QUICK DRILL · CBSE CLASS 12

Inverse Trigonometric Functions

Mathematics · Chapter 2 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS	DURATION	MARKING	TARGET
_____	15	20 min	+1 / 0	⩾ 12/15

OBJECTIVES

Reinforce the four core topics of Inverse Trigonometric Functions via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS

Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**

SECTION · QUICK DRILL

Q 1–15 · 20 MIN

Q1. The principal value of $\sin^{-1}(1/2)$ is:

(A) $\pi/6$ **(B)** $\pi/3$
(C) $\pi/4$ **(D)** $5\pi/6$

PYQ 2018 · Delhi · 1m · ? 30s

Q2. $\cos^{-1}(-1/2)$ equals:

(A) $\pi/3$ **(B)** $2\pi/3$
(C) $-\pi/3$ **(D)** $5\pi/6$

PYQ 2019 · All India · 1m · ? 30s

Q3. $\tan^{-1}(-\sqrt{3})$ equals:

(A) $-\pi/3$ **(B)** $\pi/3$
(C) $2\pi/3$ **(D)** $-2\pi/3$

PYQ 2020 · Delhi · 1m · ? 30s

Q4. The value of $\sin^{-1}(\sin(7\pi/6))$ is:

(A) $7\pi/6$ **(B)** $-\pi/6$
(C) $\pi/6$ **(D)** $5\pi/6$

PYQ 2019 · Delhi · 2m · ? 60s

Q5. If $\sin^{-1} x + \cos^{-1} x = k$, then k equals:

(A) π **(B)** $\pi/2$
(C) $\pi/4$ **(D)** 0

PYQ 2022 · Delhi · 1m · ? 20s

Q6. $\tan^{-1}(1) + \tan^{-1}(2) + \tan^{-1}(3)$ equals:

(A) $\pi/2$ **(B)** π
(C) $3\pi/4$ **(D)** 0

PYQ 2024 · All India · 3m · ? 90s

Q7. The domain of $\sec^{-1} x$ is:

(A) $\mathbb{R}$ **(B)** $(-1, 1)$
(C) $[-1, 1]$ **(D)** $(-\infty, -1] \cup [1, \infty)$

PYQ 2020 · Delhi · 1m · ? 30s

Q8. The principal value of $\text{cosec}^{-1}(-1)$ is:

(A) $\pi/2$ **(B)** $-\pi/2$
(C) $-\pi/6$ **(D)** Not defined

PYQ 2023 · Delhi · 1m · ? 30s

Q9. The value of $2\tan^{-1}(1/3)$ equals:

(A) $\tan^{-1}(2/3)$ **(B)** $\tan^{-1}(3/4)$
(C) $\tan^{-1}(1/2)$ **(D)** $\pi/3$

PYQ 2020 · All India · 2m · ? 60s

Q10. $\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2)$ equals:

(A) $\pi/3$ **(B)** $-\pi/3$
(C) $2\pi/3$ **(D)** $-2\pi/3$

PYQ 2018 · Delhi · 2m · ? 60s

Q11. $\cos^{-1}(\cos(7\pi/6))$ equals:

(A) $7\pi/6$ **(B)** $5\pi/6$
(C) $-\pi/6$ **(D)** $\pi/6$

PYQ 2019 · All India · 2m · 60s

Q12. Range of $\cot^{-1} x$ is:

(A) $(-\pi/2, \pi/2)$ **(B)** $[0, \pi]$
(C) $(0, \pi)$ **(D)** $[-\pi/2, \pi/2]$

PYQ 2022 · All India · 1m · 20s

Q13. $\sin^{-1}(1/\sqrt{5}) + \sin^{-1}(2/\sqrt{5})$ equals:

(A) $\pi/2$ **(B)** $\pi/4$
(C) $\pi/3$ **(D)** π

PYQ 2020 · Delhi · 3m · 120s

Q14. If $\tan^{-1} x + \tan^{-1} y = \pi/4$, with $xy < 1$, then $x + y$ equals:

(A) $1 - xy$ **(B)** $1 + xy$
(C) $xy - 1$ **(D)** xy

PYQ 2023 · All India · 2m · 60s

Q15. The principal value of $\sin^{-1}(-1/2)$ is:

(A) $\pi/6$ **(B)** $-\pi/6$
(C) $5\pi/6$ **(D)** $-5\pi/6$

PYQ 2023 · Delhi · 1m · 20s

ANSWER KEY & EXPLANATIONS

Q 1–15 · MARK YOUR SCORE

Q1. Answer: A
$\sin(\pi/6) = 1/2$ and $\pi/6 \in [-\pi/2, \pi/2]$.

Q2. Answer: B
$\cos(2\pi/3) = -1/2$ and $2\pi/3 \in [0, \pi]$.

Q3. Answer: A
$\tan(-\pi/3) = -\sqrt{3}$ and $-\pi/3 \in (-\pi/2, \pi/2)$.

Q4. Answer: B
$7\pi/6 \notin [-\pi/2, \pi/2]$. $\sin(7\pi/6) = -1/2$. $\sin^{-1}(-1/2) = -\pi/6$.

Q5. Answer: B
Standard identity: $\sin^{-1} x + \cos^{-1} x = \pi/2$ for all $x \in [-1, 1]$.

Q6. Answer: B
$\tan^{-1}(1)=\pi/4$; $\tan^{-1}(2)+\tan^{-1}(3)$ with $xy=6>1$ (both positive) $= \pi + \tan^{-1}(-1) = 3\pi/4$. Sum $= \pi$.

Q7. Answer: D
$\sec^{-1} x$ is defined only when $|x| \geq 1$.

Q8. Answer: B
$\operatorname{cosec}(-\pi/2) = -1$ and $-\pi/2 \in [-\pi/2, \pi/2] - \{0\}$.

Q9. Answer: B
$2\tan^{-1} x = \tan^{-1}(2x/(1-x^2))$. With $x=1/3$: $2x = 2/3$, $1-x^2=8/9$. Ratio $= (2/3)/(8/9) = 3/4$.

Q10. Answer: B
$\tan^{-1}(\sqrt{3}) = \pi/3$; $\sec^{-1}(-2) = \pi - \sec^{-1}(2) = \pi - \pi/3 = 2\pi/3$. Difference $= \pi/3 - 2\pi/3 = -\pi/3$.

Q11. Answer: B
$7\pi/6 \notin [0, \pi]$. $\cos(7\pi/6) = -\sqrt{3}/2$. $\cos^{-1}(-\sqrt{3}/2) = 5\pi/6$.

Q12. Answer: C
$\cot^{-1}$ has principal range $(0, \pi)$ — both endpoints excluded (open interval).

Q13. Answer: A
$\sin(A+B) = (1/\sqrt{5})(1/\sqrt{5})+(2/\sqrt{5})(2/\sqrt{5}) = 1/5+4/5 = 1$, so $A+B=\pi/2$.

Q14. Answer: A
$\tan^{-1}((x+y)/(1-xy)) = \pi/4 \Rightarrow (x+y)/(1-xy) = 1 \Rightarrow x + y = 1 - xy$.

Q15. Answer: B
$\sin(-\pi/6) = -1/2$ and $-\pi/6 \in [-\pi/2, \pi/2]$.