INDIAN SCHOOL MUSCAT

DEPARTMENT OF MATHEMATICS
WORKSHEET ON INVERSE TRIGONOMETRIC FUNCTIONS (WS – 4)
CLASS - 12

ONE MARK QUESTIONS

1. Find the principal value of the following:
   a) $sin^{-1}(\frac{1}{\sqrt{2}})$ b) $cos^{-1}(\frac{-1}{\sqrt{2}})$ c) $tan^{-1}(\frac{-1}{\sqrt{3}})$ d) $cosec^{-1}(-2)$ e) $sec^{-1}(-\frac{2}{\sqrt{3}})$
2. Find the value of the following:
   a) $sin^{-1}(sin\frac{3\pi}{5})$ b) $cos^{-1}(cos\frac{13\pi}{6})$ c) $tan^{-1}(tan\frac{7\pi}{6})$ d) $cosec^{-1}(cosec\frac{\pi}{8})$ e) $sec^{-1}(sec\frac{3\pi}{4})$.
3. Evaluate the following:
   a) $sin\left\{\frac{\pi}{3} - sin^{-1}\left(\frac{-1}{2}\right)\right\}$ b) $sin\left(\frac{1}{2}cos^{-1}\frac{4}{5}\right)$ c) $tan\frac{1}{2}\left(cos^{-1}\frac{\sqrt{5}}{3}\right)$.
4. Evaluate: $cos\left(sin^{-1}\frac{3}{5} + cos^{-1}\frac{12}{13}\right)$.
5. Show that: $tan^{-1}(\sqrt{x}) = \frac{1}{2}cos^{-1}\left(\frac{1-x}{1+x}\right)$.

FOUR MARKS QUESTIONS

6. Prove that $tan^{-1}\left\{\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right\} = \frac{\pi}{4} + \frac{1}{2}cos^{-1}x^2$.
7. Prove that $tan^{-1}\frac{1}{4} + tan^{-1}\frac{2}{9} = \frac{1}{2}cos^{-1}\frac{3}{5}$.
8. Prove that $cot^{-1}\left(\frac{ab+1}{a-b}\right) + cot^{-1}\left(\frac{bc+1}{b-c}\right) + cot^{-1}\left(\frac{ca+1}{c-a}\right) = 0$.
9. Prove that $tan^{-1}\frac{3}{4} + tan^{-1}\frac{3}{5} - tan^{-1}\frac{8}{19} = \frac{\pi}{4}$.
10. Prove that $cos^{-1}\frac{4}{5} + cos^{-1}\frac{12}{13} = cos^{-1}\frac{33}{65}$.
11. Solve for x: $sin^{-1}(1-x) - 2sin^{-1}x = \frac{\pi}{2}$.
12. If $cos^{-1}\frac{x}{a} + cos^{-1}\frac{y}{b} = \theta$, *then prove that* $\frac{x^2}{a^2} - \frac{2xy}{ab}cos\theta + \frac{y^2}{b^2} = sin^2\theta$.
13. Prove that $tan\left(\frac{\pi}{4} + \frac{1}{2}cos^{-1}\frac{a}{b}\right) + tan\left(\frac{\pi}{4} - \frac{1}{2}cos^{-1}\frac{a}{b}\right) = \frac{2b}{a}$.
14. Solve for x: $cos^{-1}\left(\frac{x^2-1}{x^2+1}\right) + tan^{-1}\left(\frac{2x}{x^2-1}\right) = \frac{2\pi}{3}$.
15. Solve for x: $tan^{-1}\left(\frac{x-1}{x-2}\right) + tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$.