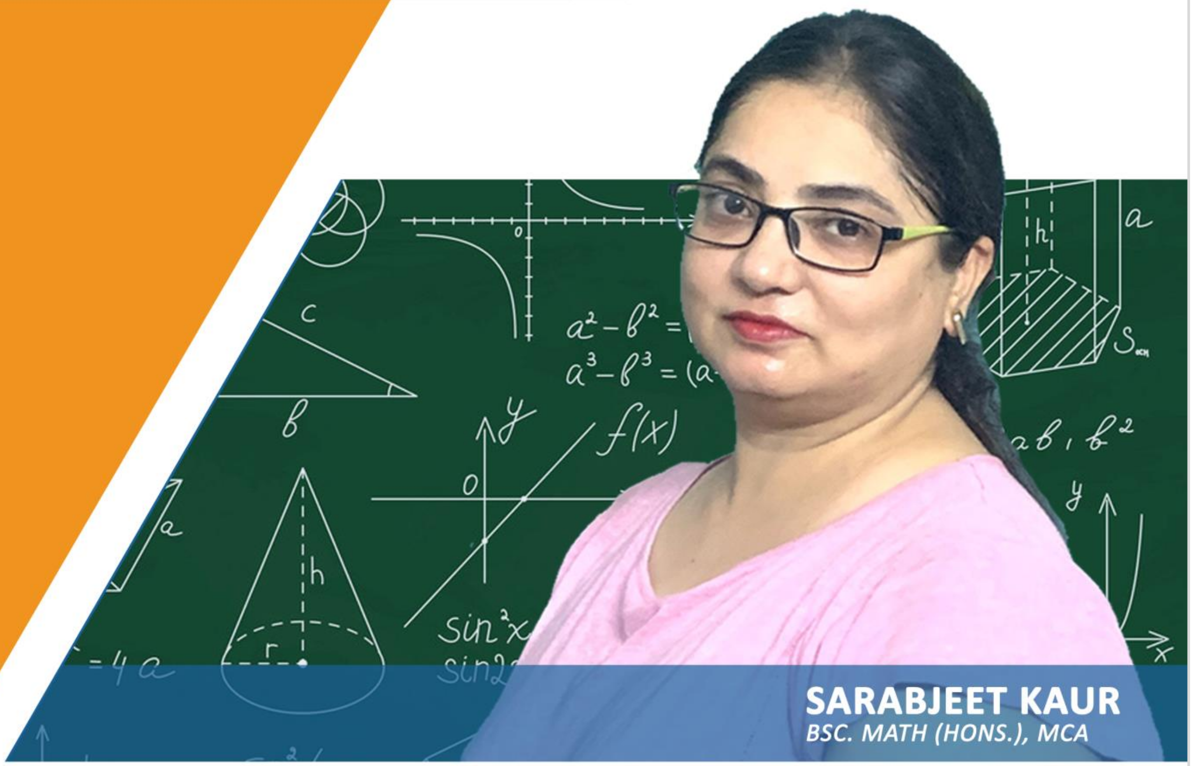

GRADE 12TH MATHS

CHAPTER 2

Inverse Trigonometry

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BASED ON EX 2.1

Q1. Write the principal value of $\tan^{-1}\left(-\frac{1}{2}\right)+2\sin^{-1}\left(\frac{1}{2}\right)$.

Q2. Write the principal value of $\cos^{-1}\left[\cos(680°)\right]$.

Q3. Write the principal value of $\tan^{-1}\left[\sin\left(-\frac{\pi}{2}\right)\right]$.

Q4. Write the principal value of $\left[\tan^{-1}(-\sqrt{3})+\tan^{-1}(1)\right]$

Q5. Find the principle value of the following:

(a) $\sin^{-1}\left(\sin\frac{3\pi}{4}\right)$ **(b)** $\cos^{-1}\left(\cos\frac{5\pi}{4}\right)$ **(c)** $\tan^{-1}\left(\tan\frac{2\pi}{3}\right)$

(d) $\cos^{-1}\left(\cos\frac{8\pi}{7}\right)$ **(e)** $\tan^{-1}\left(\tan\frac{5\pi}{6}\right)$ **(f)** $\tan^{-1}\left(\tan\frac{9\pi}{8}\right)$

Q6. Find the principle value of the following:

(a) $\operatorname{cosec}^{-1}\left(\operatorname{cosec}\frac{\pi}{6}\right)+\tan^{-1}\left(\tan\frac{7\pi}{6}\right)$ **(b)** $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)+\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$

(c) $\tan^{-1}\left(\tan\frac{3\pi}{4}\right)+\cot^{-1}\left(\cot\frac{3\pi}{4}\right)$ **(d)** $\sin^{-1}\left(\sin\frac{3\pi}{4}\right)+\cos^{-1}\left(\cos\left(-\frac{\pi}{3}\right)\right)$

Q7. Evaluate the following:

(a) $\cos\left(\sin^{-1}\left(\frac{-3}{5}\right)\right)$ **(b)** $\operatorname{cosec}\left(\cos^{-1}\left(\frac{-4}{5}\right)\right)$ **(c)** $\cos\left(\tan^{-1}\left(\frac{3}{4}\right)\right)$

Q8. Evaluate the following:

(a) $\sin\left(2\cos^{-1}\left(\frac{-3}{5}\right)\right)$ **(b)** $\cos\left(\frac{\pi}{6}-\sin^{-1}\left(-\frac{1}{2}\right)\right)$ **(c)** $\sin\left(\frac{\pi}{6}-\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right)$

Q9. Evaluate the following:

(a) $\sin\left(\frac{1}{2}\cos^{-1}\frac{4}{5}\right)$ **(b)** $\tan\left(\frac{1}{2}\cos^{-1}\frac{\sqrt{5}}{3}\right)$ **(c)** $\tan\left(\frac{1}{2}\sin^{-1}\frac{3}{4}\right)$

Q10. Evaluate the following:

(a) $\tan^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$ **(b)** $\sin\left[\frac{\pi}{3}-\sin^{-1}\left(-\frac{1}{2}\right)\right]$ **(c)** $\tan^{-1}\left[2\sin\left(2\cos^{-1}\frac{\sqrt{3}}{2}\right)\right]$

Q11. Find the domain of the function defined by $f(x)=\sin^{-1}\sqrt{x-1}$

BASED ON EX 2.2

Q1. If $\sin\left(\sin^{-1}\frac{1}{5}+\cos^{-1}x\right)=1$, then find the value of x.

Q2. If $\tan^{-1}x+\tan^{-1}y=\frac{\pi}{4}, xy<1$, then write the value of $x+y+xy$.

Q3. If $4\sin^{-1}x+\cot^{-1}x=\pi$, then find the value of x.

Q4. If $\sin^{-1}x+\sin^{-1}y=\frac{2\pi}{3}$, then find the value of $\cos^{-1}x+\cos^{-1}y$.

Q5. Prove the following:

(a) $\tan^{-1}\frac{2}{11}+\tan^{-1}\frac{7}{24}=\tan^{-1}\frac{1}{2}$

(b) $2\tan^{-1}\frac{1}{3}+\tan^{-1}\frac{1}{7}=\frac{\pi}{4}$

(c) $\tan^{-1}\frac{3}{4}+\tan^{-1}\frac{3}{5}-\tan^{-1}\frac{8}{19}=\frac{\pi}{4}$

(d) $2\sin^{-1}\frac{3}{5}-\tan^{-1}\frac{17}{31}=\frac{\pi}{4}$

(e) $\sin^{-1}\frac{5}{13}+\cos^{-1}\frac{3}{5}=\tan^{-1}\frac{63}{16}$

(f) $\cos^{-1}\frac{4}{5}+\tan^{-1}\frac{3}{5}=\tan^{-1}\frac{27}{11}$

Q6. Prove the following:

(a) $2\tan^{-1}\frac{1}{5}+\sec^{-1}\left(\frac{5\sqrt{2}}{7}\right)+2\tan^{-1}\frac{1}{8}=\frac{\pi}{4}$

(b) $2\cot^{-1}5+\cot^{-1}7+2\cot^{-1}8=\frac{\pi}{4}$

(c) $\cot^{-1}13+\cot^{-1}21+\cot^{-1}(-8)=\pi$

(d) $\sin\left[\tan^{-1}\left(\frac{1-x^2}{2x}\right)+\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right]=1$

(e) $\cot\left(\frac{\pi}{4}-2\cot^{-1}3\right)=7$

(f) $\tan^{-1}\frac{1}{4}+\tan^{-1}\frac{2}{9}=\frac{1}{2}\cos^{-1}\frac{3}{5}=\frac{1}{2}\sin^{-1}\frac{4}{5}$

Q7. Prove the following:

(a) $\cos\left(\sin^{-1}\frac{3}{5}+\cot^{-1}\frac{3}{2}\right)=\frac{6}{5\sqrt{13}}$

(b) $2\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{1}{7}\right)-\tan^{-1}\left(\frac{31}{17}\right)=0$

(c) $2\left(\tan^{-1}\frac{1}{4}+\tan^{-1}\frac{2}{9}\right)=\tan^{-1}\frac{4}{3}$

(d) $2\tan^{-1}\left(\frac{1}{5}\right)+\tan^{-1}\left(\frac{1}{4}\right)=\tan^{-1}\left(\frac{32}{43}\right)$

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

(f) $\tan^{-1}\frac{1}{5}+\tan^{-1}\frac{1}{7}+\tan^{-1}\frac{1}{3}+\tan^{-1}\frac{1}{8}=\frac{\pi}{4}$

(g) $\sin^{-1}\left(\frac{8}{17}\right)+\sin^{-1}\left(\frac{3}{5}\right)=\cos^{-1}\left(\frac{36}{85}\right)$

(h) $2\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{1}{7}\right)=\sin^{-1}\left(\frac{31}{25\sqrt{2}}\right)$

Q8. Write the following in the simplest form:

(a) $\tan^{-1}\left(\frac{\sin x}{1+\cos x}\right)$

(b) $\tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$

(c) $\tan^{-1}\left(\frac{\cos 2x}{1+\sin 2x}\right)$

(d) $\tan^{-1}\sqrt{\frac{a-x}{a+x}}$

(e) $\cos\left(\tan^{-1}\left(\sin\left(\cot^{-1}x\right)\right)\right)$

(f) $\cot^{-1}\left(\sqrt{1+x^2}-x\right)$