

CHAPTER 2

INVERSE TRIGONOMETRIC FUNCTIONS

SAY 2018

1. a) If $\cos^{-1} \frac{12}{13} = \tan^{-1} x$, then find x . (1)

b) Show that $\cos^{-1} \frac{4}{5} + \cos^{-1} \frac{12}{13} = \tan^{-1} \frac{14}{33}$

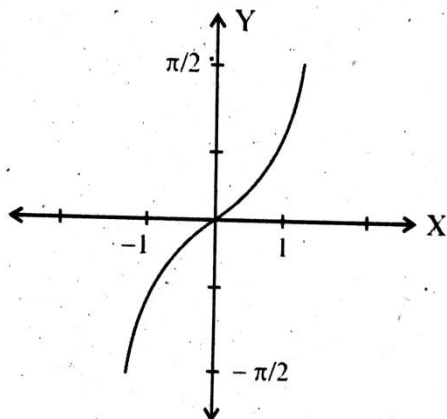
There was a mistake in the question.

Correct question is:

Show that $\cos^{-1} \frac{4}{5} + \cos^{-1} \frac{12}{13} = \tan^{-1} \frac{56}{33}$ (3)

MARCH 2018

2.



a) Identify the function from the above graph.

- i) $\tan^{-1} x$
- ii) $\sin^{-1} x$
- iii) $\cos^{-1} x$
- iv) $\operatorname{cosec}^{-1} x$ (1)

b) Find the domain and range of the function represented in above graph. (1)

c) Prove that $\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{2}{11} = \tan^{-1} \frac{3}{4}$ (2)

SAY 2017

3. a) The principal value of $\tan^{-1}(-\sqrt{3})$ is

- i) $\frac{\pi}{3}$
- ii) $\frac{-\pi}{3}$
- iii) $\frac{\pi}{4}$
- iv) $\frac{-\pi}{6}$ (1)

b) If $x \in \left(0, \frac{\pi}{2}\right)$, show that

$$\cot^{-1} \left(\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right) = \frac{x}{2} \quad (3)$$

MARCH 2017

4. a) The principal value of $\cot^{-1} \left(-\frac{1}{\sqrt{3}} \right)$ is

- i) $\frac{\pi}{3}$
- ii) $\frac{-\pi}{3}$
- iii) $\frac{\pi}{6}$
- iv) $\frac{2\pi}{3}$ (1)

b) Solve:

$$\tan^{-1} \left(\frac{x-1}{x-2} \right) + \tan^{-1} \left(\frac{x+1}{x+2} \right) = \frac{\pi}{4} \quad (3)$$

SAY 2016

5. a) The principal value of $\tan^{-1}(-\sqrt{3})$ is

- i) $\frac{\pi}{3}$
- ii) $\frac{-\pi}{3}$
- iii) $\frac{\pi}{4}$
- iv) $\frac{-\pi}{6}$ (1)

b) Show that $\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{2}{11} = \tan^{-1} \frac{3}{4}$ (3)

MARCH 2016

6. a) If $xy < 1$, $\tan^{-1} x + \tan^{-1} y = \dots\dots\dots$ (1)
 b) Prove that $2\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{1}{7} = \tan^{-1} \frac{31}{17}$ (3)

SAY 2015

7. a) What is the principal value of $\cos^{-1} \left(-\frac{1}{2} \right)$ (1)
 b) Express $\tan^{-1} \left(\frac{\sqrt{1+x^2}-1}{x} \right)$, $x \neq 0$ in the smallest form. (3)

MARCH 2015

8. (a) What is the value of $\sin^{-1}(\sin 160^\circ)$?
 (i) 160° (ii) 70°
 (iii) -20° (iv) 20° (1)
 (b) Prove that $2\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{1}{7} = \tan^{-1} \frac{31}{17}$ (3)

SAY 2014

9. a) The principal value of $\tan^{-1}(-1)$ is
 $\left(\frac{\pi}{4}, -\frac{\pi}{4}, \pi - \frac{\pi}{4}, \pi + \frac{\pi}{4} \right)$ (1)
 b) If $\tan^{-1} \left(\frac{x-1}{x-2} \right) + \tan^{-1} \left(\frac{x+1}{x+2} \right) = \frac{\pi}{4}$, then find the value of x. (3)

MARCH 2014

10. a) The principal value of $\cos^{-1} \left(-\frac{1}{2} \right)$ is (1)
 b) Write the function $\tan^{-1} \left(\frac{\cos x - \sin x}{\cos x + \sin x} \right)$, $0 < x < \pi$ in the simplest form. (3)

SAY 2013

11. a) Show that $\tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$ (2)
 b) Given that $\cot 3\theta = \frac{3\cot^2 \theta - 1}{\cot^3 \theta - 3\cot \theta}$, show that $\cot^{-1} \left(\frac{3x^2 - 1}{x^3 - 3x} \right)$, $|x| < \sqrt{3}$ is $3\cot^{-1} x$.

MARCH 2013

12. a) Find the principal value of $\sin^{-1} \left(\frac{1}{2} \right)$ (1)
 b) Show that $\sin^{-1} \left(\frac{3}{5} \right) - \sin^{-1} \left(\frac{8}{17} \right) = \cos^{-1} \left(\frac{84}{85} \right)$ (3)

2012 SAY

13. a) If $\sin \left(\sin^{-1} \frac{1}{5} + \cos^{-1} x \right) = 1$, write the value of x. (1)
 b) Write the simplest form of $\tan^{-1} \left(\frac{\cos x}{1 - \sin x} \right)$, $-\frac{\pi}{2} < x < \frac{3\pi}{2}$ (3)

2012 MARCH

14. a) The principal value of $\tan^{-1}(1)$ is (1)
 b) Express $\tan^{-1} \left(\frac{\sqrt{1+x^2}-1}{x} \right)$, $x \neq 0$ in the smallest form. (3)

SAY 2011

15. a) Given an expression for $\tan(x+y)$ (1)
 b) Prove that for $xy < 1$, $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \left(\frac{x+y}{1-xy} \right)$ (2)

c) Using the above result, prove that

$$\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right) = \frac{\pi}{4} \quad (2)$$

MARCH 2011

16. a) Find the principal value of $\cos^{-1}\left(-\frac{1}{2}\right)$ (1)

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

SAY 2010

17. Match the following:

A	B
a) $\sin^{-1} x + \cos^{-1} x, x \in [-1, 1]$	$\frac{\pi}{4}$
b) $\sin^{-1}\left(\sin \frac{4\pi}{5}\right)$	$\frac{5\pi}{6}$
c) $\cot^{-1}(-\sqrt{3})$	$\frac{\pi}{2}$
d) $\tan^{-1}\left(\frac{1-\sqrt{2}}{1-2\sqrt{2}}\right) + \tan^{-1}\left(\frac{1+\sqrt{2}}{1+2\sqrt{2}}\right)$	$\frac{\pi}{5}$

(4)



**Confidence and Hardwork
is the Best Medicine to Kill
the Disease called Failure .
It will Make You
Successful Person.....**