



MATHS

BOOKS - CENGAGE PUBLICATION

GRAPH OF INVERSE TRIGONOMETRIC FUNCTIONS

Illustration

1. Solve $\sin^{-1} x \leq \cos^{-1} x$ graphically. Check the differentiability of $f(x)$
 $= \min. \{ \sin^{-1} x \leq \cos^{-1} x \}$. Also find the range of $y = f(x)$

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2. Evaluate: $\left[(\lim)_{x \rightarrow 0} \frac{\tan^{-1} x}{x} \right]$, where $[.]$ represent the greatest integer function

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3. Find the values of a for which $\sin^{-1} x = |x - a|$ will have at least one solution.

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4. Draw the graph of $y = \sin^{-1} 2x$ and $y = \sin^{-1}(x/2)$ and compare with $y = \sin^{-1} x$.

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5. Draw the graphs of $y = \sin^{-1}\{x\}$, where $\{\cdot\}$ represent the fractional part function.

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6. Draw the graph of $y = \sin^{-1} x + \cos^{-1} x$.



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7. Draw the graph of $y = \sec^{-1} x + \operatorname{cosec}^{-1} x$



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8. Draw the graph of $y = \cos^2 x$.



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9. Draw the graph of $y = \sin^{-1} x^3$ and compare with the graph of $y = \sin^{-1} x$.



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10. Draw the graph of

$f(x) = [\tan^{-1} x]$, where $[\cdot]$ represents the greatest integer function.



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11. Draw the graph of $y = \sin^{-1}(\log_e x)$. Also find the point of inflection.



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12. Draw the graph of the function $y = f(x) = \tan^{-1}\left(\frac{1 - x^2}{1 + x^2}\right)$.



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13. Draw the graph of $y = \sin(\sin^{-1} x)$ or $y = \cos(\cos^{-1} x)$



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14. Draw the graph of $y = \tan(\tan^{-1} x)$ or $y = \cot(\cot^{-1} x)$



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15. Draw the graph of $y = \sin^{-1}(\sin x)$



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16. Draw the graph of $y = \cos^{-1}(\cos x)$.



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17. Let $f: [0, 4\pi] \rightarrow [0, \pi]$ be defined by $f(x) = \cos^{-1}(\cos x)$. The number of points $x \in [0, 4\pi]$ satisfying the equation $f(x) = \frac{10 - x}{10}$ is ____



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18. Draw the graph of $y = \tan^{-1}(\tan x)$



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19. Draw the graph of $y = \cot^{-1}(\cot x)$



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20. Draw in graph of $y = \operatorname{cosec}^{-1}(\operatorname{cosec} x)$.



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21. Draw the graph of $f(x) = \sec^{-1}(\sec x)$



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22. Find the area bounded by $y = \sin^{-1}(\sin x)$ and x-axis for x in $[0, 100\pi]$



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23. The sum of roots of the equation $\cos^{-1}(\cos x) = [x]$, $[.]$ denotes the greatest integer function, is $2\pi + 3$ (b) $\pi + 3$ (c) $\pi - 3$ (d) $2\pi - 3$

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24. Draw the graph of $f(x) = \sin^{-1}|\sin x| + \cos^{-1}(\cos x)$. Find the range of the function. Find the points of non-differentiability. Also find the value of $\int_0^{10\pi} [\sin^{-1}|\sin x| + \cos^{-1}(\cos x)] dx$

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25. Draw the graph of $y = 2x^2 - 1$ and hence the graph of $f(x) = \cos^{-1}(2x^2 - 1)$.

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26. Draw the graph of $y = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$



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27. Draw the graph of $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$



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28. Draw the graph of $y = \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$



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29. Draw the graph of

$y = \sin^{-1}|\sin x|$ and $y = (\sin^{-1}|\sin x|)^2, 0 \leq x \leq 2\pi$



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1. Draw the graph of $y = \tan^{-1} x - \cot^{-1} x$.



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2. Find the number of real solutions to the equation

$$3 \cos^{-1} x - \pi x - \frac{\pi}{2} = 0$$

A. A. 0

B. B. 1

C. C. 2

D. D. Infinite

Answer:



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3. Evaluate $\left[\lim_{x \rightarrow 0} \frac{\sin^{-1} x}{x} \right] = 1$, where $[\cdot]$ represents the greatest interger function.

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4. Solve $\tan^{-1} x > \cot^{-1} x$ graphically. Also find where $f(x) = \max. [\tan^{-1} x, \cot^{-1} x]$ is non-differentiable. Also find the range of $y = f(x)$.

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5. Match the columns.

Column I	Column II
(a) $\sin^{-1} x + x > 0$, for	(p) $x < 0$
(b) $\cos^{-1} x - x \geq 0$, for	(q) $x \in (0, 1]$
(c) $\tan^{-1} x + x < 0$ for	(r) $x \in [-1, 0)$
(d) $\cot^{-1} x + x > 0$, for	(s) $x > 0$

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6. Draw the graph of $y = \cos^{-1} \sqrt{\log_{[x]} \left(\frac{|x|}{x} \right)}$ where $[\cdot]$ represents the greatest integer function.



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7. Find the value of $\int_0^{100\pi} \sin^{-1}(\sin x) dx$.



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8. Draw the graph of $y = \sin^{-1}\left(\frac{1}{x}\right)$



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9. Draw the graph of $y = \sin^{-1}(x^2)$



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10. Draw the graph of $y = \cos^{-1} x^3$ and compare with the graph of $y = \cos^{-1} x$.



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11. Draw the graph of $y = \cos^{-1}(2^x)$.

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12. Draw the graph of $y = \cos^{-1}\{x\}$, where $\{ \cdot \}$ represents the fractional part function.

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13. If $\cos^{-1}(\cos x) = \frac{n-x}{n}$, $x \geq 0$, has seven roots, then find values of n .

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14. Draw the graph of $f(x) = [\cot^{-1} x]$, where $[\cdot]$ represents the greatest integer function.

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15. Draw the graph of $y = \operatorname{cosec}(\operatorname{cosec}^{-1} x)$ or $y = \sec(\sec^{-1} x)$.

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16. Draw the graph of $f(x) = \cot^{-1} \left(\frac{2 - |x|}{2 + |x|} \right)$.

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17. Draw the graph of $y = \sin^{-1} \left(2x \sqrt{1 - x^2} \right)$

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18. Draw the graph of $y = \frac{3x - x^3}{1 - 3x^2}$ and hence the graph of $y = \tan^{-1} \frac{3x - x^3}{1 - 3x^2}$.



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