MATHS

BOOKS - CENGAGE MATHS (HINGLISH)

GRAPH OF INVERSE TRIGONOMETRIC FUNCTIONS

Illustrations

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

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2. Evlute $\left[\lim t_{x \to 0} \dfrac{\tan^{-1} x}{x}\right]$, where $\left[\,\cdot\,\right]$ re[resemts the greatest integer function.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

23. Find the sum of roots the equation $\cos^{-1}(\cos x) = [x]$, $[\,\cdot\,]$ denotes the greatest integer funtions.

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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 $\displaystyle\int_{0}^{10\pi} \left[\sin^{-1}|\sin x| + \cos^{-1}(\cos x)\right] dx$

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

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

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

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

29. Draw the graph of

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

Exercise

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

2. Find the number of real solution to the equation $3\cos^{-1} x - \pi x - \dfrac{\pi}{2} = 0$

3. Evalute $\left[\lim\limits_{x \to 0} \dfrac{\sin^{-1} x}{x} \right] = 1,$ where $[\cdot]$ represets the greatest interger function.

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

5. Match the colums.

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) $x > 0$

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

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

8. Draw the graph of $y = \sin^{-1}\dfrac{1}{x}$

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

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

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

12. Draw the graph of

$y = \cos^{-1}\{x\},$ where $\{\cdot\}$ represetns the fractional part function.

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

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

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

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

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

18. Draw the graph of $y = \tan^{-1}\left(\dfrac{3x - x^3}{1 - 3x^2}\right)$.