MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

INVERSE TRIGONOMETRIC FUNCTIONS

Spq

1. Prvoe that $\sin^{-1}\frac{3}{5}+\cos^{-1}\frac{12}{13}=\cos^{-1}\frac{33}{65}$.

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2. P.T $\tan^{-1}\frac{1}{7}+\tan^{-1}\frac{1}{13}-\tan^{-1}\frac{2}{9}=0$

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3. If $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\pi$ then prove that $x+y+z=xyz.$

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4. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\pi,$ then prove that $x^4+y^4+z^4+4x^2y^2z^2=2\left(x^2y^2+y^2z^2+z^2x^2\right).$

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Saq 1 D Star Q

1. Prove that $\sin^{-1}\left(\frac{4}{5}\right)+\frac{\sin^{-1}7}{25}=\frac{\sin^{-1}117}{125}.$

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2. Prove that $\sin^{-1}\frac{3}{5}+\sin^{-1}\frac{8}{17}=\cos^{-1}\frac{36}{85}$

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3. P.T. $\cos^{-1}\left(\frac{4}{5}\right)+\sin^{-1}\left(\frac{3}{\sqrt{34}}\right)=\tan^{-1}\left(\frac{27}{11}\right)$.

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4. Find the value of $\sin\left(\frac{\cos^{-1}3}{5}+\frac{\cos^{-1}12}{13}\right)$

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5. Find $\cos\left(\frac{\sin^{-1}3}{5}+\frac{\sin^{-1}5}{13}\right)$

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6. Find the value of $\tan\left(\frac{\sin^{-1}3}{5}+\frac{\cos^{-1}5}{\sqrt{34}}\right)$.

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7. Find the value of $\tan\left(\frac{\cos^{-1}4}{5}+\frac{\tan^{-1}2}{3}\right)$

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8. Show that $\cot\left(\sin^{-1}\sqrt{\frac{13}{17}}\right)=\sin\left(\tan^{-1}\frac{2}{3}\right)$.

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

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10. Prove that $\cos\left(2\frac{\tan^{-1}1}{7}\right) = \sin\left(4\frac{\tan^{-1}1}{3}\right)$

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

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12. Show that $\frac{\tan^{-1}3}{4} + \frac{\tan^{-1}3}{5} - \frac{\tan^{-1}8}{19} = \frac{\pi}{4}.$

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13. Show that $\frac{\tan^{-1}1}{7} + \frac{\tan^{-1}1}{8} = \frac{\cot^{-1}201}{43} + \cot^{-1}18$

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14. Prove that $\cot^{-1} 9 + \operatorname{cosec}^{-1} \frac{\sqrt{41}}{4} = \frac{\pi}{4}$.

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15. Prove that $\sin^{-1} \frac{4}{5} + \sin^{-1} \frac{5}{13} + \sin^{-1}\left(\frac{16}{65}\right) = \frac{\pi}{2}$

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16. Prove that $\sin^{-1}\left(\frac{4}{5}\right) + 2\tan^{-1}\left(\frac{1}{3}\right) = \frac{\pi}{2}$.

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17. Prove that $\sin\left[\frac{\cot^{-1}(2x)}{1-x^2} + \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right] = 1.$

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18. Show that $\tan\left[2\tan^{-1}\left(\frac{\sqrt{5}-1}{2}\right)\right]=2$

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19. If $\sin^{-1}x-\cos^{-1}x=\frac{\pi}{6}$ then find x.

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20. If $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\frac{\pi}{2}$, then prove that $xy+yz+zx=1$

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21. If $\sin^{-1}(x)+\sin^{-1}(y)+\sin^{-1}(z)=\pi$, prove that $x\sqrt{1-x^2}+y\sqrt{1-y^2}+z\sqrt{1-z^2}=2xyz.$

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22. If $\cos^{-1} p + \cos^{-1} q + \cos^{-1} r = \pi$ then,

$P.T. p^2 + q^2 + r^2 = 2pqr = 1$

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Saq 2 D Hard Q 3 D Mis Q

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

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2. If $\frac{\sin^{-1}(2p)}{1+p^2} - \cos^{-1}\left(\frac{1-q^2}{1+q^2}\right) = \frac{\tan^{-1}(2x)}{1-x^2}$, then prove that $x = \frac{p-q}{1+pq}$

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3. Id a, b, c are distinct non-zero real numbers having the same sign.

Prove that

$$\cot^{-1}\left(\frac{ab+1}{a-b}\right)+\cot^{-1}\left(\frac{bc+1}{b-c}\right)+\cot^{-1}\left(\frac{ca+1}{c-a}\right)=\pi(\text{ or })2\pi$$

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4. Solve : $\sin^{-1}\left(\frac{5}{x}\right)+\sin^{-1}\left(\frac{12}{x}\right)=\frac{\pi}{2}$

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5. Solve $\sin^{-1}x+\sin^{-1}2x=\frac{\pi}{3}$.

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6. Prove that

$$\tan\left\{\frac{\pi}{4}+\frac{1}{2}\cos^{-1}\left(\frac{a}{b}\right)\right\}+\tan\left\{\left(\frac{\pi}{4}-\frac{1}{2}\frac{\cos^{-1}a}{b}\right)\right\}=\frac{2b}{a}.$$

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7. Solve

$$3\sin^{-1}\left(\frac{2x}{1+x^2}\right)-4\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)+2\tan^{-1}\left(\frac{2x}{1-x^2}\right)=\frac{\pi}{3}$$

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8. Show that $\sec^2\left(\tan^{-1}2\right)+\operatorname{cosec}^2\left(\cot^{-1}2\right)=10$

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9. Prove that $2\sin^{-1}\left(\frac{3}{5}\right)-\cos^{-1}\frac{5}{13}=\cos^{-1}\left(\frac{323}{325}\right).$

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10. If $\alpha = \tan^{-1}\left(\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right)$ then prove that $x^2 = \sin 2\alpha$.

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11. Solve $\sin^1 \frac{3x}{5} + \sin^{-1} \frac{4x}{5} = \sin^{-1} x$

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