

# AI1110 assignment 2

## ICSE 12 2017

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**Question:** 1(iii) prove that

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

**Solution:** let

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

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

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