|+c$$

$$= -2\ln|\csc\theta+\cot\theta| + c$$



$$= -2\ln\left|\frac{x}{\sqrt{x^2-1}} + \frac{1}{\sqrt{x^2-1}}\right| + c$$

$$= -2\ln\left|\frac{x+1}{\sqrt{x^2-1}}\right| + c$$

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