PARISHRAM 2025

Mathematics

DPP: 3

Inverse Trigonometric Functions

Q1 A value of $\tan^{-1}\left\{\sin\left(\cos^{-1}\sqrt{\frac{2}{3}}\right)\right\}$, is

(A) $\pi/4$ (B) $\pi/2$

(C) $\pi/3$ (D) $\pi/6$

Q2 The value of $\sin\left(2\ \tan^{-1}\frac{12}{5}\right)$ is equal to

(A) $\frac{110}{169}$ (B) $\frac{120}{169}$

(C) $\frac{121}{169}$ (D) $\frac{12}{5}$

Q3 The value of $\cos\left(2\sin^{-1}\frac{3}{5}\right)$ is equal to

(A) $\frac{7}{25}$ (B) $\frac{9}{25}$

(C) $\frac{16}{25}$ (D) 1

Q4 The value of $\cos\left(\sin^{-1}\frac{1}{4}+\sec^{-1}\frac{4}{3}\right)$, is

(A) $\frac{3\sqrt{15}-\sqrt{7}}{16}$

(B) $\frac{3\sqrt{15}+\sqrt{7}}{16}$

(C) $\frac{\sqrt{7}-3\sqrt{15}}{16}$

(D) $\frac{3\sqrt{15}-\sqrt{7}}{4}$

Q5 The value of $\tan^2\left(\sec^{-1}2\right)+\cot^2\left(\text{cosec}^{-1}3\right)$, is

(A) 5 (B) 10

(C) 11 (D) 15

Q6 Given below are two statements: one is labelled as **Assertion A** and other is labelled as **Reason R**.

Assertion A: The value of $cot\left(\cos^{-1}\frac{7}{25}\right)$ is $\frac{7}{24}$

Reason R: $cot^{-1}\left(cot\,\theta\right)\ =\ \theta$ for all $\theta\ \in\ \left(0,\ \pi\right)$

In the light of the above statements, choose the most appropriate answer from the options given below

(A) Both **A** and **R** are correct and **R** is the correct explanation of **A**

(B) Both **A** and **R** are correct but **R** is NOT the correct explanation of **A**

(C) **A** is correct but **R** is not correct

(D) **A** is not correct but **R** is correct

Q7 The values of $\sin\left(\cos^{-1}\frac{3}{5}+\text{cosec}^{-1}\frac{13}{5}\right)$, is

(A) $48/65$ (B) $15/65$

(C) $33/65$ (D) $63/65$

Q8 The value of $\tan\left(\cos^{-1}\frac{3}{5}+\tan^{-1}\frac{1}{4}\right)$ is

(A) $\frac{19}{8}$ (B) $\frac{8}{19}$

(C) $\frac{19}{12}$ (D) $\frac{3}{4}$

Q9 The value of $\cos^{-1}\left(\sin\ x\right)+\sin^{-1}\ \left(\cos\ x\right)$ is:

(A) $\frac{\pi}{2}$ (B) $\pi-\mathrm{x}$

(C) $\pi-2\mathrm{x}$ (D) $\frac{\pi}{2}-x$

Q10 The value of $\sec^2\left(\tan^{-1}2\right)+\text{cosec}^2\left(\cot^{-1}3\right)=$

(A) 5 (B) 10

(C) 15 (D) 20

Q11 Prove that: $\cos^{-1}\frac{4}{5}+\cos^{-1}\frac{12}{13}=\cos^{-1}\frac{33}{65}$

Q12 Write in the simplest form : $\tan^{-1}\sqrt{\frac{a-x}{a+x}}$.

Q13 Prove that: $\tan^{-1}\left(\frac{\cos x}{1+\sin x}\right)=\frac{\pi}{4}-\frac{x}{2}$, $x\in\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$.

Q14 Prove that following: $\left[\tan^{-1}\left\{\sin\left(cot^{-1}x\right)\right\}\right]=\sqrt{\frac{1+x^2}{2+x^2}}$

Q15 Write $y=\tan^{-1}\left[\frac{\sqrt{1+x^2}-1}{x}\right]$, $x\neq0$ in the simplest form.

Answer Key

Q1 (D)

Q2 (B)

Q3 (A)

Q4 (A)

Q5 (C)

Q6 (B)

Q7 (D)

Q8 (A)

Q9 (C)

Q10 (C)

Q11 Check the solution

Q12 $\frac{1}{2}\cos^{-1}\left(\frac{x}{a}\right)$

Q13 Check the solution

Q14 Check the solution

Q15 $\frac{1}{2}\tan^{-1}x$