MATHS

BOOKS - ACCURATE PUBLICATION

INVERSE TRIGONOMETRIC FUNCTIONS

Example

1. Find the value of $\tan\left(\sin^{-1}\dfrac{3}{5} + \cot^{-1}\dfrac{3}{2}\right)$

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2. Find the value of $\tan\left(\sin^{-1}\dfrac{3}{5} - \cot^{-1}\dfrac{3}{2}\right)$

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3. Find the value of

$$\tan\left(\cos^{-1}\frac{3}{5} - \cot^{-1}\frac{3}{2}\right)$$

4. Show that $\sin^{-1}\frac{3}{5} - \sin^{-1}\frac{8}{17} = \cos^{-1}\frac{84}{85}$

5. Prove that $\sin^{-1}\frac{3}{5} + \sin^{-1}\frac{8}{17} = \cos^{-1}\frac{36}{85}$

6. Prove that : $\sin^{-1}\frac{5}{13} + \sin^{-1}\frac{7}{25} = \cos^{-1}\frac{253}{325}$

7. Prove that : $\cos^{-1}\left(\dfrac{4}{5}\right) + \cos^{-1}\left(\dfrac{12}{13}\right) = \cos^{-1}\left(\dfrac{33}{65}\right)$

8. Prove that $\cos^{-1}\dfrac{12}{13} + \sin^{-1}\dfrac{3}{5} = \sin^{-1}\dfrac{56}{65}$

9. Prove that : $\sin^{-1}\left(\dfrac{5}{13}\right) + \cos^{-1}\left(\dfrac{3}{5}\right) = \tan^{-1}\left(\dfrac{63}{16}\right)$

10. Prove that : $\sin^{-1}\left(\dfrac{5}{13}\right) + \cos^{-1}\left(\dfrac{3}{5}\right) = \tan^{-1}\left(\dfrac{63}{16}\right)$

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11. Prove that $\cos^{-1}\left(\dfrac{12}{13}\right) + \sin^{-1}\left(\dfrac{1}{\sqrt{5}}\right) = \tan^{-1}\left(\dfrac{22}{19}\right)$

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12. Prove that : $\sin^{-1}\left(\dfrac{3}{5}\right) + \cos^{-1}\left(\dfrac{15}{17}\right) = \sin^{-1}\left(\dfrac{77}{85}\right)$

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13. Prove that

$\sin^{-1}\dfrac{5}{13} + \cos^{-1}\dfrac{3}{5} = \sin^{-1}\dfrac{63}{65}$

14. Prove that $\sin^{-1}\left(\dfrac{4}{5}\right) + \sin^{-1}\left(\dfrac{5}{13}\right) + \sin^{-1}\left(\dfrac{16}{65}\right) = \dfrac{\pi}{2}$

.

15. Write in the simplest form : `tan^-1 (sin x/(1 + cos x))`

16. Express $\tan^{-1}\left(\dfrac{\cos x}{1 - \sin x}\right)$, $-\dfrac{\pi}{2} < x < \dfrac{\pi}{2}$ in the simplest form.

17. Write the following in the simplest form :

$$\tan^{-1}\left(\frac{\cos x}{1+\sin x}\right), \quad -\frac{\pi}{2} < x < \frac{\pi}{2}$$

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18. Prove that $\tan^{-1}\left(\frac{\sqrt{1-x^2}}{1+x}\right) = \frac{1}{2}\cos^{-1}x$

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19. Prove that $\tan^{-1}\left(\frac{x}{1+\sqrt{1-x^2}}\right) = \frac{1}{2}\sin^{-1}x.$

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20. Write $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right), x \neq 0$ simplest form.

21. Show that :

$$\tan^{-1}\left[\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right] = \frac{\pi}{4} + \frac{1}{2}\cos^{-1}x^2.$$

22. Prove that : $\tan^{-1}\left[\dfrac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right] = \dfrac{\pi}{4} - \dfrac{1}{2}\cos^{-1}x$

23. ਸਿੱਧ ਕਰੋ :

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

24. Find the value of $\tan\left(\sin^{-1}\dfrac{3}{5} + \cot^{-1}\dfrac{3}{2}\right)$

25. Find the value of $\tan\left(\sin^{-1}\dfrac{3}{5} - \cot^{-1}\dfrac{3}{2}\right)$

26. Find the value of

$\tan\left(\cos^{-1}\dfrac{3}{5} - \cot^{-1}\dfrac{3}{2}\right)$

27. Show that $\sin^{-1}\dfrac{3}{5} - \sin^{-1}\dfrac{8}{17} = \cos^{-1}\dfrac{84}{85}$

28. Prove that : $\sin^{-1}\dfrac{3}{5} + \sin^{-1}\dfrac{8}{17} = \cos^{-1}\dfrac{36}{85}$.

29. Prove that : $\sin^{-1}\dfrac{5}{13} + \sin^{-1}\dfrac{7}{25} = \cos^{-1}\dfrac{253}{325}$

30. Show that $\cos^{-1}\dfrac{4}{5} + \cos^{-1}\dfrac{12}{13} = \cos^{-1}\dfrac{33}{65}$

31. Prove that $\cos^{-1}\dfrac{12}{13} + \sin^{-1}\dfrac{3}{5} = \sin^{-1}\dfrac{56}{65}$

32. Prove that : $\sin^{-1}\left(\dfrac{5}{13}\right) + \cos^{-1}\left(\dfrac{3}{5}\right) = \tan^{-1}\left(\dfrac{63}{16}\right)$

33. Prove that $\cos^{-1}\left(\dfrac{12}{13}\right) + \sin^{-1}\left(\dfrac{4}{5}\right) = \tan^{-1}\left(\dfrac{63}{16}\right)$.

34. Prove that $\cos^{-1}\left(\dfrac{12}{13}\right) + \sin^{-1}\left(\dfrac{1}{\sqrt{5}}\right) = \tan^{-1}\left(\dfrac{22}{19}\right)$

35. Prove that : $\sin^{-1}\left(\dfrac{3}{5}\right) + \cos^{-1}\left(\dfrac{15}{17}\right) = \sin^{-1}\left(\dfrac{77}{85}\right)$

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36. Prove that

$\sin^{-1}\dfrac{5}{13} + \cos^{-1}\dfrac{3}{5} = \sin^{-1}\dfrac{63}{65}$

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37. Prove that $\sin^{-1}\left(\dfrac{4}{5}\right) + \sin^{-1}\left(\dfrac{5}{13}\right) + \sin^{-1}\left(\dfrac{16}{65}\right) = \dfrac{\pi}{2}$

.

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38. Write in the simplest form : `tan^-1 (sin x/(1 + cos x))`

39. Express $\tan^{-1}\left(\dfrac{\cos x}{1 - \sin x}\right)$, $-\dfrac{\pi}{2} < x < \dfrac{\pi}{2}$ in the simplest form.

40. Write the following in the simplest form :

$$\tan^{-1}\left(\dfrac{\cos x}{1 + \sin x}\right), \quad -\dfrac{\pi}{2} < x < \dfrac{\pi}{2}$$

41. Prove that $\tan^{-1}\left(\dfrac{\sqrt{1 - x^2}}{1 + x}\right) = \dfrac{1}{2}\cos^{-1} x$

42. Prove that $\tan^{-1}\left(\dfrac{x}{1+\sqrt{1-x^2}}\right) = \dfrac{1}{2}\sin^{-1} x.$

43. Simplify: $\tan^{-1}\left(\dfrac{\sqrt{1+x^2}-1}{x}\right)$

44. Show that :

$$\tan^{-1}\left[\dfrac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right] = \dfrac{\pi}{4} + \dfrac{1}{2}\cos^{-1} x^2.$$

45. Prove that : $\tan^{-1}\left[\dfrac{\sqrt{1+z}+\sqrt{1-z}}{\sqrt{1+z}-\sqrt{1-z}}\right] = \dfrac{\pi}{4} + \dfrac{1}{2}\cos^{-1} z$

46. Prove that : $\tan^{-1}\left[\dfrac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right] = \dfrac{\pi}{4} - \dfrac{1}{2}\cos^{-1}x$

Questions Carrying 1 Mark Type I Multipe Choice Question

1. Domain of function $f(x) = \sin^{-1}(x)$ is equal to :

A. [0, 1]

B. R

C. [-1, 1]

D. None of these

Answer: C

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2. Domain of the function $f(x) = \tan^{-1} x$ is equal to :

A. $\left[0, \dfrac{\pi}{2}\right]$

B. $\left(0, \dfrac{\pi}{2}\right)$

C. $\left(-\dfrac{\pi}{2}, 0\right)$

D. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$

Answer: D

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3. Range of function $\sin^{-1} x$ is :

A. $[-1, 1]$

B. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$

C. $(-1, 1)$

D. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$

Answer: B

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4. If $\cos^{-I} x = y$, then :

A. $\dfrac{-\pi}{2} \le y \le \dfrac{\pi}{2}$

B. $0 < y < \pi$

C. $\dfrac{-\pi}{2} < y < \dfrac{\pi}{2}$

D. $0 \le y \le \pi$

Answer: D

5. If $\tan^{-1} x = y$, then

A. $\dfrac{-\pi}{2} \le y \le \dfrac{\pi}{2}$

B. $0 < y < \pi$

C. $\dfrac{-\pi}{2} < y < \dfrac{\pi}{2}$

D. $0 \le y \le \pi$

Answer: C

6. If $\sin^{-1} x = y$, then

A. $\dfrac{-\pi}{2} \le y \le \dfrac{\pi}{2}$

B. $0 < y < \pi$

C. $\dfrac{-\pi}{2} < y < \dfrac{\pi}{2}$

D. $0 \le y \le \pi$

Answer: A

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7. $\sin^{-1}\left(\dfrac{1}{2}\right)$ is equal to

A. 0

B. $\dfrac{\pi}{6}$

C. $\dfrac{\pi}{2}$

D. $\dfrac{\pi}{3}$

Answer: C

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8. $\sin^{-1}(1)$ is equal to :

A. 0

B. $\dfrac{\pi}{6}$

C. $\dfrac{\pi}{2}$

D. $\dfrac{\pi}{3}$

Answer: C

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9. Principal value of `sec^-1 (2/√3) is :

A. $\dfrac{5\pi}{6}$

B. $\dfrac{\pi}{6}$

C. $\dfrac{-\pi}{6}$

D. $\dfrac{-5\pi}{6}$

Answer: B

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10. Principal value of `cosec^-1 (2)` is :

A. $\dfrac{5\pi}{6}$

B. $\dfrac{\pi}{6}$

C. $\dfrac{-\pi}{6}$

D. $\dfrac{-5\pi}{6}$

Answer: B

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11. the principal value of $\sin^{-1}\left(-\dfrac{\sqrt{3}}{2}\right)$ is

A. $\dfrac{2\pi}{3}$

B. $\dfrac{\pi}{3}$

C. $\dfrac{-\pi}{3}$

D. $\dfrac{-2\pi}{3}$

Answer: C

12. $\tan^{-1}\left(\sqrt{3}\right) - \cos^{-1}\dfrac{1}{2}$ is equal to :

A. $\dfrac{\pi}{3}$

B. $\dfrac{2\pi}{3}$

C. 0

D. $\dfrac{\pi}{6}$

Answer: C

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13. $\tan^{-1}\left(\dfrac{1}{\sqrt{3}}\right) - \sin^{-1}\left(\dfrac{1}{2}\right)$ is equal to :

A. 0

B. $\dfrac{\pi}{3}$

C. $\dfrac{\pi}{4}$

D. $\dfrac{\pi}{6}$

Answer: A

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14. $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$ is equal to :

A. $\dfrac{\pi}{3}$

B. $-\dfrac{\pi}{3}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{2\pi}{3}$

Answer: B

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15. Find the value of $\tan^{-1}\left(\tan\dfrac{3\pi}{4}\right)$

A. $\dfrac{3\pi}{4}$

B. $\dfrac{\pi}{4}$

C. $-\dfrac{\pi}{4}$

D. $\dfrac{5\pi}{4}$

Answer: C

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16. $\cos^{-1}\left(\cos\dfrac{7\pi}{6}\right)$ is equal to

A. $\dfrac{\pi}{3}$

B. $\dfrac{\pi}{6}$

C. $\dfrac{2\pi}{3}$

D. $\dfrac{5\pi}{6}$

Answer: D

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17. Find the value of $\sin^{-1}\left(\sin\dfrac{2\pi}{3}\right)$

A. $\dfrac{2\pi}{3}$

B. $-\dfrac{2\pi}{3}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{4\pi}{3}$

Answer: C

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18. The Principle value of $\sin^{-1}\left(\sin\left(7\dfrac{\pi}{4}\right)\right)$ is :

A. $\dfrac{7\pi}{4}$

B. $\dfrac{3\pi}{4}$

C. $\dfrac{-3\pi}{4}$

D. $\dfrac{-\pi}{4}$

Answer: D

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19. Principal value of $\cos^{-1}\left(-\cos\left(2\dfrac{\pi}{3}\right)\right)$ is

A. $\dfrac{\pi}{3}$

B. $\dfrac{2\pi}{3}$

C. $\dfrac{\pi}{5}$

D. $\dfrac{2\pi}{5}$

Answer: C

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20. Principal value of $\cos^{-1}\left(-\cos\dfrac{4\pi}{5}\right)$ is :

A. $\dfrac{\pi}{3}$

B. $\dfrac{2\pi}{3}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{2\pi}{5}$

Answer: C

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21. $\tan^{-1}\sqrt{3} - \cot^{-1}(-\sqrt{3})$ is equal to

A. π

B. $-\dfrac{\pi}{2}$

C. 0

D. $2\sqrt{3}$

Answer: B

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22. $\tan^{-1}(1) - \cot^{-1}(-1)$ is equal to :

A. π

B. 0

C. 2

D. $-\dfrac{\pi}{2}$

Answer: D

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23. Which of the following corresponds to the principal value of $\tan^{-1}$?

A. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$

B. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$

C. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right) - \{0\}$

D. $(0, \pi)$

Answer: A

24. The principal value branch of $\sec^{-1}$ is

A. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right] - \{0\}$

B. $[0, \pi] - \left\{ \dfrac{\pi}{2} \right\}$

C. $(0, \pi)$

D. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right)$

Answer: B

25. One branch of $\cos^{-1}$ other than the principal value branch

corresponds to

A. $\left[\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right]$

B. $[\pi, 2\pi] - \left\{\dfrac{3\pi}{2}\right\}$

C. $(0, \pi)$

D. $[2\pi, 3\pi]$

Answer: D

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26. The value of $\sin^{-1}\left(\cos\dfrac{43\pi}{5}\right)$ is

A. $\dfrac{3\pi}{5}$

B. $-\dfrac{7\pi}{5}$

C. $\dfrac{\pi}{10}$

D. $-\dfrac{\pi}{10}$

Answer: D

27. The principal value of the expression $\cos^{-1}[\cos(-680°)]$ is

A. $\dfrac{2\pi}{9}$

B. $-\dfrac{2\pi}{9}$

C. $\dfrac{34\pi}{9}$

D. $\dfrac{\pi}{9}$

Answer: A

28. The value of $\cot(\sin^{-1}x)$ is

A. $\sqrt{1 + x^2} / x$

B. $\dfrac{x}{\sqrt{1 + x^2}}$

C. $\dfrac{1}{x}$

D. $\dfrac{\sqrt{1 - x^2}}{x}$

Answer: D

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29. The domain of $\sin^{-1} 2x$ is

A. [0,1]

B. [-1, 1]

C. $\left[-\dfrac{1}{2}, \dfrac{1}{2} \right]$

D. $\left[-2, 2 \right]$

Answer: C

---

30. the principal value of $\sin^{-1}\left(-\dfrac{\sqrt{3}}{2}\right)$ is

A. $-\dfrac{2\pi}{3}$

B. $-\dfrac{\pi}{3}$

C. $\dfrac{4\pi}{3}$

D. $\dfrac{5\pi}{3}$

Answer: B

31. Let $\theta = \left(\sin^{-1}\sin(-600^\circ)\right)$, then value of θ is

A. $\dfrac{\pi}{3}$

B. $\dfrac{\pi}{2}$

C. $\dfrac{2\pi}{3}$

D. $-\dfrac{2\pi}{3}$

Answer: A

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32. The domain of the function $y = \sin^{-1}\left(-x^2\right)$ is

A. $[0, 1]$

B. $(0, 1)$

C. $[-1, 1]$

D. ϕ

Answer: C

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33. The domain of $y = \cos^{-1}\left(x^2 - 4\right)$ is

A. $[3, 5]$

B. $[0, \pi]$

C. $\left[-\sqrt{5}, -\sqrt{3}\right] \cap \left[-\sqrt{5}, \sqrt{3}\right]$

D. $\left[-\sqrt{5}, -\sqrt{3}\right] \cup \left[\sqrt{3}, \sqrt{5}\right]$

Answer: D

34. The value of the expression $\sin\left[\cot^{-1}\left(\cos\left(\tan^{-1}1\right)\right)\right]$ is

A. 0

B. 1

C. $\dfrac{1}{\sqrt{3}}$

D. $\sqrt{\dfrac{2}{3}}$

Answer: D

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35. The value of $\tan^2\left(\sec^{-1}(2)\right) - \sec^2\left(\sec^{-1}(2)\right)$ is

A. -1

B. 1

C. 5

D. 15

Answer: B

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36. Which of the following is the principal value branch of $\cos^{-1} x$?

A. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right]$

B. $(0, \pi)$

C. $[0, \pi]$

D. $(0, \pi) - \left\{ \dfrac{\pi}{2} \right\}$

Answer: C

37. Which of the following is the principal value branch of $\cos ec^{-1} x$?

A. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right)$

B. $[0, \pi] - \left\{ \dfrac{\pi}{2} \right\}$

C. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right]$

D. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right] - \{0\}$

Answer: D

38. The value of $\sin^{-1} \left(\cos \left(\dfrac{33\pi}{5} \right) \right)$ is

A. $\dfrac{3\pi}{5}$

B. $-\dfrac{7\pi}{5}$

C. $\dfrac{\pi}{10}$

D. $-\dfrac{\pi}{10}$

Answer: D

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39. The domain of the function $\cos^{-1}(2x - 1)$ is

A. [0, 1]

B. [-1, 1]

C. (-1, 1)

D. $[0, \pi]$

Answer: A

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40. The domain of the function defined by $f(x) = \sin^{-1}\sqrt{x-1}$ is

A. $[1, 2]$

B. $[-1, 1]$

C. $[0, 1]$

D. none of these

Answer: A

41. If $\cos\left(\sin^{-1}\dfrac{3}{5} + \cos^{-1}x\right) = 0$, then x is equal to

A. $\dfrac{1}{5}$

B. $\dfrac{3}{5}$

C. 0

D. 1

Answer: B

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42. The value of $\cos^{-1}\left(\cos\dfrac{3\pi}{2}\right)$ is equal to

A. $\dfrac{\pi}{2}$

B. $\dfrac{3\pi}{2}$

C. $\dfrac{5\pi}{2}$

D. $\dfrac{7\pi}{2}$

Answer: A

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43. The value of expression $2\sec^{-1}2 + \sin^{-1}\left(\dfrac{1}{2}\right)$ is

A. $\dfrac{\pi}{6}$

B. $\dfrac{5\pi}{6}$

C. $\dfrac{7\pi}{6}$

D. 1

Answer: B

44. The value of $\cot\left[\cos^{-1}\left(\dfrac{7}{25}\right)\right]$ is

A. $\dfrac{25}{24}$

B. $\dfrac{25}{7}$

C. $\dfrac{24}{25}$

D. $\dfrac{7}{24}$

Answer: D

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45. The value of the expression $\tan\left(\dfrac{1}{2}\cos^{-1}\dfrac{2}{\sqrt{5}}\right)$ is

A. $2 + \sqrt{5}$

B. $\sqrt{5} - 2$

C. $\dfrac{\sqrt{5} + 2}{2}$

D. $5 + \sqrt{2}$

Answer: B

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46. Domain of function $f(x) = \sin^{-1}(x)$ is equal to :

A. [0, 1]

B. R

C. [-1, 1]

D. None of these

Answer: C

47. Range of function $\tan^{-1} x$ is :

A. $\left[0, \dfrac{\pi}{2}\right]$

B. $\left(0, \dfrac{\pi}{2}\right)$

C. $\left(-\dfrac{\pi}{2}, 0\right)$

D. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$

Answer: D

48. Range of function $\sin^{-1} x$ is :

A. $\left[-1, 1\right]$

B. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right]$

C. $(-1, 1)$

D. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right)$

Answer: B

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49. If $\cos^{-I} x = y$, then :

A. $\dfrac{-\pi}{2} \le y \le \dfrac{\pi}{2}$

B. $0 < y < \pi$

C. $\dfrac{-\pi}{2} < y < \dfrac{\pi}{2}$

D. $0 \le y \le \pi$

Answer: D

50. If $\tan^{-1} x = y$, then

A. $\dfrac{-\pi}{2} \le y \le \dfrac{\pi}{2}$

B. $0 < y < \pi$

C. $\dfrac{-\pi}{2} < y < \dfrac{\pi}{2}$

D. $0 \le y \le \pi$

Answer: C

51. If $\sin^{-1} x = y$, then

A. $\dfrac{-\pi}{2} \le y \le \dfrac{\pi}{2}$

B. $0 < y < \pi$

C. $\dfrac{-\pi}{2} < y < \dfrac{\pi}{2}$

D. $0 \le y \le \pi$

Answer: A

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52. $\sin^{-1}\left(\dfrac{1}{2}\right)$ is equal to

A. 0

B. $\dfrac{\pi}{6}$

C. $\dfrac{\pi}{2}$

D. $\dfrac{\pi}{3}$

Answer: C

53. $\sin^{-1}(1)$ is equal to :

A. 0

B. $\dfrac{\pi}{6}$

C. $\dfrac{\pi}{2}$

D. $\dfrac{\pi}{3}$

Answer: C

54. Principal value of `sec^-1 (2/√3) is :

A. $\dfrac{5\pi}{6}$

B. $\dfrac{\pi}{6}$

C. $\dfrac{-\pi}{6}$

D. $\dfrac{-5\pi}{6}$

Answer: B

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55. Principal value of `cosec^-1 (2) is :

A. $\dfrac{5\pi}{6}$

B. $\dfrac{\pi}{6}$

C. $\dfrac{-\pi}{6}$

D. $\dfrac{-5\pi}{6}$

Answer: B

56. the principal value of $\sin^{-1}\left(-\dfrac{\sqrt{3}}{2}\right)$ is

A. $\dfrac{2\pi}{3}$

B. $\dfrac{\pi}{3}$

C. $\dfrac{-\pi}{3}$

D. $\dfrac{-2\pi}{3}$

Answer: C

57. $\tan^{-1}\left(\sqrt{3}\right) - \cos^{-1}\left(\dfrac{1}{2}\right)$ is equal to :

A. $\dfrac{\pi}{3}$

B. $\dfrac{2\pi}{3}$

C. 0

D. $\dfrac{\pi}{6}$

Answer: C

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58. $\tan^{-1}\left(\dfrac{1}{\sqrt{3}}\right) - \sin^{-1}\left(\dfrac{1}{2}\right)$ is equal to :

A. 0

B. $\dfrac{\pi}{3}$

C. $\dfrac{\pi}{4}$

D. $\dfrac{\pi}{6}$

Answer: A

---

59. $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$ is equal to $-\dfrac{\pi}{3}$.

A. $\dfrac{\pi}{3}$

B. $-\dfrac{\pi}{3}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{2\pi}{3}$

Answer: B

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60. Find the value of $\tan^{-1}\left(\tan\dfrac{3\pi}{4}\right)$

A. $\dfrac{3\pi}{4}$

B. $\dfrac{\pi}{4}$

C. $-\dfrac{\pi}{4}$

D. $\dfrac{5\pi}{4}$

Answer: C

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61. $\cos^{-1}\left(\cos\dfrac{7\pi}{6}\right)$ is equal to

A. $\dfrac{\pi}{3}$

B. $\dfrac{\pi}{6}$

C. $\dfrac{2\pi}{3}$

D. $\dfrac{5\pi}{6}$

Answer: D

62. Find the value of $\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$

A. $\dfrac{2\pi}{3}$

B. $-\dfrac{2\pi}{3}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{4\pi}{3}$

Answer: C

63. The Principle value of $\sin^{-1}\left(\sin\left(7\frac{\pi}{4}\right)\right)$ is :

A. $\dfrac{7\pi}{4}$

B. $\dfrac{3\pi}{4}$

C. $\dfrac{-3\pi}{4}$

D. $\dfrac{-\pi}{4}$

Answer: D

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64. Principal value of $\cos^{-1}\left(-\cos\left(2\dfrac{\pi}{3}\right)\right)$ is

A. $\dfrac{\pi}{3}$

B. $\dfrac{2\pi}{3}$

C. $\dfrac{\pi}{5}$

D. $\dfrac{2\pi}{5}$

Answer: C

---

65. Principal value of $\cos^{-1}\left(-\cos\dfrac{4\pi}{5}\right)$ is :

A. $\dfrac{\pi}{3}$

B. $\dfrac{2\pi}{3}$

C. $\dfrac{\pi}{3}$

D. $\dfrac{2\pi}{5}$

Answer: C

---

66. $\tan^{-1}\sqrt{3} - \cot^{-1}\left(-\sqrt{3}\right)$ is equal to

A. π

B. $-\dfrac{\pi}{2}$

C. 0

D. $2\sqrt{3}$

Answer: B

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67. $\tan^{-1}(1) - \cot^{-1}(1)$ is equal to ......

A. π

B. 0

C. 2

D. $-\dfrac{\pi}{2}$

Answer: D

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68. Which of the following corresponds to the principal value of $\tan^{-1}$?

A. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right)$

B. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right]$

C. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right) - \{0\}$

D. $(0, \pi)$

Answer: A

69. The principal value branch of $\sec^{-1}$ is

A. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right] - \{0\}$

B. $[0, \pi] - \left\{\dfrac{\pi}{2}\right\}$

C. $(0, \pi)$

D. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$

Answer: B

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70. One branch of $\cos^{-1}$ other than the principal value branch

corresponds to

A. $\left[\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right]$

B. $[\pi, 2\pi] - \left\{\dfrac{3\pi}{2}\right\}$

C. $(0, \pi)$

D. $[2\pi, 3\pi]$

Answer: D

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71. The value of $\sin^{-1}\left(\cos \dfrac{43\pi}{5}\right)$ is

A. $\dfrac{3\pi}{5}$

B. $-\dfrac{7\pi}{5}$

C. $\dfrac{\pi}{10}$

D. $-\dfrac{\pi}{10}$

Answer: D

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72. The principal value of the expression $\cos^{-1}[\cos(-680°)]$ is

A. $\dfrac{2\pi}{9}$

B. $-\dfrac{2\pi}{9}$

C. $\dfrac{34\pi}{9}$

D. $\dfrac{\pi}{9}$

Answer: A

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73. The value of $\cot(\sin^{-1} x)$ is

A. $\sqrt{1+x^2}/x$

B. $\dfrac{x}{\sqrt{1+x^2}}$

C. $\dfrac{1}{x}$

D. $\dfrac{\sqrt{1-x^2}}{x}$

Answer: D

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74. The domain of $\sin^{-1} 2x$ is

A. $[0, 1]$

B. $[-1, 1]$

C. $\left[-\dfrac{1}{2}, \dfrac{1}{2} \right]$

D. $[-2, 2]$

Answer: C

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75. the principal value of $\sin^{-1}\left(-\dfrac{\sqrt{3}}{2}\right)$ is

A. $-\dfrac{2\pi}{3}$

B. $-\dfrac{\pi}{3}$

C. $\dfrac{4\pi}{3}$

D. $\dfrac{5\pi}{3}$

Answer: B

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76. Let $\theta = \left(\sin^{-1}\sin(-600°)\right)$, then value of θ is

A. $\dfrac{\pi}{3}$

B. $\dfrac{\pi}{2}$

C. $\dfrac{2\pi}{3}$

D. $-\dfrac{2\pi}{3}$

Answer: A

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77. The domain of the function $y = \sin^{-1}\left(-x^2\right)$ is

A. $[0, 1]$

B. $(0, 1)$

C. $[-1, 1]$

D. ϕ

Answer: C

78. The domain of $y = \cos^{-1}(x^2 - 4)$ is

   A. $[3, 5]$

   B. $[0, \pi]$

   C. $\left[-\sqrt{5}, -\sqrt{3}\right] \cap \left[-\sqrt{5}, \sqrt{3}\right]$

   D. $\left[-\sqrt{5}, -\sqrt{3}\right] \cup \left[\sqrt{3}, \sqrt{5}\right]$

Answer: D

79. The value of the expression $\sin\left[\cot^{-1}\left(\cos\left(\tan^{-1} 1\right)\right)\right]$ is

   A. 0

B. 1

C. $\dfrac{1}{\sqrt{3}}$

D. $\sqrt{\dfrac{2}{3}}$

Answer: D

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80. The value of $\tan^2\left(\sec^{-1} 2\right) + \cot^2\left(\operatorname{cosec}^{-1} \dfrac{2}{\sqrt{3}}\right)$ is

A. 5

B. 11

C. 13

D. 15

Answer: B

81. Which of the following is the principal value branch of $\cos^{-1} x$?

A. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right]$

B. $(0, \pi)$

C. $[0, \pi]$

D. $(0, \pi) - \left\{ \dfrac{\pi}{2} \right\}$

Answer: C

82. Which of the following is the principal value branch of $\cos ec^{-1}x$?

A. $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right)$

B. $[0, \pi] - \left\{ \dfrac{\pi}{2} \right\}$

C. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right]$

D. $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2} \right] - \{0\}$

Answer: D

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83. The value of $\sin^{-1} \left(\cos \left(\dfrac{33\pi}{5} \right) \right)$ is

A. $\dfrac{3\pi}{5}$

B. $-\dfrac{7\pi}{5}$

C. $\dfrac{\pi}{10}$

D. $-\dfrac{\pi}{10}$

Answer: D

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84. The domain of the function $\cos^{-1}(2x - 1)$ is

A. [0, 1]

B. [-1, 1]

C. (-1, 1)

D. $[0, \pi]$

Answer: A

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85. The domain of the function defined by $f(x) = \sin^{-1}\sqrt{x-1}$ is

A. $[1, 2]$

B. $[-1, 1]$

C. $[0, 1]$

D. none of these

Answer: A

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86. If $\cos\left(\sin^{-1}\dfrac{3}{5} + \cos^{-1}x\right) = 0$, then x is equal to

A. $\dfrac{1}{5}$

B. $\dfrac{2}{5}$

C. 0

D. 1

Answer: B

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87. The value of $\cos^{-1}\left(\cos\dfrac{3\pi}{2}\right)$ is equal to

A. $\dfrac{\pi}{2}$

B. $\dfrac{3\pi}{2}$

C. $\dfrac{5\pi}{2}$

D. $\dfrac{7\pi}{2}$

Answer: A

88. The value of expression $2 \sec^{-1} 2 + \sin^{-1}\left(\dfrac{1}{2}\right)$ is

A. $\dfrac{\pi}{6}$

B. $\dfrac{5\pi}{6}$

C. $\dfrac{7\pi}{6}$

D. 1

Answer: B

89. The value of $\cot\left[\cos^{-1}\left(\dfrac{7}{25}\right)\right]$ is

A. $\dfrac{25}{24}$

B. $\dfrac{25}{7}$

C. $\dfrac{24}{25}$

D. $\dfrac{7}{24}$

Answer: D

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90. The value of the expression $\tan\left(\dfrac{1}{2}\cos^{-1}\dfrac{2}{\sqrt{5}}\right)$ is

A. $2 + \sqrt{5}$

B. $\sqrt{5} - 2$

C. $\dfrac{\sqrt{5} + 2}{2}$

D. $5 + \sqrt{2}$

Answer: B

Questions Carrying 1 Mark Type Ii Fill In The Blanks Questions

1. Domain of function $f(x) = \cos^{-1} 2x$ is equal to ....

2. Range of function $\cos^{-1} 2x$ is ......

3. Range of function $\tan^{-1} 2x$ is ....

4. $\sin^{-1}(-1)$ is equal to ......

5. Principal value of $\sin^{-1}\left(\dfrac{1}{\sqrt{2}}\right)$ is ......

6. Principal value of $\cos^1\left(\dfrac{1}{2}\right)$ is ......

7. $\tan^{-1}(1) - \cos^{-1}\left(\dfrac{1}{2}\right)$ is)equal to ....

8. $\cos^{-1}\left(\sin\dfrac{5\pi}{6}\right)$ equals ....

9. $\cos^{-1}\left(\cos\dfrac{10\pi}{6}\right)$ equals ......

10. The value of $\cos^{-1}\left(\cos\dfrac{13\pi}{6}\right)$ is ......

11. The principal value of $\sin^{-1}\left(\sin\dfrac{2\pi}{3}\right)$ is ....

12. The principal value of $\sin^{-1}\left(\sin\dfrac{\pi}{4}\right)$ is ....

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13. Principal value of $\cos^{-1}\left(\cos\dfrac{3\pi}{5}\right)$ is ......

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14. $\sin\left[\dfrac{\pi}{3} - \sin^{-1}\left(-\dfrac{1}{2}\right)\right]$ is equal to ....

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15. Principal vlaue of $\sin^{-1}\left(\dfrac{1}{2}\right) + \cos^{-1}\left(\dfrac{1}{2}\right)$ is ....

16. $\tan^{-1}(1) - \cot^{-1}(1)$ is equal to ......

17. $\sin\left(\tan^{-1} 2x\right)$, $|2x| < 1$ is equal to ....

18. The principal value of $\cos^{-1}\left(\dfrac{1}{\sqrt{2}}\right)$ is ....

19. The value of $\sin^{-1}\left(\sin\dfrac{4\pi}{5}\right)$ is ....

20. The set of values of $\sec^{-1}\left(\sqrt{2}\right)$ is ....

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

22. The value of $\cos^{-1}\left(\cos\dfrac{14\pi}{3}\right)$ is ....

23. Domain of the function $f(x) = \cos^{-1}x$ is equal to :

24. Range of function $\cos^{-1} x$ is :

25. Range of function $\tan^{-1} x$ is :

26. $\sin^{-1}(0)$ is equal to :

27. The principal value of $\sin^{-1}\left(-\dfrac{1}{2}\right)$ is

28. Principal value of `cos^-1 (-1/2) is :

29. $\tan^{-1}(1) - \cos^{-1}\left(\dfrac{1}{\sqrt{2}}\right)$ is equal to :

30. $\cos^{-1}\left(\sin 7\dfrac{\pi}{6}\right)$ equals :

31. $\cos^{-1}\left(\cos 11\dfrac{\pi}{6}\right)$ equals :

32. The value of $\cos^{-1}\left(\cos\dfrac{13\pi}{6}\right)$ is ......

33. The principal value of $\sin^{-1}\left(\sin\dfrac{2\pi}{3}\right)$ is ....

34. The Principle value of $\sin^{-1}\left(\sin\left(3\dfrac{\pi}{4}\right)\right)$ is :

35. Principal value of $\cos^{-1}\left(-\cos\left(3\dfrac{\pi}{5}\right)\right)$ is

36. $\sin\left[\dfrac{\pi}{3} - \sin^{-1}\left(-\dfrac{1}{2}\right)\right]$ is equal to ....

37. Principal value of $\sin^{-1}\left(-\dfrac{1}{2}\right) + \cos^{-1}\left(-\dfrac{1}{2}\right)$ is (a)$\dfrac{\pi}{2}$ (b)$-\dfrac{\pi}{2}$ (c)$\dfrac{3\pi}{2}$ (d)none of these

38. $\tan^{-1}\left(\dfrac{1}{\sqrt{3}}\right) - \cot^{-1}\left(-\dfrac{1}{\sqrt{3}}\right)$ is equal to :

39. Choose the correct option in the question :

$\sin\left(\tan^{-1}x\right), |x| < 1$ is equal to

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40. Principal value of `cos^-1 (-1/2)` is :

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41. The value of $\sin^{-1}\left(\sin\dfrac{3\pi}{5}\right)$ is ....

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42. The set of values of $\sec^{-1}\left(\sqrt{2}\right)$ is ....

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

44. The value of $\cos^{-1}\left(\cos\dfrac{14\pi}{3}\right)$ is ....

Questions Carrying 1 Mark Type Iii True Or False Questions

1. All trigonometric functions have inverse over their respective domains.

2. The value of the expressions $\left(\cos^{-1} x\right)^2$ is equal to $\sec^2 x$.

A. True

B. False

C.

D.

Answer:

3. The domain of trigonometric functions can be restricted to any one of their branch (not necessarily principal value) in order to obtain their inverse functions.

A. True

B. False

C.

D.

Answer: 1

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4. The least numerical value, either positive or negative of angle θ is called principal value of the inverse trigonometric function.

A. True

B. False

C.

D.

Answer: 1

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5. The graph of inverse trigonometric function can be obtained from the graph of their corresponding trigonometric function by interchanging x and y axes.

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6. The minimum value of n for which $\tan^{-1}\dfrac{n}{\pi} < \dfrac{\pi}{4}$, $n \in N$, is valid is 5.

7. The principal value of $\sin^{-1}\left[\cos\left(\sin^{-1}\dfrac{1}{2}\right)\right]$ is $\dfrac{\pi}{3}$.

8. Whether the given statement is true or not ..... $\sin^{-1}x = (\sin x)^{-1}$.

9. The value of an inverse trigonometric function, which lies in range of principal branch is called the principal value of that inverse trigonometric functions.

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10. The principal value of $\sec^{-1}(-2)$ is $\dfrac{2\pi}{3}$.

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11. $\tan^{-1}\left[\sin\left(-\dfrac{\pi}{2}\right)\right] = \dfrac{\pi}{4}$.

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12. If $\sin^{-1}x = y$, then $-\dfrac{\pi}{2} < y < \dfrac{\pi}{2}$.

13. $2 \tan^{-1} x = \sin^{-1} \dfrac{2x}{1 + x^2}, \ |x| \leq 1.$

14. $\sin^{-1}\left(\sin \dfrac{3\pi}{5} \right) = \dfrac{2\pi}{5}.$

15. $\cos^{-1}\left(\cos \dfrac{13\pi}{6} \right) = \dfrac{\pi}{4}.$

16. All trigonometric functions have inverse over their respective domains.

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17. The value of the expressions $\left(\cos^{-1} x\right)^2$ is equal to $\sec^2 x$.

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18. The domain of trigonometric functions can be restricted to any one of their branch (not necessarily principal value) in order to obtain their inverse functions.

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19. The least numerical value, either positive or negative of angle θ is called principal value of the inverse trigonometric function.

20. The graph of inverse trigonometric function can be obtained from the graph of their corresponding trigonometric function by interchanging x and y axes.

21. The minimum value of n for which $\tan^{-1}\dfrac{n}{\pi} < \dfrac{\pi}{4}, n \in N$, is valid is 5.

22. Show that: The principal value of $\sin^{-1}\left[\cos\left(\sin^{-1}\dfrac{1}{2}\right)\right]$ is $\dfrac{\pi}{3}$.

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23. Whether the given statement is true or not .....
$\sin^{-1}x = (\sin x)^{-1}$.

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24. The value of an inverse trigonometric function, which lies in range of principal branch is called the principal value of that inverse trigonometric functions.

> ▶ Watch Video Solution

25. The principal value of $\sec^{-1}(-2)$ is $\dfrac{2\pi}{3}$.

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26. $\tan^{-1}\left[\sin\left(-\dfrac{\pi}{2}\right)\right] = \dfrac{\pi}{4}$.

> ▶ Watch Video Solution

27. If $\sin^{-1} x = y,$ then $-\dfrac{\pi}{2} < y < \dfrac{\pi}{2}$.

> ▶ Watch Video Solution

28. $2\tan^{-1} x = \sin^{-1}\dfrac{2x}{1+x^2},\ |x| \leq 1.$

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29. $\sin^{-1}\left(\sin\dfrac{3\pi}{5}\right) = \dfrac{2\pi}{5}$.

30. $\cos^{-1}\left(\cos\dfrac{13\pi}{6}\right) = \dfrac{\pi}{4}$.

Questions Carrying 4 Marks

1. Write the value of $\tan^{-1}\left[2\sin\left(2\cos^{-1}\dfrac{\sqrt{3}}{2}\right)\right]$.

2. Write the principle value of $\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right)$.

3. Find the value of the following :

$\tan^{-1}(1) + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(\frac{1}{2}\right)$

4. Find the value of the following :

$\cos^{-1}\left(\frac{1}{2}\right) + 2\sin^{-1}\left(\frac{1}{2}\right)$

5. Find the value of the following :

$$\cos^{-1}\left(\frac{1}{2}\right) - 2\sin^{-1}\left(\frac{1}{2}\right)$$

6. Write the value of $\cos^{-1}\left(-\frac{1}{2}\right) + 2\sin^{-1}\left(\frac{1}{2}\right)$

7. Prove that $\cos\left(\tan^{-1}\left(\sin\left(\cot^{-1}x\right)\right)\right) = \sqrt{\dfrac{x^2 + 1}{x^2 + 2}}$

8. If $\sin\left[\cot^{-1}(x + 1)\right] = \cos\left(\tan^{-1}x\right)$, then find x.

9. Solve the following equation $\cos\left(\tan^{-1} x\right) = \sin\left(\cot^{-1}\dfrac{3}{4}\right)$

.

10. Solve the following equations :

(i) $2\tan^{-1}(\cos(2x)) = \tan^{-1}(2\cos ec(2x))$

11. Prove that : $\sin^{-1}\dfrac{8}{17} + \sin^{-1}\dfrac{3}{5} = \sin^{-1}\dfrac{77}{85} = \tan^{-1}\dfrac{77}{36}$.

12. Prove that : $\sin^{-1}\dfrac{3}{5} + \sin^{-1}\dfrac{8}{17} = \cos^{-1}\dfrac{36}{85}$.

13. Write the value of $\tan^{-1}\left[2\sin\left(2\cos^{-1}\dfrac{\sqrt{3}}{2}\right)\right]$.

14. Write the principle value of $\tan^{-1}(1) + \cos^{-1}\left(-\dfrac{1}{2}\right)$.

15. Find the value of the following :

$\tan^{-1}(1) + \cos^{-1}\left(-\dfrac{1}{2}\right) + \sin^{-1}\left(\dfrac{1}{2}\right)$

16. Find the value of the following :

$$\cos^{-1}\left(\frac{1}{2}\right) + 2\sin^{-1}\left(\frac{1}{2}\right)$$

17. Find the value of the following :

$$\cos^{-1}\left(\frac{1}{2}\right) - 2\sin^{-1}\left(\frac{1}{2}\right)$$

18. Write the value of $\cos^{-1}\left(-\frac{1}{2}\right) + 2\sin^{-1}\left(\frac{1}{2}\right)$

19. Prove the following:

$$\cos\left[\tan^{-1}\{\sin(\cot^{-1}x)\}\right] = \sqrt{\frac{1+x^2}{2+x^2}}$$

20. If $\sin\left[\cot^{-1}(x+1)\right] = \cos(\tan^{-1}x)$, then find x.

21. Solve the following equation

$$\cos(\tan^{-1}x) = \sin\left(\cot^{-1}\frac{3}{4}\right).$$

22. Solve the following equations :

(i) $2 \tan^{-1}(\cos(2x)) = \tan^{-1}(2 \cos ec(2x))$

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23. Prove that : $\sin^{-1} \dfrac{8}{17} + \sin^{-1} \dfrac{3}{5} = \sin^{-1} \dfrac{77}{85} = \tan^{-1} \dfrac{77}{36}$

.

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24. Prove that : $\sin^{-1} \dfrac{3}{5} + \sin^{-1} \dfrac{8}{17} = \cos^{-1} \dfrac{36}{85}.$

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25. Prove that

$$\cos^{-1} \frac{12}{13} + \cos^{-1} \frac{4}{3} = \tan^{-1} \frac{56}{33}$$

26. Prove that :

$$2\tan^{-1}\left(\sqrt{\frac{a-b}{a+b}} \tan \frac{x}{2}\right) = \cos^{-1}\left(\frac{a\cos x + b}{a + b\cos x}\right).$$

27. Prove that

$$\tan^{-1} x + \tan^{-1} \frac{2x}{1 - x^2} = \tan^{-1}\left(\frac{3x - x^3}{1 - 3x^2}\right), |x| < \frac{1}{\sqrt{3}}$$