

Exemplar Problems

33.  $\sin^{-1} \frac{1}{\sqrt{x+1}}$

Sol. Let  $y = \sin^{-1} \frac{1}{\sqrt{x+1}}$

$\therefore \frac{dy}{dx} = \frac{d}{dx} \left( \sin^{-1} \frac{1}{\sqrt{x+1}} \right)$

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

$$= \frac{1}{\sqrt{\frac{x+1-1}{x+1}}} \cdot \frac{d}{dx} (x+1)^{-1/2}$$

$$= \sqrt{\frac{x+1}{x}} \cdot \frac{-1}{2} (x+1)^{-3/2} = \frac{-1}{2\sqrt{x}} \cdot \left( \frac{1}{x+1} \right)$$

Example of chain rule applied on an inverse trig function