

# VISION VICTORY TEST SERIES

## CLASS 12

### MATHEMATICS

#### Inverse Trigonometric Functions

**TIME:-1:30Hrs**

Q 1 If  $\sin^{-1}\left(\frac{3}{5}\right) = x$  find the value of  $\cos x$ . Mark (1)

Q 2 Is the following statement true?  $\cos^{-1} x = (\cos x)^{-1} = \frac{1}{\cos x}$  Mark (1)

Q 3 Find the principal value of  $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$  Mark (1)

Q 4 If  $\sin^{-1} x = y$  then what will be the range of y? Mark (1)

Q 5 Show that  $\sin^{-1}\left(2x\sqrt{1-x^2}\right) = 2\sin^{-1} x$  Mark (1)

Q 6 Find the value of  $\cos^{-1}\left(\cos \frac{13\pi}{6}\right)$  Mark (1)

Q 7 Find the value of  $\tan^{-1}\left(\frac{2}{11}\right) + \tan^{-1}\left(\frac{7}{24}\right)$  Mark (1)

Q 8 Find the value of  $\tan^{-1}\left(\frac{3a^2x-x^3}{a^3-3ax^2}\right)$  Mark (1)

Q 9  $2 \tan^{-1} x = \dots\dots\dots$  Mark (1)

Q 10 Write domain and range of  $\tan^{-1} x$  Mark (1)

Q 11 a)  $\cos^{-1}(-x) = \dots$  b)  $\cos^{-1}\frac{1}{x} = \dots$  Mark (1)

Q 12 Find the principal value of  $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

Mark (1)

Q 13 Express  $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right), \frac{\pi}{2} < x < \frac{\pi}{2}$  in the simplest form

Marks (3)

Q 14 Find the value of  $\sin^{-1}\left(\sin \frac{2\pi}{3}\right)$

Marks (3)

Q 15 Write  $\tan^{-1}\left(\frac{1}{\sqrt{x^2-1}}\right), |x| > 1$  in the simplest form.

Marks (3)

Q 16 Prove that  $\tan^{-1} x + \tan^{-1} \frac{2x}{1-x^2} = \tan^{-1} \left(\frac{3x-x^3}{1-3x^2}\right)$

Marks (3)

Q 17 Show that  $\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{2}{11} = \tan^{-1} \frac{3}{4}$

Marks (3)

Q 18

Find the principal value of (i)  $\sin^{-1}\left(\frac{-1}{2}\right)$  (ii)  $\cot^{-1}\left(\frac{-1}{\sqrt{3}}\right)$

Marks (3)

Q 19 Prove that  $\tan^{-1} x + \tan^{-1} \frac{2x}{1-x^2} = \tan^{-1} \left(\frac{3x-x^3}{1-3x^2}\right)$

Marks (3)

Q 20 Find the value of  $\sin^{-1}\left(\sin \frac{2\pi}{3}\right)$

Marks (3)

Q 21 Prove that:  $\tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$

Marks (4)

Q 22 Solve  $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$

Marks (4)

Q 23 Prove that:  $\cot^{-1} \left[ \frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right] = \frac{x}{2}, x \in \left(0, \frac{\pi}{4}\right)$

Marks (4)

Q 24 If  $\tan^{-1} \left(\frac{x-1}{x-2}\right) + \tan^{-1} \left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$

Marks (4)

Q 25 Find the value of:  $\tan^{-1} \left[ \sin^{-1} \frac{2x}{1+x^2} + \cos^{-1} \frac{1-y^2}{1+y^2} \right], |x| < 1, y > 0 \text{ and } xy > 1$

Marks (4)

Q 26 Show that  $\sin^{-1} \frac{3}{5} - \sin^{-1} \frac{8}{17} = \cos^{-1} \frac{84}{85}$

Marks (4)

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

Q 27 Find the values of the following:

Marks (4)

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

Q 28 Write the function in the simplest form.

Marks (4)

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

Q 29 Prove that:

Marks (4)

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

Q 30 Prove that:

Marks (6)

$$\sin^{-1}\frac{12}{13} + \cos^{-1}\frac{4}{5} + \tan^{-1}\frac{63}{16} = \pi$$

Q 31 Show that

Marks (6)

$$\sin^{-1}\frac{12}{13} + \cos^{-1}\frac{4}{5} + \tan^{-1}\frac{63}{16} = \pi$$

Q 32 Show that

Marks (6)

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PHONE/FAX: -011-41642844, 09871581508

dikshaworld@gmail.com, dikshaworld@rediffmail.com