

# ← ULTIMATE MATHEMATICS →

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## INVERSE TRIGONOMETRY

MARKS: 68

TIME: 80 Mins

1 → value of  $\tan^{-1}(\tan 37) + \cos^{-1}(\cos 57) + \sin^{-1}(\sin 137)$

- A)  $\frac{\pi}{4}$  (B)  $\frac{3\pi}{4}$  (C)  $\frac{3\pi}{6}$  (D)  $\frac{5\pi}{6}$

2 → value of  $\cos^{-1}(\cos(-1540^\circ))$  is

- A)  $110^\circ$  (B)  $-110^\circ$  (C)  $100^\circ$  (D)  $40^\circ$

3 → value of  $\operatorname{cosec}^{-1}(-2) - \sec^{-1}(-2) + \cot^{-1}(-1)$  is

- A)  $-\frac{\pi}{13}$  (B)  $\frac{\pi}{12}$  (C)  $-\frac{\pi}{12}$  (D)  $\frac{5\pi}{12}$

4 → Simplified form of  $\tan^{-1}\left(\frac{\sqrt{1+x^2}+1}{x}\right)$  is

- A)  $\frac{\pi}{2} + \frac{1}{2}\tan^{-1}x$  (B)  $\frac{\pi}{2} - \frac{1}{2}\tan^{-1}x$  (C)  $\frac{\pi}{2} - \tan^{-1}\left(\frac{x}{2}\right)$  (D) none

5 →  $2\tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) + 2\tan^{-1}\left(\frac{1}{8}\right) =$  \_\_\_\_\_  
(Fill in the blank)

6 → value of  $\sin^{-1}\left(\frac{4}{5}\right) + \sin^{-1}\left(\frac{5}{13}\right) + \sin^{-1}\left(\frac{16}{65}\right)$  is

- A)  $\frac{\pi}{2}$  (B)  $\infty$  (C)  $\frac{\pi}{8}$  (D)  $\frac{\pi}{4}$

7 → Simplified form of

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

- (A)  $\frac{\pi}{4} + \frac{1}{2} \cos^{-1}(x^2)$  (B)  $\frac{\pi}{2} - \frac{1}{2} \cos^{-1}(x^2)$  (C)  $\frac{1}{2} \cos^{-1} x^2$   
(D)  $\frac{\pi}{4} - \frac{1}{2} \cos^{-1}(x^2)$

Q no 8  $\rightarrow$  Solution of  $\sin^{-1}(1-x) - 2 \sin^{-1} x = \frac{\pi}{2}$  is

- (A)  $x=0, x=1/2$  (B)  $x=1/2$  (C)  $x=0$  (D)  $x=-\frac{1}{2}$

Q no 9  $\rightarrow$  Simplified form of

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

- (A)  $\frac{2a}{b}$  (B)  $\frac{2a}{3b}$  (C)  $\frac{a}{b}$  (D) none of these

Q no 10  $\rightarrow$   $\cot^{-1} \left( \frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right)$  is equal to

- (A)  $\frac{\pi}{2} - x$  (B)  $\frac{\pi}{4} + x$  (C)  $\frac{\pi}{4} - x$  (D)  $\frac{x}{2}$

Q no 11  $\rightarrow$  Write the simplified form of  $\sin \left[ \cot^{-1} (\cos (\tan^{-1} x)) \right]$

Q no 12  $\rightarrow$  If  $\cos^{-1} \left( \frac{x}{a} \right) + \cos^{-1} \left( \frac{y}{b} \right) = \alpha$

$$\text{then } \frac{x^2}{a^2} + \frac{y^2}{b^2} = ?$$

- (A)  $\sin^2 \alpha$  (B)  $\frac{2xy}{ab} \sin \alpha + \cos^2 \alpha$  (C)  $\frac{2xy}{ab} (\cos \alpha - \sin^2 \alpha)$   
(D)  $\frac{2xy}{ab} \cos \alpha + \sin^2 \alpha$



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Q. No 13  $\rightarrow$  value of  $\tan \left[ 2 \tan^{-1} \left( \frac{1}{5} \right) - \frac{\pi}{4} \right]$  is

- (A)  $\frac{7}{17}$  (B)  $-\frac{17}{7}$  (C)  $-\frac{7}{17}$  (D)  $-\frac{1}{7}$

Q. No 14  $\rightarrow \cot^{-1}(7) + \cot^{-1}(8) + \cot^{-1}(18) = ?$

- (A)  $\cot^{-1} \left( \frac{1}{3} \right)$  (B)  $\cot^{-1}(3)$  (C)  $\tan^{-1}(3)$  (D)  $\tan^{-1}(1)$

Q. No 15  $\rightarrow$  If  $4 \sin^2 x + \cos^2 x = 7$ , then  $x =$

Q. 16 Simplified form of  $\sin \left\{ 2 \tan^{-1} \sqrt{\frac{1-x}{1+x}} \right\}$  is

- (A)  $\sqrt{1-x^2}$  (B)  $-\sqrt{1-x^2}$  (C)  $\sqrt{1+x^2}$  (D)  $\frac{1}{2} \sqrt{1-x^2}$

Q. No 17  $\rightarrow$  If  $a > b > c$  then

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

- (A)  $\frac{\pi}{2}$  (B) 0 (C)  $\pi$  (D)  $\frac{\pi}{4}$