



TERM – 1 MATHS
CLASS: XII MATHEMATICS (041)
CHAPTER:2 INVERSE TRIGONOMETRIC FUNCTIONS
WORKSHEET 2

Q1	Which of the following is the principal value branch of $\cos^{-1} x$? (a) $[-\frac{\pi}{2}, \frac{\pi}{2}]$ (b) $(0, \pi)$ (c) $[0, \pi]$ (d) $(0, \pi) - \{\frac{\pi}{2}\}$
Q2	Which of the following is the principal value branch of $\operatorname{cosec}^{-1} x$? (a) $(-\frac{\pi}{2}, \frac{\pi}{2})$ (b) $(0, \pi) - \{\frac{\pi}{2}\}$ (c) $[-\frac{\pi}{2}, \frac{\pi}{2}]$ (d) $[-\frac{\pi}{2}, \frac{\pi}{2}] - \{0\}$
Q3	The value of $\sin^{-1} [\cos (\frac{33\pi}{5})]$ is..... (a) $\frac{3\pi}{5}$ (b) $\frac{-7\pi}{5}$ (c) $\frac{\pi}{10}$ (d) $\frac{-\pi}{10}$
Q4	The domain of the function $\cos^{-1}(2x - 1)$ is (a) $[0, 1]$ (b) $[-1, 1]$ (c) $[0, 1/2]$ (d) $[0, \pi]$
Q 5	The domain of the function defined by $\sin^{-1}(\sqrt{x-1})$ is (a) $[1, 2]$ (b) $[-1, 1]$ (c) $[0, 1]$ (d) None of these
Q 6	The value of $\cos^{-1} (\cos \frac{3\pi}{2})$ is (a) $\frac{\pi}{2}$ (b) $\frac{3\pi}{2}$ (c) $\frac{5\pi}{2}$ (d) $\frac{7\pi}{2}$

Q 7	<p>The value of $2\sec^{-1}(2) + \sin^{-1}\left(\frac{1}{2}\right)$ is</p> <p>(a) $\frac{\pi}{6}$ (b) $\frac{5\pi}{6}$ (c) $\frac{7\pi}{6}$ (d) 1</p>
Q 8	<p>If $\cos^{-1} x > \sin^{-1} x$ then</p> <p>(a) $\frac{1}{\sqrt{2}} < x \leq 1$ (b) $0 \leq x < \frac{1}{\sqrt{2}}$ (c) $-1 < x \leq \frac{1}{\sqrt{2}}$ (d) $x > 0$</p>
Q 9	<p>$\cos^{-1}\left(\cos\frac{7\pi}{6}\right) = \dots\dots$</p> <p>(a) $\frac{\pi}{6}$ (b) $\frac{5\pi}{6}$ (c) $-\frac{\pi}{6}$ (d) $\frac{7\pi}{6}$</p>
Q10	<p>The value of $\cos^{-1}\left[\cos\left(-\frac{\pi}{3}\right)\right] = \dots\dots$</p> <p>(a) $-\frac{\pi}{3}$ (b) $\frac{\pi}{3}$ (c) $\frac{4\pi}{3}$ (d) $\frac{2\pi}{3}$</p>
Q11	<p>The value of $\sin^{-1}\left[\sin\left(\frac{5\pi}{3}\right)\right] = \dots\dots$</p> <p>(a) $-\frac{\pi}{3}$ (b) $\frac{5\pi}{3}$ (c) $\frac{\pi}{3}$ (d) $\frac{2\pi}{3}$</p>
Q 12	<p>$\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) + 2\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ is</p> <p>(a) $\frac{5\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{4\pi}{3}$ (d) $\frac{4\pi}{6}$</p>

Q13	<p>The value of $\sin^{-1} \left[\sin \left(\frac{7\pi}{6} \right) \right] = \dots$</p> <p>(a) $\frac{\pi}{6}$ (b) $\frac{5\pi}{6}$ (c) $-\frac{\pi}{6}$ (d) $\frac{7\pi}{6}$</p>
Q14	<p>$\sin \left\{ \frac{\pi}{3} - \sin^{-1} \left(-\frac{1}{2} \right) \right\}$</p> <p>(a) 0 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1</p>
Q15	<p>Value of $\sin \left(\cos^{-1} \frac{4}{5} \right)$ is</p> <p>(a) 1/2 (b) 3/5 (c) 2/3 (d) 3/4</p>
Q16	<p>Value of $\cos \left(\tan^{-1} \frac{4}{3} \right)$ is</p> <p>(a) 2/3 (b) 1/2 (c) 3/4 (d) 3/5</p>
Q 17	<p>$\cos^2 \left(\sin^{-1} \left(\frac{1}{2} \right) \right) + \sin^2 \left(\cos^{-1} \left(\frac{1}{2} \right) \right)$</p> <p>(a) 1/2 (b) 1 (c) 3/2 (d) 2</p>
Q 18	<p>$\sin^{-1} \left(\frac{1}{2} \right) + 2 \cos^{-1} \left(-\frac{\sqrt{3}}{2} \right) = \dots$</p> <p>(a) $\frac{\pi}{2}$ (b) π (c) $\frac{3\pi}{4}$ (d) $\frac{3\pi}{2}$</p>
Q 19	<p>The value of $\cos^{-1} \left[\cos \left(\frac{4\pi}{3} \right) \right] = \dots$</p>

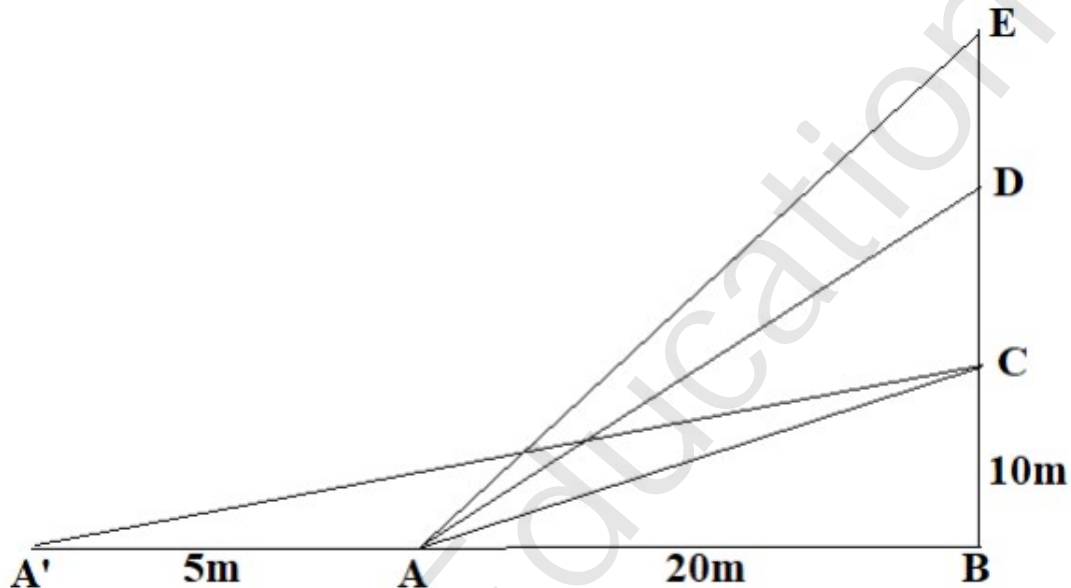
	<p>(a) $\frac{\pi}{3}$</p> <p>(b) $\frac{2\pi}{3}$</p> <p>(c) $\frac{4\pi}{3}$</p> <p>(d) $-\frac{\pi}{3}$</p>
Q 20	<p>The value of $\tan^{-1} \left[\tan \left(\frac{7\pi}{4} \right) \right] = \dots$</p> <p>(a) $-\frac{\pi}{4}$</p> <p>(b) $\frac{\pi}{4}$</p> <p>(c) $\frac{3\pi}{4}$</p> <p>(d) $-\frac{3\pi}{4}$</p>
Q 21	<p>$\cos \left(\frac{\pi}{3} + \cos^{-1}(-1) \right) = \dots$</p> <p>(a) $1/2$</p> <p>(b) $-1/2$</p> <p>(c) 1</p> <p>(d) -1</p>
Q 22	<p>Domain of $\sin^{-1} x$ is</p> <p>(a) $[0, 1]$</p> <p>(b) $(-\infty, \infty)$</p> <p>(c) $[0, \pi]$</p> <p>(d) $[-1, 1]$</p>
Q 23	<p>$\sin \left[\tan^{-1}(-\sqrt{3}) + \cos^{-1} \left(-\frac{\sqrt{3}}{2} \right) \right] = \dots$</p> <p>(a) 1</p> <p>(b) -1</p> <p>(c) 0</p> <p>(d) 2</p>
Q 24	<p>The solution set of $\sin^{-1} x \leq \cos^{-1} x$ is</p> <p>(a) $\frac{1}{\sqrt{2}} \leq x \leq 1$</p> <p>(b) $-\frac{1}{\sqrt{2}} \leq x \leq 1$</p> <p>(c) $-1 \leq x \leq \frac{1}{\sqrt{2}}$</p> <p>(d) $-\frac{1}{\sqrt{2}} \leq x \leq \frac{1}{\sqrt{2}}$</p>
Q 25	<p>If $\tan^{-1} x > \cot^{-1} x$ then ...</p> <p>(a) $x > 1$</p> <p>(b) $x < 1$</p>

	<p>(c) $x = 1$ (d) $x \in R$</p>
Q 26	<p>Value of $\cos \left[\frac{\pi}{6} + \cos^{-1} \left(-\frac{1}{2} \right) \right] = \dots$</p> <p>(a) $-\frac{\sqrt{3}}{2}$ (b) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (c) $\frac{\sqrt{5}-1}{4}$ (d) $\frac{\sqrt{3}+1}{2\sqrt{2}}$</p>
Q 27	<p>If $\sin^{-1} x = y$, then</p> <p>(a) $-\frac{\pi}{2} < y < \frac{\pi}{2}$ (b) $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$ (c) $0 < y < \pi$ (d) $0 \leq y \leq \pi$</p>
Q 28	<p>$\cot^{-1} \left(\frac{\sqrt{1-\sin x} + \sqrt{1+\sin x}}{\sqrt{1-\sin x} - \sqrt{1+\sin x}} \right) = \dots \quad \left(0 < x < \frac{\pi}{2} \right)$</p> <p>(a) $\frac{x}{2}$ (b) $\frac{\pi}{2} - 2x$ (c) $2\pi - x$ (d) $\pi - \frac{x}{2}$</p>
Q 29	<p>$\cos \left[\tan^{-1} \left\{ \cot \left(\sin^{-1} \frac{1}{2} \right) \right\} \right] = \dots$</p> <p>(a) 1 (b) 1/4 (c) 1/8 (d) 1/2</p>
Q 30	<p>$\cot^{-1} \left(\frac{\sqrt{1+x^2} - 1}{x} \right) = \dots$</p> <p>(a) $-\frac{1}{2} \tan^{-1} x$ (b) $\cot^{-1} x$ (c) $\frac{\pi}{2} - \frac{1}{2} \tan^{-1} x$ (d) $\frac{\pi}{2} - \frac{1}{2} \cot^{-1} x$</p>
<p>CASE STUDY: 1</p> <p>Read the following text and answer on the basis of the same: The value of an inverse trigonometric function which lies in the</p>	

	range of principal branch is called the principal value of that inverse trigonometric function.
Q 1	Principal value of $\sin^{-1}\left(\frac{1}{2}\right)$ is (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{2}$
Q 2	Principal value of $\tan^{-1}(1)$ is (a) $\frac{\pi}{3}$ (b) π (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$
Q 3	Principal value of $\cot^{-1}(\sqrt{3})$ is (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$
Q 4	Principal value of $\sin^{-1}(1) + \sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$ is (a) 2π (b) π (c) $\frac{3\pi}{4}$ (d) $\frac{\pi}{3}$
Q 5	Principal value of $2\cos^{-1}(1) + 5\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$ is (a) $\frac{3\pi}{4}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{2}$ (d) $\frac{5\pi}{4}$
CASE STUDY: 2	
<p>The Government of India is planning to fix a hoarding board at the face of a building on the road of a busy market for awareness on COVID-19 protocol. Ram, Robert and Rahim are the three engineers who are working on this project. "A" is considered to be a person viewing the hoarding board 20 metres away from the building, standing at the edge of a pathway nearby. Ram, Robert and Rahim suggested to the firm to place the hoarding board at three different locations namely C, D and E. "C" is at the height of</p>	

10 metres from the ground level. For the viewer A, the angle of elevation of "D" is double the angle of elevation of "C". The angle of elevation of "E" is triple the angle of elevation of "C" for the same viewer.

Look at the figure given and based on the above information answer the following:

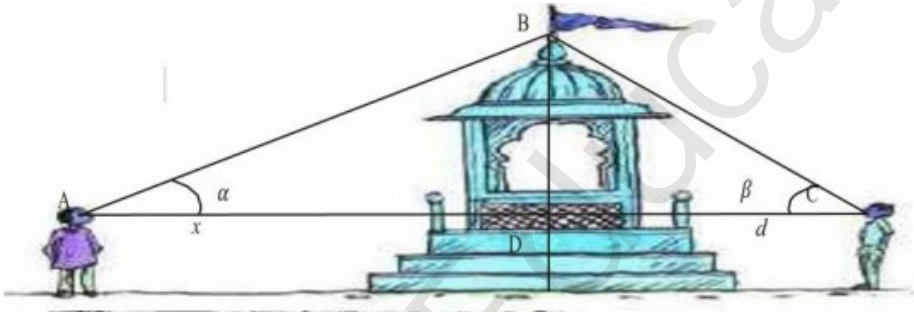


- Q 1** Measure of $\angle CAB =$
 (a) $\tan^{-1} 2$
 (b) $\tan^{-1}(\frac{1}{2})$
 (c) $\tan^{-1} 1$
 (d) $\tan^{-1} 3$

- Q 2** Measure of $\angle DAB =$
 (a) $\tan^{-1} \frac{3}{4}$
 (b) $\tan^{-1}(3)$
 (c) $\tan^{-1} \frac{4}{3}$
 (d) $\tan^{-1} 4$

- Q 3** Measure of $\angle EAB =$
 (a) $\tan^{-1} 11$
 (b) $\tan^{-1}(3)$
 (c) $\tan^{-1} \frac{2}{11}$
 (d) $\tan^{-1} \frac{11}{2}$

- Q 4** A' is another viewer standing on the same line of observation across the road. If the width of the road is 5 meters, then the difference between $\angle CAB$ and $\angle CA'B$ is

	<p>(a) $\tan^{-1}\left(\frac{1}{2}\right)$</p> <p>(b) $\tan^{-1}\left(\frac{1}{8}\right)$</p> <p>(c) $\tan^{-1}\frac{2}{5}$</p> <p>(d) $\tan^{-1}\frac{11}{21}$</p>
Q 5	<p>Domain and range of $\tan^{-1} x =$</p> <p>(a) $R^+, \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$</p> <p>(b) $R^-, \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$</p> <p>(c) $R, \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$</p> <p>(d) $R, \left(0, \frac{\pi}{2}\right)$</p>
	<p style="text-align: center;">CASE STUDY: 3</p>  <p>Two men on either side of a temple of 30 meters high observe its top at the angles of elevation α and β respectively. (As shown in the figure above). The distance between the two men is $40\sqrt{3}$ meters and the distance between the first person A and the temple is $30\sqrt{3}$ meters.</p> <p>Based on the above information answer the following:</p>
Q 1	<p>$\angle CAB = \alpha = \dots$</p> <p>(a) $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$</p> <p>(b) $\sin^{-1}\left(\frac{1}{2}\right)$</p> <p>(c) $\sin^{-1}(2)$</p> <p>(d) $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$</p>
Q 2	<p>$\angle CAB = \alpha = \dots$</p> <p>(a) $\cos^{-1}\left(\frac{1}{5}\right)$</p> <p>(b) $\cos^{-1}\left(\frac{2}{5}\right)$</p> <p>(c) $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$</p> <p>(d) $\cos^{-1}\left(\frac{4}{5}\right)$</p>
Q 3	<p>$\angle BCA = \beta = \dots$</p>

	<p>(a) $\tan^{-1}\left(\frac{1}{2}\right)$</p> <p>(b) $\tan^{-1}(2)$</p> <p>(c) $\tan^{-1}\frac{1}{\sqrt{3}}$</p> <p>(d) $\tan^{-1}\sqrt{3}$</p>
Q 4	<p>$\angle ABC =$</p> <p>(a) $\frac{\pi}{4}$</p> <p>(b) $\frac{\pi}{6}$</p> <p>(c) $\frac{\pi}{2}$</p> <p>(d) $\frac{\pi}{3}$</p>
Q 5	<p>Domain and range of $\cos^{-1} x =$</p> <p>(a) $(-1, 1), (0, \pi)$</p> <p>(b) $[-1, 1], (0, \pi)$</p> <p>(c) $[-1, 1], [0, \pi]$</p> <p>(d) $(-1, 1), \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$</p>

ANSWERS
TERM – 1 MATHS
CLASS: XII MATHEMATICS (041)
CHAPTER:2 INVERSE TRIGONOMETRIC FUNCTIONS

Q1	(c) $[0, \pi]$
Q2	(d) $[-\frac{\pi}{2}, \frac{\pi}{2}] - \{0\}$
Q3	(d) $\frac{-\pi}{10}$
Q4	(a) $[0, 1]$
Q 5	(a) $[1, 2]$
Q 6	(a) $\frac{\pi}{2}$
Q 7	(b) $\frac{5\pi}{6}$
Q 8	(c) $-1 < x \leq \frac{1}{\sqrt{2}}$
Q 9	(b) $\frac{5\pi}{6}$
Q10	(b) $\frac{\pi}{3}$
Q11	(a) $-\frac{\pi}{3}$
Q 12	(a) $\frac{5\pi}{6}$
Q13	(c) $-\frac{\pi}{6}$
Q14	(d) 1
Q15	(b) $3/5$
Q16	(d) $3/5$
Q 17	(c) $3/2$
Q 18	(d) $\frac{3\pi}{2}$
Q 19	(b) $\frac{2\pi}{3}$
Q 20	(a) $-\frac{\pi}{4}$
Q 21	(b) $-1/2$
Q 22	(d) $[-1, 1]$
Q 23	(a) 1
Q 24	(c) $-1 \leq x \leq \frac{1}{\sqrt{2}}$
Q 25	(a) $x > 1$
Q 26	(a) $-\frac{\sqrt{3}}{2}$
Q 27	(b) $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
Q 28	(d) $\pi - \frac{x}{2}$

Q 29	(d) $1/2$
Q 30	(c) $\frac{\pi}{2} - \frac{1}{2} \tan^{-1} x$
ANSWER TO CASE STUDY: 1	
Q 1	(a) $\frac{\pi}{6}$
Q 2	(c) $\frac{\pi}{4}$
Q 3	(c) $\frac{\pi}{6}$
Q 4	(c) $\frac{3\pi}{4}$
Q 5	(d) $\frac{5\pi}{4}$
ANSWER TO CASE STUDY: 2	
Q 1	(b) $\tan^{-1}\left(\frac{1}{2}\right)$
Q 2	(c) $\tan^{-1}\frac{4}{3}$
Q 3	(d) $\tan^{-1}\frac{11}{2}$
Q 4	(b) $\tan^{-1}\left(\frac{1}{8}\right)$
Q 5	(c) $R, \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$
ANSWER TO CASE STUDY: 3	
Q 1	(b) $\sin^{-1}\left(\frac{1}{2}\right)$
Q 2	(c) $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$
Q 3	(d) $\tan^{-1}\sqrt{3}$
Q 4	(c) $\frac{\pi}{2}$
Q 5	(c) $[-1, 1], [0, \pi]$