$$\int \frac{dx}{(x^2-4)^{3/2}}$$

$(x-1)^{2/3} = \sqrt[3]{(x-1)^2}$

$(x^2-4)^{3/2} = \sqrt{(x^2-4)^3}$

$(x)^2 - (2)^2$ $\quad x = a\sec(\alpha)$

$dx = a\sec(\alpha)\cdot\tan(\alpha)$

$x = 2\sec(\alpha)$

$dx = 2\sec(\alpha)\cdot\tan(\alpha)\,d\alpha$

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

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

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

$$\int \frac{2\sec(\alpha)\cdot\tan(\alpha)}{\sqrt{(4\tan^2(\alpha))^3}}\,d\alpha \qquad \left(\tan^2(\alpha)\right)^3=\tan^6(\alpha)$$

$$\int \frac{2\sec(\alpha)\cdot\tan(\alpha)\,d\alpha}{\sqrt{64\tan^6(\alpha)}}$$

$$\int \frac{2\sec(\alpha)\cdot\tan(\alpha)}{\sqrt{64}\cdot\sqrt{\tan^6(\alpha)}}\,d\alpha \qquad 8^2=64$$

$6/2=3$

$$\int \frac{2\sec(\alpha)\cdot\tan(\alpha)}{8\tan^3(\alpha)}\,d\alpha \qquad \tan^3(\alpha)$$

$$\tan^2=\frac{\sec^2(\alpha)}{\cos\sec(\alpha)}$$

$$[\cos(\alpha)]^{-1}=\boxed{\frac{1}{\cos(\alpha)}}=\sec(\alpha)$$

$$\int \frac{2\sec(\alpha)}{8\tan^2(\alpha)}\,d\alpha = \frac{1}{4}\int \frac{\sec(\alpha)}{\tan^2(\alpha)}\,d\alpha = \frac{1}{4}\int \frac{1}{\cos(\alpha)}\cdot\frac{\sec^2(\alpha)}{\cos^2(\alpha)}\,d\alpha$$

$$= \frac{1}{4}\int \frac{1}{\cos(\alpha)}\cdot\frac{\cos^2(\alpha)}{\sec^2\tan(\alpha)}\,d\alpha = \frac{1}{4}\int \frac{\cos(\alpha)}{\sec^2(\alpha)}\,d\alpha$$

$u=\sec(\alpha)$

$du=\cos(\alpha)\,d\alpha$

$x^{-2}=\frac{1}{x^2}$

$$= \frac{1}{4}\int \frac{du}{u^2} = \frac{1}{4}\int \frac{1}{u^2}\,du$$

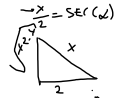
$\int a^x = \frac{a^{x+1}}{x+1}+C$

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

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

$$= -\frac{1}{4}\cdot\frac{1}{\sec(\alpha)}+C = \frac{-1}{4}\underline{(\csc(\alpha))}+C \qquad x=2\sec(\alpha)$$

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



$\csc(\alpha)=\frac{h}{OP}$

$\csc(\alpha)=\frac{x}{\sqrt{x^2-4}}$

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