

**Example 10** Find value of  $\tan(\cos^{-1}x)$  and hence evaluate  $\tan \cos^{-1} \frac{8}{17}$ .

**Solution** Let  $\cos^{-1}x = \theta$ , then  $\cos \theta = x$ , where  $\theta \in [0, \pi]$

Therefore, 
$$\tan(\cos^{-1}x) = \tan \theta = \frac{\sqrt{1 - \cos^2 \theta}}{\cos \theta} = \frac{\sqrt{1 - x^2}}{x}.$$

Hence 
$$\tan\left(\cos^{-1} \frac{8}{17}\right) = \frac{\sqrt{1 - \left(\frac{8}{17}\right)^2}}{\frac{8}{17}} = \frac{15}{8}.$$