MATHS

BOOKS - MAHAVEER PUBLICATION

INVERSE TRIGONOMETRIC FUNCTIONS

Question Bank

1. Find the principal value of $\sin^{-1}\left(\dfrac{1}{\sqrt{2}}\right)$.

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2. Find the principal value of $\cos^{-1}\left(\dfrac{\sqrt{3}}{2}\right)$.

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3. Find the principal value of $\cos^{-1}\left(-\dfrac{1}{2}\right)$

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4. Find the principal value of $\tan^{-1}\left(-\sqrt{3}\right)$.

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5. $\cos^{-1}\left(\cos\left(13\frac{\pi}{6}\right)\right)$

6. Show that
$$\tan^{-1}\left(\frac{2}{11}\right) + \tan^{-1}\left(\frac{7}{24}\right) = \tan^{-1}\left(\frac{1}{2}\right)$$

7. Show that $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right) = \frac{\pi}{4}$.

8. Show that

$$2\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{7}\right) = \tan^{-1}\left(\frac{31}{17}\right)$$

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9. Prove that

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

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10. Prove that $3\tan^{-1}x = \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$

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11. Prove that$\sin^{-1} x = \cos^{-1} \sqrt{1 - x^2}$

12. Prove that

$$\sin^{-1}\left(3x - 4x^3\right) = 3\sin^{-1} x, \ x \in \left[\frac{1}{2}, 1\right]$$

13. If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$, prove that

$x + y + z = xyz.$

14. Find the principal values of $\sin^{-1}\left(-\dfrac{1}{2}\right)$

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15. Find the principal values of $\cos^{-1}\left(-\dfrac{1}{\sqrt{2}}\right)$

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16. $\tan^{-1}(-1)$

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17. Find the principal value of $\cos ec^{-1}(-2)$

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18. Find the principal value of $\sec^{-1}\left(\dfrac{2}{\sqrt{3}}\right)$

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19. Find the principal value of $\cot^{-1}(-\sqrt{3})$

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20. Find the principal values of $\cos ec^{-1}\left(-\sqrt{2}\right)$

21. Find the principal value of $\cot^{-1}\left(\dfrac{-1}{\sqrt{3}}\right)$.

22. The vlaue of $\tan^{-1}\left(\dfrac{1}{2}\right) + \tan^{-1}\left(\dfrac{1}{3}\right)$ is

23. Prove that: $\dfrac{\tan^{-1} 2}{11} + \dfrac{\tan^{-1} 7}{24} = \dfrac{\tan^{-1} 1}{2}$

24. Prove that

$$\tan^{-1} . \frac{1}{7} + \tan^{-1} . \frac{1}{13} = \tan^{-1} . \frac{2}{9}$$

25. Prove that

$$\tan^{-1} . \frac{1}{2} + \tan^{-1} . \frac{1}{5} + \tan^{-1} . \frac{1}{8} = \frac{\pi}{4}$$

26. Prove that

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

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27. Prove that : 2 sin^(-1), 3/5 = tan^(-1), 24/7`

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28. Prove that $\tan^{-1} x = \sec^{-1}\sqrt{1+x^2}$

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29. Prove that

$$\cos^{-1}\left(3x - 4x^3\right) = 3\cos^{-1} x, \; x \in \left[\frac{1}{2}, 1\right]$$

30. prove that

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

31.

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