CBSE CLASS 12 MATHS MCQ'S & CASE STUDY

Ch.2 : INVERSE TRIGONOMETRY

Multiple Choice Questions

1) If $\sin^{-1}x + \sin^{-1}y = \frac{\pi}{2}$, then the value of $\cos^{-1}x + \cos^{-1}y$ is

(a) $\frac{\pi}{2}$

(b) 0

(c) π

(d) $\frac{2\pi}{3}$

View Explanation

2) The number of solutions of the equation $\sin^{-1}x - \cos^{-1}x = \sin^{-1}\left(\frac{1}{2}\right)$ is

(a) 2

(b) 1

(c) 3

(d) Infinite

View Explanation

3) $\cot^{-1}\left(\frac{ab+1}{a-b}\right) + \cot^{-1}\left(\frac{bc+1}{b-c}\right) + \cot^{-1}\left(\frac{ca+1}{c-a}\right)$

(a) 0

(b) None of these

(c) -1

(d) 1

View Explanation

4) Let $\theta = \sin^{-1}(\sin(-600°))$, then the value of θ is

(a) $\frac{-2\pi}{3}$

(b) $\frac{2\pi}{3}$

(c) $\frac{\pi}{2}$

(d) $\frac{\pi}{3}$

View Explanation

5) The principal value branch of $\sec^{-1}$ is

(a) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

(b) $[0, \pi] - \left\{\frac{\pi}{2}\right\}$

(c) $(0,\pi)$

(d) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right] - \{0\}$

View Explanation

6) $4\tan^{-1}\left(\frac{1}{5}\right) - \tan^{-1}\left(\frac{1}{239}\right) =$

(a) $\frac{\pi}{4}$

(b) π

(c) $\frac{\pi}{2}$

(d) $\frac{\pi}{3}$

View Explanation

7) The value of $\tan\left(cos^{-1}\frac{3}{5} + tan^{-1}\frac{1}{4}\right)$

(a) $\frac{19}{12}$

(b) $\frac{8}{19}$

(c) $\frac{19}{8}$

(d) $\frac{3}{4}$

View Explanation

8) $\tan^{-1}\left(\frac{ab+1}{a-b}\right) + \tan^{-1}\left(\frac{bc+1}{b-c}\right) + \tan^{-1}\left(\frac{ca+1}{c-a}\right)$, a, b, c>0, is equal to

(a) 0

(b) $\frac{\pi}{2}$

(c) π

(d) None of these

View Explanation

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

(a) $\sqrt{\frac{2}{3}}$

(b) 0

(c) $\frac{1}{\sqrt{3}}$

(d) 1

View Explanation

10) If $x>0$, then $\tan^{-1}x + \tan^{-1}\left(\frac{1}{x}\right)$ is equal to

(a) None of these (b) π

(c) tan 1 (d) 1

View Explanation

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

(a) $-\frac{\pi}{3}$ (b) $-\frac{2\pi}{3}$

(c) $\frac{4\pi}{3}$ (d) $\frac{5\pi}{3}$

View Explanation

12) Domain of $f(x) = \sin^{-1}x - \sec^{-1}x$ is

(a) 0 or 1 (b) $\{0, 1\}$

(c) $\{-1, 1\}$ (d) None of these

View Explanation

13) If $\cos^{-1}x+\cos^{-1}y = 2\pi$, then the value of $\sin^{-1}x+\sin^{-1}y$ is

(a) $-\pi$ (b) 0

(c) π (d) None of these

View Explanation

14) If $3\sin^{-1}\left(\frac{2x}{1+x^2}\right) - 4\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right) + 2\tan^{-1}\left(\frac{2x}{1-x^2}\right) = \frac{\pi}{3}$. Then x =

(a) $\frac{1}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{2}}$

(c) 2 (d) 1

View Explanation

15) $\cos^{-1}\left(cos\,\frac{5\pi}{4}\right)$ is equal to

(a) $\frac{3\pi}{4}$ (b) None of these

(c) $\frac{5\pi}{4}$ (d) $-\frac{\pi}{4}$

View Explanation

16) If $\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$, then the value of $\cos^{-1}x+\cos^{-1}y$ is

(a) $\frac{\pi}{6}$ (b) $\frac{2\pi}{3}$

(c) $\frac{\pi}{3}$ (d) π

View Explanation

17) $\cot^{-1}\left(\frac{5}{3}\right)+\cos^{-1}\left(\frac{4}{5}\right)=$

(a) $\cos^{-1}\left(\frac{27}{2\sqrt{38}}\right)$ (b) $\tan^{-1}\left(\frac{27}{11}\right)$

(c) $\cot^{-1}\left(\frac{27}{11}\right)$ (d) 0

View Explanation

18) $\cos(\tan^{-1}x)$ is equal to

(a) $\frac{\sqrt{1+x^2}}{x}$ (b) $-\frac{1}{\sqrt{1+x^2}}$

(c) $\frac{1}{\sqrt{1+x^2}}$ (d) None of these

View Explanation

19) $\sin^{-1}\left(\frac{3}{5}\right)+\tan^{-1}\left(\frac{1}{7}\right)=$

(a) $\cos^{-1}\left(\frac{4}{5}\right)$ (b) $\frac{\pi}{4}$

(c) π (d) $\frac{\pi}{2}$

View Explanation

20) The domain of $\sin^{-1}2x$ is

(a) $[0, 1]$ (b) $\left[-\frac{1}{2}, \frac{1}{2}\right]$

(c) $[-2, 2]$ (d) $[-1, 1]$

View Explanation

21) If $\cos^{-1}x+\sin^{-1}\left(\frac{x}{2}\right)=\frac{\pi}{6}$. then x =

(a) 0 (b) $\frac{1}{\sqrt{2}}$

(c) 1 (d) ± 3

View Explanation

22) $\cos^{-1}\left(cos\left(-\frac{\pi}{3}\right)\right)$ is equal to

(a) $\frac{2\pi}{3}$ (b) $-\frac{\pi}{3}$

(c) None of these (d) $\frac{\pi}{3}$

View Explanation

23) $\tan^{-1}\left(\frac{1}{7}\right)+2\tan^{-1}\left(\frac{1}{3}\right)$ is equal to

(a) $\frac{3\pi}{4}$ (b) $\frac{\pi}{2}$

(c) $\frac{\pi}{4}$ (d) None of these

View Explanation

24) The value of $\tan^2(\sec^{-1}2)+\cot^2(\operatorname{cosec}^{-1}3)$ is equal to

(a) None of these (b) 13

(c) 5 (d) 11

View Explanation

25) If $\cot^{-1}(\sqrt{cos\ \alpha})+\tan^{-1}(\sqrt{cos\ \alpha}) = \mu$, then $\sin\mu$ is equal to

(a) $\tan^2\alpha$ (b) $\tan 2\ \alpha$

(c) $\cot^2\left(\frac{\alpha}{2}\right)$ (d) 1

View Explanation

26) The number of solutions of the equations $\cos^{-1}(1-x)-2\cos^{-1}x=\frac{\pi}{2}$ is

(a) More than one (b) Two

(c) One (d) None of these

View Explanation

27) The value of $\tan^{-1}\left(\frac{a}{b}\right)-\tan^{-1}\left(\frac{a-b}{a+b}\right)$ is (a, b>0)

(a) $-\frac{\pi}{4}$ (b) $\frac{\pi}{4}$

(c) $\frac{\pi}{2}$ (d) $-\frac{\pi}{2}$

View Explanation

28) The relation $\operatorname{cosec}^{-1}\left(\frac{x^2+1}{2x}\right)= 2\cot^{-1}x$ is valid for

(a) $x\geq 0$ (b) $|x| \geq 1$

(c) $x\geq 1$ (d) None of these

View Explanation

29) Which of the following is different from $2\tan^{-1}x$?

(a) $\tan^{-1}\left(\frac{2x}{1-x^2}\right), |x|<1$ (b) $\sin^{-1}\left(\frac{2x}{1-x^2}\right)\ |x| \leq 1$

(c) None of these (d) $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\ |x| \geq 0$

View Explanation

30) $\tan^{-1}\left(\frac{1}{4}\right)+\tan^{-1}\left(\frac{2}{9}\right)=$

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

(c) $\frac{1}{2}\tan^{-1}\left(\frac{3}{5}\right)$ (d) $\frac{1}{2}\sin^{-1}\left(\frac{3}{5}\right)$

View Explanation

31) The equation $\tan^{-1}x-\cot^{-1}x = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$ has

(a) Unique solution (b) Infinite number of solutions

(c) No solution (d) Two solutions

View Explanation

32) The solution of the equation $\cos^{-1}\left(\sqrt{3}x\right)+ \cos^{-1}x = \frac{\pi}{2}$

(a) $-\frac{1}{2}$ (b) None of these

(c) $\pm\frac{1}{2}$ (d) $\frac{1}{2}$

View Explanation

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

(a) $[0, 1]$ (b) Φ

(c) $(0, -4)$ (d) $[-1, 1]$

View Explanation

34) The value of x which satisfy the trigonometric equation $\tan^{-1}\left(\frac{x-1}{x-2}\right)+ \tan^{-1}\left(\frac{x+1}{x+2}\right)=\frac{\pi}{4}$ are ?

(a) ± 12 (b) $\pm\frac{1}{2}$

(c) $\pm\frac{1}{\sqrt{2}}$ (d) $\pm\sqrt{2}$

View Explanation

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

(a) $\frac{\sqrt{1-x^2}}{x}$ (b) $\frac{x}{\sqrt{1+x^2}}$

(c) $\frac{1}{x}$ (d) $\frac{\sqrt{1+x^2}}{x}$

View Explanation

36) If $(\cos^{-1}x+\sin^{-1}x)=\frac{\pi}{2}$, then x =

(a) 0 (b) None of these

(c) 1 (d) $\frac{1}{2}$

View Explanation

37) If $\tan^{-1}x+\tan^{-1}\left(\frac{1}{7}\right)=\frac{\pi}{4}$, then x =

(a) $\frac{7}{6}$ (b) $\frac{4}{3}$

(c) $\frac{3}{4}$ (d) $\frac{6}{7}$

View Explanation

38) If $\tan^{-1}x=\frac{\pi}{10}$ for some $x\in R$, then the value of $\cot^{-1}x$ is

(a) $\frac{2\pi}{5}$ (b) $\frac{\pi}{5}$

(c) $\frac{3\pi}{5}$ (d) $\frac{4\pi}{5}$

View Explanation

39) $\cot^{-1}(21)+\cot^{-1}(13)+\cot^{-1}(-8)$ is equal to

(a) $\cot^{-1}(26)$ (b) π

(c) 0 (d) None of these

View Explanation

40) The value of $\cos^{-1}(-1)-\sin^{-1}(1)$ is

(a) $\frac{3\pi}{2}$ (b) π

(c) $-\frac{3\pi}{2}$ (d) $\frac{\pi}{2}$

View Explanation

41) $\sin(\cot^{-1}x)$ is equal to

(a) $\sqrt{1+x^2}$ (b) $\frac{x}{\sqrt{1+x^2}}$

(c) $\frac{1}{\sqrt{1+x^2}}$ (d) None of these

View Explanation

42) The principal value of $\sin^{-1}\left(sin\ \frac{3\pi}{4}\right)=$

(a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{4}$

(c) $\frac{5\pi}{4}$ (d) $-\frac{\pi}{4}$

View Explanation

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

(a) $[-\sqrt{5}, -\sqrt{3}] \cap [-\sqrt{5}, \sqrt{3}]$ (b) $[0, \pi]$

(c) $[3, 5]$ (d) $[-\sqrt{5}, -\sqrt{3}] \cup [\sqrt{3}, \sqrt{5}]$

View Explanation

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

(a) $-\frac{\pi}{10}$ (b) $\frac{-7\pi}{5}$

(c) $\frac{3\pi}{5}$ (d) $\frac{\pi}{10}$

View Explanation

45) The greatest and least value of $(\sin^{-1}x)^2 + (\cos^{-1}x)^2$ are respectively

(a) $\frac{5\pi^2}{4}$ and $\frac{\pi^2}{8}$ (b) $\frac{\pi}{2}$ and $\frac{-\pi}{2}$

(c) $\frac{\pi^2}{4}$ and 0 (d) $\frac{\pi^2}{4}$ and $\frac{-\pi^2}{4}$

View Explanation

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

(a) $\frac{\pi}{9}$ (b) $\frac{-2\pi}{9}$

(c) $\frac{34\pi}{9}$ (d) $\frac{2\pi}{9}$

View Explanation

47) $\cot(\cos^{-1}x)$ is equal to

(a) None of these (b) $\frac{x}{\sqrt{1-x^2}}$

(c) $\frac{|x|}{\sqrt{1-x^2}}$ (d) $-\frac{x}{\sqrt{1+x^2}}$

View Explanation

48) One branch of $\cos^{-1}$ other than the principal value of branch corresponds to

(a) $[2\pi, 3\pi]$ (b) $[\pi, 2\pi] - \left\{\frac{3\pi}{2}\right\}$

(c) $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$ (d) $(0, \pi)$

View Explanation

49) The value of $\sin(2\sin^{-1}(0.6))$ is

(a) 0.96 (b) 0.48

(c) $\sin 1.2$ (d) 1.2

View Explanation

50) $\cos^{-1}(\cos x) = x$ is satisfied by,

(a) $x \in [-1, 1]$ (b) $x \in [0, \pi]$

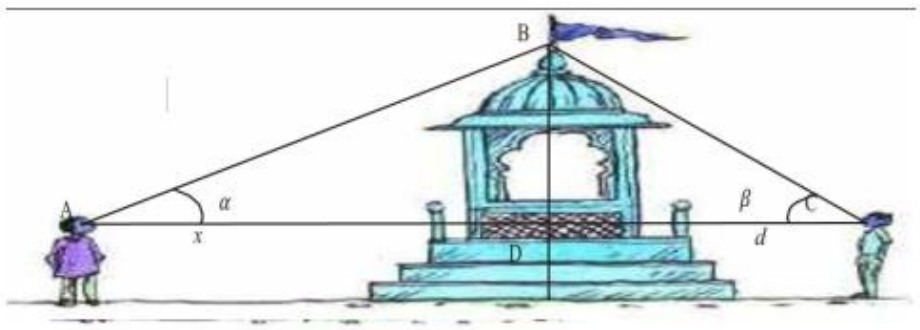
(c) None of these (d) $x \in [0, 1]$

View Explanation

View Explanations

CASE STUDY QUESTIONS

1) Two men on either side of a temple of 30 meters high observe its top at the angles of elevation α and β respectively. (as shown in the figure above). The distance between the two men is $40\sqrt{3}$ meters and the distance between the first person A and the temple is $30\sqrt{3}$ meters. Based on the above information answer the following:



1 $\angle CAB = \alpha =$

a. $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$

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

C. $\sin^{-1}(2)$

d. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

2 $\angle CAB = \alpha =$

a. $\cos^{-1}\left(\frac{1}{5}\right)$

b. $\cos^{-1}\left(\frac{2}{5}\right)$

C. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

d. $\cos^{-1}\left(\frac{4}{5}\right)$

3. $\angle BCA = \beta =$

a. $\tan^{-1}\left(\frac{1}{2}\right)$

b. $\tan^{-1}(2)$

C. $\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

d. $\tan^{-1}(\sqrt{3})$

4. $\angle ABC =$

a. $\frac{\pi}{4}$ b. $\frac{\pi}{6}$ C. $\frac{\pi}{2}$ d. $\frac{\pi}{3}$

5. Domain and Range of $\cos^{-1} x =$

a. $(-1,1), (0,\pi)$

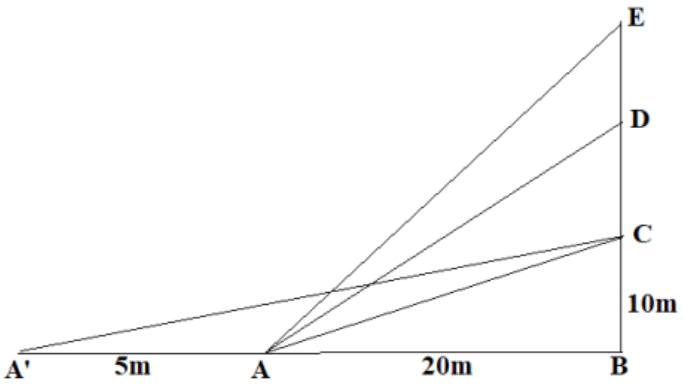
b. $[-1,1], (0,\pi)$

c. $[-1,1], [0,\pi]$

d. $(-1,1), \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

View Explanation

2) The Government of India is planning to fix a hoarding board at the face of a building on the road of a busy market for awareness on COVID-19 protocol. Ram, Robert and Rahim are the three engineers who are working on this project. "A" is considered to be a person viewing the hoarding board 20 metres away from the building, standing at the edge of a pathway nearby. Ram, Robert and Rahim suggested to the firm to place the hoarding board at three different locations namely C, D and E. "C" is at the height of 10 metres from the ground level. For the viewer A, the angle of elevation of "D" is double the angle of elevation of "C" The angle of elevation of "E" is triple the angle of elevation of "C" for the same viewer. Look at the figure given and based on the above information answer the following:



1 Measure of $\angle CAB =$

a. $\tan^{-1}(2)$ b. $\tan^{-1}\left(\frac{1}{2}\right)$

C. $\tan^{-1}(1)$ d. $\tan^{-1}(3)$

2 Measure of $\angle DAB =$

a. $\tan^{-1}\left(\frac{3}{4}\right)$ b. $\tan^{-1}(3)$

C. $\tan^{-1}\left(\frac{4}{3}\right)$ d. $\tan^{-1}(4)$

3 Measure of $\angle EAB =$

a. $\tan^{-1}(11)$ b. $\tan^{-1} 3$

C. $\tan^{-1}\left(\frac{2}{11}\right)$ d. $\tan^{-1}\left(\frac{11}{2}\right)$

4 A^l Is another viewer standing on the same line of observation across the road. If the width of the road is 5 meters, then the difference between $\angle CAB$ and $\angle CA'B$ Is

a. $\tan^{-1}(1/2)$ b. $\tan^{-1}(1/8)$

c. $\tan^{-1}\left(\frac{2}{5}\right)$ d. $\tan^{-1}\left(\frac{11}{21}\right)$

5. Domain and Range of $\tan^{-1} x =$

a. $R^+, \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

b. $R^-, \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

c. R, $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

d. R, $\left(0, \frac{\pi}{2}\right)$

View Explanation