

1-Write the principal values of $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$.

2-Write one branch of $\sin^{-1}x$ other than the principal branch.

3-Write the principal value of $\tan^{-1}\left(\tan\frac{3\pi}{4}\right)$.

4-Show that $\sin^{-1}\left(2x\sqrt{1-x^2}\right) = 2\sin^{-1}x$, $-\frac{1}{\sqrt{2}} \leq x \leq \frac{1}{\sqrt{2}}$.

5-Find the value of $\sec\left(\tan^{-1}\frac{y}{2}\right)$.

6-Prove the following: $\tan^{-1}\sqrt{x} = \frac{1}{2}\cos^{-1}\left(\frac{1-x}{1+x}\right)$, $x \in [0, 1]$

7-Write the principal value of the following: $\sin^{-1}\left(\sin\frac{4\pi}{5}\right)$

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

8-Using principal value evaluate the following:

9-Write the following function in the simplest form $\tan^{-1}\sqrt{\frac{1-\cos 3x}{1+\cos 3x}}$, $x < \pi$.

10-Write the value of $\cos^{-1}\left(-\frac{1}{2}\right) + 2\sin^{-1}\left(-\frac{1}{2}\right)$.

11-Show that $\sin^{-1}\left(\sqrt{\frac{a-x}{2a}}\right) = \frac{1}{2}\cos^{-1}\frac{x}{a}$.

12-Evaluate $\cos^{-1}\left(\cos\frac{5\pi}{3}\right)$

13-Evaluate $\sec^{-1}\left(\frac{x-3}{x+3}\right) + \sin^{-1}\left(\frac{x+3}{x-3}\right)$

14-Prove the following: $\cos\left(\sin^{-1}\frac{3}{5} + \cot^{-1}\frac{3}{2}\right) = \frac{6}{5\sqrt{13}}$

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

15-Show that

16-Simplify: $\tan^{-1}\left[\frac{a\cos x - b\sin x}{b\cos x + a\sin x}\right]$, if $\frac{a}{b}\tan x > -1$.

17-Solve for x : $\tan^{-1}\frac{2x}{1-x^2} + \cot^{-1}\frac{1-x^2}{2x} = \frac{\pi}{3}$, $x > 0$.

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

19-Prove that

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

20-Solve the following equation: $\sin^{-1} (1 - x) - 2 \sin^{-1} x = \frac{\pi}{2}$.