$$\int \frac{\tan^{-1} x}{1+x^2}\,dx$$

Solution

Apply substitution with $u = \tan^{-1} x$, so $du = \frac{1}{1+x^2}\,dx$, thus

$$\int \frac{\tan^{-1} x}{1+x^2}\,dx = \int u\,du = \frac{u^2}{2} + C = \frac{(\tan^{-1} x)^2}{2} + C.$$