Board – CBSE	Class – 12	Topic – Inverse Trigonometric functions

1 marks

1. Find the value of $\cos\left\{\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)+\frac{\pi}{6}\right\}$
2. Find the value of $\tan^{-1}1+\tan^{-1}2+\tan^{-1}3$
3. Solve for x: $\sin\left[\sin^{-1}\frac{1}{5}+\cos^{-1}x\right]=1$
4. Write the simplest form: $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right)$
5. Considering the principle solutions. Find the number of solution of $\tan^{-1}2x+\tan^{-1}3x=\frac{\pi}{4}$
6. Find the principle value of $\sin^{-1}\left(\frac{-\sqrt{3}}{2}\right)+\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)$
7. Find the value of x if $\operatorname{cosec}^{-1}x+2\cot^{-1}7+\cos^{-1}\left(\frac{3}{4}\right)$
8. If $\cos^{-1}=\tan^{-1}x$. Show that $\sin(\cos^{-1}x)=x^2$
9. If $x>0$ and $\sin^{-1}\left(\frac{5}{x}\right)+\sin^{-1}\left(\frac{12}{x}\right)=\frac{\pi}{2}$. Then find the value of x.
10. Prove that $\cos\left\{2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right\}+x=0$

4 marks /6 marks

11. Prove that $4\tan^{-1}\frac{1}{5}-\tan^{-1}\frac{1}{70}+\tan^{-1}\frac{1}{99}=\frac{\pi}{4}$
12. if $x.y.z\ \varepsilon[-1,1]$ such that $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\frac{3\pi}{2}$. Find the value of

    $x^{2006}+y^{2007}+z^{2008}-\frac{9}{x^{2006}+y^{2007}+z^{2008}}$
13. $\cos^{-1}\frac{x}{a}+\cos^{-1}\frac{v}{b}=\alpha$. Prove that $\frac{x^2}{a^2}-\frac{2xy}{ab}\cos\alpha+\frac{v^2}{b^2}=\sin^2\alpha$
14. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\pi$. prove that $x\sqrt{1-x}+y\sqrt{1-y^2}+z\sqrt{1-z^2}=2xyz$
15. Prove that: $\sin2[\cot^{-1}\{\cos(\tan^{-1}x)\}]=\sqrt{\frac{x^2+1}{x^2+1}}$
16. In any triangle ABC. If $A=\tan^{-1}2$ and $B=\tan^{-1}3$. Prove that $c=\frac{\pi}{4}$
17. If $x=\operatorname{cosec}[\tan^{-1}\{\cos(\cot^{-1}(\sec(\sin^{-1}a)))\}]$ and $y=$

    $\sec\left[\cot^{-1}\left(\operatorname{cosec}(\cos^{-1}a)\right)\right]$ where $a\ \varepsilon[0,1]$

    Find the relationship between x and y in terms of a
18. Prove that : $\cot^{-1}\left[\frac{ab+1}{a-b}\right]+\cot^{-1}\left[\frac{bc+1}{b-c}\right]+\cot^{-1}\left[\frac{ca+1}{c-a}\right]=0$

19. Solve for x: $\sin^{-1}\frac{2\alpha}{1+\alpha^2}+\sin^{-1}\frac{2\beta}{1+\beta^2}=2\tan^{-1}x$

20. Prove: $\cos^{-1}x-\cos^{-1}y=\cos^{-1}\left[xy+\sqrt{1-x^2}.\sqrt{1-y^2}\right]$

21. If $\tan^{-1}a+\tan^{-1}b+\tan^{-1}c=\pi$. Prove that $a+b+c=abc$

22. Prove that $\tan^{-1}\frac{yz}{xr}+\tan^{-1}\frac{zx}{yr}+\tan^{-1}\frac{xy}{zr}=\frac{\pi}{2}$ where $x^2+y^2+z^2=r^2$

23. Solve for x: $\tan^{-1}(x+1)+\tan^{-1}(x-1)=\tan^{-1}3$

24. Solve : $\sin[2\cos^{-1}\{\cot(2\tan^{-1}x)\}]=0$

25. If $\cos^{-1}\frac{x}{2}+\cos^{-1}\frac{y}{3}=\theta$. prove that $9x^2-12xy\cos\theta+4y^2=36\sin^2\theta$

Answer

1. -1
2. π
3. $\frac{1}{5}$
4. $\frac{\pi}{4}+\frac{x}{2}$
5. 2
6. $\frac{\pi}{2}$
7. $x=\text{cosec}^{-1}\frac{125}{117}$
8. $x=13$
12. Zero: $x=1, y=1, z=1$
17. $x^2=y^2=3-a^2$
19. $x=\frac{\alpha+\beta}{1-\alpha\beta}$
23. $x=-1$
24. $\pm1, -1\pm\sqrt{2}, 1\pm\sqrt{2}$