

$$\int \frac{dx}{(x^2 - 4)^{3/2}} \quad \begin{matrix} (x-1)^{2/3} = \sqrt[3]{(x-1)^2} \\ (x^2-4)^{3/2} = \sqrt{(x^2-4)^3} \end{matrix}$$

$$\downarrow \quad (x)^2 - (2)^2 \quad \begin{matrix} x = \sec(\omega) \\ dx = \sec(\omega) \cdot \tan(\omega) d\omega \end{matrix}$$

$$\begin{matrix} x = 2 \sec(\omega) \\ dx = 2 \sec(\omega) \cdot \tan(\omega) d\omega \end{matrix}$$

$$\int \frac{2 \sec(\omega) \cdot \tan(\omega)}{((4 \sec^2(\omega) - 4))^{3/2}} d\omega$$

$$\int \frac{2 \sec(\omega) \cdot \tan(\omega)}{((4(\sec^2(\omega) - 1))^{3/2}} d\omega \quad \sec^2(\omega) - 1 = \tan^2(\omega)$$

$$\int \frac{2 \sec(\omega) \cdot \tan(\omega)}{(4 \tan^2(\omega))^{3/2}} d\omega$$

$$\int \frac{2 \sec(\omega) \cdot \tan(\omega)}{\sqrt{(4 \tan^2(\omega))^3}} d\omega \quad (\tan^2(\omega))^3 = \tan^6(\omega)$$

$$\int \frac{2 \sec(\omega) \cdot \tan(\omega)}{\sqrt{64 \tan^3(\omega)}} d\omega$$

$$\int \frac{2 \sec(\omega) \cdot \tan(\omega)}{16 \omega^3 \cdot \sqrt{\tan^3(\omega)}} d\omega \quad \begin{matrix} 8^2 = 64 \\ 6/2 = 3 \end{matrix}$$

$$\int \frac{2 \sec(\omega) \cdot \cancel{\tan(\omega)} \cdot \tan^2(\omega)}{8 \tan^3(\omega)} d\omega \quad \begin{matrix} \tan^2 = \frac{\sec^2 \omega}{\cos^2 \omega} \\ (\cos(\omega))^{-1} = \frac{1}{\cos(\omega)} = \sec(\omega) \end{matrix}$$

$$\int \frac{2 \sec(\omega)}{8 \tan^3(\omega)} d\omega = \frac{1}{4} \int \frac{\sec(\omega)}{\tan^3(\omega)} d\omega = \frac{1}{4} \int \frac{1}{\cos(\omega)} \cdot \frac{\sin^3(\omega)}{\cos^3(\omega)} d\omega$$

$$= \frac{1}{4} \int \frac{1}{\sec(\omega)} \cdot \frac{\sin^2(\omega)}{\sec^3(\omega)} d\omega = \frac{1}{4} \int \frac{\cos(\omega)}{\sec^2(\omega)} d\omega$$

$$u = \sec(\omega) \quad du = \sec(\omega) \tan(\omega) d\omega \quad x^{-2} = \frac{1}{x^2}$$

$$= \frac{1}{4} \int \frac{du}{u^2} = \frac{1}{4} \int u^{-2} du \quad \int u^n = \frac{u^{n+1}}{n+1} + C$$

$$= \frac{1}{4} \int u^{-2} du = \frac{1}{4} \frac{u^{-2+1}}{-2+1} = \frac{1}{4} u^{-1} + C$$

$$= -\frac{1}{4} \cdot \frac{1}{u} + C = -\frac{1}{4u} = -\frac{1}{4 \sec(\omega)} + C$$

$$= -\frac{1}{4} \cdot \frac{1}{\sec(\omega)} + C = -\frac{1}{4} \cos(\omega) + C \quad x = 2 \sec(\omega)$$

$$\frac{x}{2} = \sec(\omega)$$

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$$\cos(\omega) = \frac{1}{\sec(\omega)} = \frac{1}{\frac{x}{2}} = \frac{2}{x}$$

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$$= -\frac{1}{4} \cdot \frac{x}{\sqrt{x^2-4}} + C$$