AI1110 assignment 2
ICSE 12 2017

Pranav Pettugadi

Question: 1(iii) prove that

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

Solution: let

$$x = tan^2(y)$$

$$\begin{aligned}
&\implies \frac{1}{2}\cos^{-}\left(\frac{1-x}{1+x}\right)\\
&\implies \frac{1}{2}\cos^{-}\left(\frac{1-tan^2(y)}{1+tan^2(y)}\right)\\
&\implies \frac{1}{2}\cos^{-}(\cos 2y)\\
&\implies \frac{1}{2}2y\\
&\implies y\\
&\implies tan^{-}\sqrt{x}
\end{aligned}$$

$\therefore \frac{1}{2}\cos^{-}\left(\frac{1-x}{1+x}\right) = \tan^{-}\sqrt{x}$