

- (i) $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \left(\frac{x + y + z - xyz}{1 - xy - yz - zx} \right)$
- (ii) If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \frac{\pi}{2}$, then $xy + yz + zx = 1$
- (iii) If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$, then $x + y + z = xyz$
- (iv) If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{\pi}{2}$, then $x^2 + y^2 + z^2 + 2xyz = 1$
- (v) If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$, then
 $x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2} = 2xyz$
- (vi) If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = 3\pi$, then $xy + yz + zx = 3$
- (vii) If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$, then $x^2 + y^2 + z^2 + 2xyz = 1$
- (viii) If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$, then $xy + yz + zx = 3$
- (ix) If $\sin^{-1} x + \sin^{-1} y = \theta$, then $\cos^{-1} x + \cos^{-1} y = \pi - \theta$
- (x) If $\cos^{-1} x + \cos^{-1} y = \theta$, then $\sin^{-1} x + \sin^{-1} y = \pi - \theta$
- (xi) If $\tan^{-1} x + \tan^{-1} y = \frac{\pi}{2}$, then $xy = 1$
- (xii) If $\cot^{-1} x + \cot^{-1} y = \frac{\pi}{2}$, then $xy = 1$
- (xiii) If $\cos^{-1} \frac{x}{a} + \cos^{-1} \frac{y}{b} = \theta$,
then $\frac{x^2}{a^2} - \frac{2xy}{ab} \cos \theta + \frac{y^2}{b^2} = \sin^2 \theta$
- (xiv) $\tan^{-1} x_1 + \tan^{-1} x_2 + \dots + \tan^{-1} x_n = \tan^{-1} \left(\frac{S_1 - S_3 + S_5 - \dots}{1 - S_2 + S_4 - \dots} \right)$

where S_k denotes the sum of the product of $x_1, x_2, \dots, x_n$ taken k at a time.

Inverse

Trigonometric Equation

An equation involving one or more trigonometrical ratios of unknown angle is called a trigonometric equation.

Solution/Roots of a Trigonometric Equation

A value of the unknown angle which satisfies the given equation, is called a solution or root of the equation.

The trigonometric equation may have infinite number of solutions.

(i) **Principal Solution** – The least value of unknown angle which satisfies the given equation, is called a principal solution of trigonometric equation.