Red Rose Senior Secondary School
Class: XII (Board Paper)
Subject: MATHS

Chapter: 2 (INVERSE TRIGONOMETRIC FUNCTION)

Q.1: Using Principal value, evaluate the following ***(1) [2008, 2011]***

$\cos^{-1}\left(\cos\frac{2\pi}{3}\right) + \sin^{-1}\left(\sin\frac{2\pi}{3}\right)$

Q.2: -Prove the following ***(4) [2008]***

$\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{8}\right) = \frac{\pi}{4}$

OR

Solve for x

$\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$

Q.3: Write the principal value of $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$ ***(1) [2009]***

Q.4: Prove the following ***(4) [2009]***

$\cot^{-1}\left(\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}}\right) = \frac{x}{2}, \quad x \in \left(0, \frac{\pi}{4}\right)$

OR

Solve for the x

$2\tan^{-1}(\cos x) = \tan^{-1}(2\, cosec\, x)$

Q.5: -Find the value of $\sin^{-1}\left(\boldsymbol{sin\frac{4\pi}{5}}\right)$ ***(1) [2010]***

Q.6: -Prove the following ***(4) [2010]***

$\tan^{-1} x + \tan^{-1}\left(\frac{2x}{1-x^2}\right) = \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$

OR

Prove the following

$\cos[tan^{-1}\{sin(cot^{-1}x)\}] = \sqrt{\frac{1+x^2}{2+x^2}}$

Q.7: -Prove the ***(4) [2011]***

$\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{8}\right) = \frac{\pi}{4}$

Q.8: -Find the Principal value of $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$ ***(1) [2012]***

Q.9: -Prove the following ***(4) [2012]***

$\cos^{-1}\left(\frac{12}{13}\right) + \sin^{-1}\left(\frac{3}{5}\right) = \sin^{-1}\left(\frac{56}{65}\right)$

Q.10: -Write the Principal value of $\tan^{-1}\sqrt{3} - \cot^{-1}(-\sqrt{3})$ ***(1) [2013]***

Q.12: -Write the value of $\tan^{-1}\left[2sin\left(2cos^{-1}\frac{\sqrt{3}}{2}\right)\right]$ ***(1) [2013]***

Q.13: -Show that ***(4) [2013]***

$\tan\left(\frac{1}{2}sin^{-1}\frac{3}{4}\right) = \frac{4-\sqrt{7}}{3}$

OR

Solve the following equation

$\cos(tan^{-1}x) = \sin\left(cot^{-1}\frac{3}{4}\right)$

Q.14: -If $\tan^{-1}x + \tan^{-1}y = \frac{\pi}{4}$, xy<1, then write the value of x+y+xy ***(1) [2014]***

Q.15: -Prove the following ***(4) [2014]***

$\tan^{-1}\left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}\right) = \frac{\pi}{4} - \frac{1}{2}cos^{-1}x \quad , \quad \frac{-1}{\sqrt{2}} \leq x \leq 1$

OR

If $\tan^{-1}\left(\frac{x-2}{x-4}\right) + \tan^{-1}\left(\frac{x+2}{x+4}\right) = \frac{\pi}{4}$, find the value of x

Q.16:-Solve for x ***(4) [2015]***

$\tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1}\frac{8}{31}$

OR

$\cot^{-1}\left(\frac{xy+1}{x-y}\right) + \cot^{-1}\left(\frac{yz+1}{y-z}\right) + \cot^{-1}\left(\frac{zx+1}{z-x}\right) = 0$ $(0<xy, yx, zx<1)$

Q.17: -Prove the following ***(4) [2015, Comptt.]***

$2\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{7}\right) = \sin^{-1}\left(\frac{31}{25\sqrt{2}}\right)$

OR

Solve for x: $\tan^{-1}\left(\frac{1-x}{1+x}\right) = \frac{1}{2}\tan^{-1} x,\ x>0$

Q.18: -If $\cos^{-1}\frac{x}{a} + \cos^{-1}\frac{y}{b} = \propto$, *prove that* ***(4) [2016]***

$\frac{x^2}{a^2} - 2\frac{xy}{ab}\cos\propto + \frac{y^2}{b^2} = \sin^2\propto$

OR

Solve for equation x : $\sin^{-1} x + \sin^{-1}(1-x) = \cos^{-1} x$

Q.19: If $\tan^{-1}\left(\frac{x-3}{x-4}\right) + \tan^{-1}\left(\frac{x+3}{x+4}\right) = \frac{\pi}{4}$, find the value of x. ***(4) [2017]***

Q.20:Find the real solutions of the equation $\tan^{-1}\left(\frac{1-x}{1+x}\right) = \frac{1}{2}\tan^{-1} x, (x > 0)$

(4) 2017 compp.

Q.21: find the value of $\tan^{-1}\sqrt{3} - \cot^{-1}\sqrt{-3}$. (1) 2018

Q.22:prove that: $3\sin^{-1} x = \sin^{-1}(3x - 4x^3).\ x\epsilon[-\frac{1}{2}, \frac{1}{2}]$ ***(2) 2018***

Q.23.Find the value of $Sin\left(\cos^{-1}\frac{4}{5}\ \tan^{-1}\frac{2}{3}\right)$. ***(4) 2019***

Q.24.Solve for x: $\tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1}\left(\frac{8}{31}\right)$. ***(4) 2019***

By: Nitin Sir