

AIRPORT SCHOOL, AHMEDABAD
HOLIDAY HOMEWORK 2018 – 19
CLASS: XII
SUBJECT: MATHEMATICS

Solve for x :

1. $\sin^{-1} x + \sin(1 - x) = \cos^{-1} x.$
2. $\tan^{-1}(x + 1) + \tan^{-1} x + \tan^{-1}(x - 1) = \tan^{-1} 3x$
3. $\tan^{-1}\left(\frac{2-x}{2+x}\right) = \frac{1}{2} \tan^{-1} \frac{x}{2}$
4. $(\tan^{-1} x)^2 + (\cot^{-1} x)^2 = \frac{5\pi^2}{8}$
5. $\tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1} \frac{8}{31}$
6. $\sin(\cot^{-1} x) = \cos(\tan^{-1} x)$
7. $\tan^{-1} \sqrt{x^2 + x} + \sin^{-1} \sqrt{x^2 + x + 1} = \frac{\pi}{2}$
8. $\tan^{-1} \left(\frac{x-3}{x-4} \right) + \tan^{-1} \left(\frac{x+3}{x+4} \right) = \frac{\pi}{4}$
9. $\tan^{-1} 3x + \tan^{-1} 2x = \frac{\pi}{4}$

Prove that

10. $\cos^{-1} x + \cos^{-1} \left[\frac{x}{2} + \frac{\sqrt{3-3x^2}}{2} \right] = \frac{\pi}{3}$
11. $\tan\left(\frac{1}{2} \sin^{-1} \frac{3}{4}\right) = \frac{4-\sqrt{7}}{3}$
12. $\cos[\tan^{-1}\{\sin(\cot^{-1} x)\}] = \sqrt{\frac{1+x^2}{2+x^2}}$
13. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$ then prove that $x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2} = 2xyz$
14. If $\cos^{-1} \frac{x}{a} + \cos^{-1} \frac{y}{b} = \alpha$, then prove that $\frac{x^2}{a^2} - \frac{2xy \cos \alpha}{ab} + \frac{y^2}{b^2} = \sin^2 \alpha$
15. $\cot\left(\frac{\pi}{4} - 2 \cot^{-1} 3\right) = 7$