MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

TRIGONOMETRIC FUNCTIONS

Exercise 1 Topical Problems

1. $\left(\cos^4 x - \sin^4 x\right)$ is equal to

A. $2\sin^2 x - 1$

B. $1 - 2\cos^2 x$

C. $\sin^2 x - \cos^2 x$

D. $2\cos^2 x - 1$

Answer: D

Watch Video Solution

2. $\frac{\sin\theta}{1-\cot\theta}+\frac{\cos\theta}{1-\tan\theta}$ is equal to (a) 0 (b) 1 (c) $\sin\theta+\cos\theta$ (d) $\sin\theta-\cos\theta$

A. $\frac{1-\tan\theta}{1-\cot\theta}$

B. $\frac{1-\cot\theta}{1-\tan\theta}$

C. $\cos\theta+\sin\theta$

D. none of these

Answer: C

Watch Video Solution

3. If $\tan\theta = \frac{x\sin\phi}{1 - x\cos\phi}$ and $\tan\phi = \frac{y\sin\theta}{1 - y\cos\theta}$ then the value of $\frac{x}{y}$ is

A. $\frac{\sin\phi}{\sin\theta}$

B. $\frac{\sin\theta}{\sin\phi}$

C. $\frac{\sin\theta}{1 - \cos\theta}$

D. $\frac{\sin\phi}{1 - \cos\phi}$

Answer: B

Watch Video Solution

4. If $\sin\theta + \sin^2\theta = 1$ then $\cos^2\theta + \cos^4\theta$ is equal to

A. -1

B. 1

C. 0

D. $\frac{1}{2}$

Answer: B

Watch Video Solution

5. If $\tan\theta + \sin\theta = m$, $\tan\theta - \sin\theta = n$ then $m^2 - n^2$ is equal

A. $\sqrt{mn}$

B. $\sqrt{\frac{m}{n}}$

C. $4\sqrt{mn}$

D. none of these

Answer: C

Watch Video Solution

6. If $7\sin^2\theta + 3\cos^2\theta = 4$, then $\sec\theta + \cos ec\theta$ is equal to

A. $\frac{2}{\sqrt{3}} - 2$

B. $\frac{2}{\sqrt{3}} + 2$

C. $\frac{2}{\sqrt{3}}$

D. None of these

Answer: B

Watch Video Solution

7. If $a\cos\theta + b\sin\theta = 4$ and $a\sin\theta - b\cos\theta = 3$ then $a^2 + b^2$ is equal to

A. 7

B. 12

C. 25

D. none of these

Answer: C

Watch Video Solution

8. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$ then $\cos\theta - \sin\theta$ is equal to

A. $\sqrt{2}\tan\theta$

B. $\sqrt{2}\sin\theta$

C. $\frac{\sqrt{2}}{\cos\theta + \sin\theta}$

D. none of these

Answer: B

Watch Video Solution

9. $\tan^2\theta \sin^2\theta$ si equal to

A. $\tan^2\theta - \sin(2)\theta$

B. $\tan^2\theta + \sin^2\theta$

C. $\dfrac{\tan\theta}{\sin^2\theta}$

D. $\sin^2\theta \cot^2\theta$

Answer: A

Watch Video Solution

10. If $\sec\theta + \tan\theta = x$ then $\sin\theta$ is equal to

A. $\dfrac{x^2+1}{2x}$

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

C. $\dfrac{x^2-1}{x^2+1}$

D. $\frac{2x}{x^2-1}$

Answer: C

Watch Video Solution

11. If $x = r\sin\alpha\cos\beta, y = r\sin\alpha\sin\beta$ and $z = r\cos\alpha,$ prove that

$x^2 + y^2 + z^2 = r^2.$

A. $x^2 + y^2 + z^2 = r^2$

B. $x^2 + y^2 - z^2 = r^2$

C. $x^2 - y^2 + z^2 = r^2$

D. $x^2 + y^2 - z^2 = r^2$

Answer: A

Watch Video Solution

12. $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1, \frac{x}{a}\sin\theta - \frac{y}{b}\cos\theta = 1$ then $\frac{x^2}{a^2} + \frac{y^2}{b^2} =$

A. $x^2 + y^2 = a^2 + b^2$

B. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2$

C. $a^2x^2 + b^2y^2 = 1$

D. None of the above

Answer: B

Watch Video Solution

13. The value of $(1 + \cot\theta - \operatorname{cosec}\theta)(1 + \tan\theta + \sec\theta)$ is

A. 1

B. 2

C. 4

D. 0

Answer: B

Watch Video Solution

14. $\frac{\cot\theta}{\cot\theta - \cot 3\theta} + \frac{\tan\theta}{\tan\theta - \tan 3\theta}$ is equal to

A. 0

B. 1

C. -1

D. 2

Answer: B

Watch Video Solution

15. $2\left(\sin^6\theta+\cos^6\theta\right)-3\left(\sin^4\theta+\cos^4\theta\right)$ is equal to 0 (b) 1 (c) -1

(d) None of these

A. 0

B. 3

C. 1

D. -1

Answer: D

Watch Video Solution

16. $(\cos ec\theta+\sin\theta)(\sec\theta-\cos\theta)\tan\theta+\cot\theta)$ is equal to

A. 0

B. 1

C. -1

D. None of these

Answer: B

Watch Video Solution

17. If $a\cos\theta - b\sin\theta = c, \quad \text{then} a\sin\theta + b\cos\theta$ is equal to

A. $\pm\sqrt{a^2+b^2+c^2}$

B. $\pm\sqrt{a^2+b^2-c^2}$

C. $\pm\sqrt{c^2-a^2-b^2}$

D. None of these

Answer: B

Watch Video Solution

Exercise 1 Trigonomertric Ratio Of Allied Angle

1. If $\sin\alpha$ and $\cos\alpha$ are roots of the equation $px^2 + qx + r = 0$ then :

A. $p^2 + q^2 - 2pr = 0$

B. $(p + r)^2 = q^2 + r^2$

C. $p^2 - q^2 + 2pr = 0$

D. $(p + r)^2 = q^2 - r^2$

Answer: C

Watch Video Solution

2. The value of $2\cot^2(\pi/6) + 4\tan^2(\pi/6) - 3\cos ec(\pi/6)$ is

A. 2

B. 4

C. $4/3$

D. $3/4$

Answer: C

Watch Video Solution

3. Find the value of $1\cos(29\pi/3)$

A. 1

B. 0

C. $\frac{\sqrt{3}}{2}$

D. $1/2$

Answer: D

Watch Video Solution

4. If $\frac{\cos A}{3} = \frac{\cos B}{4} = \frac{1}{5}, -\frac{\pi}{2} < A < 0$ and $-\frac{\pi}{2} < B < 0$ then the value of $2\sin A + 4\sin B$ is

A. 4

B. -2

C. -4

D. 0

Answer: C

Watch Video Solution

5. The value of $\frac{\cot 54^\circ}{\tan 36^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ}$ is

A. 0

B. 2

C. 3

D. 1

Answer: B

Watch Video Solution

6. The value of $\cos 480^\circ \sin 150^\circ + \sin 600^\circ \cos 390^\circ$ is

A. 0

B. 1

C. $\frac{1}{2}$

D. -1

Answer: D

Watch Video Solution

7. Find the value of $\frac{\cos^2 \pi}{16} + \frac{\cos^2(3\pi)}{16} + \frac{\cos^2(5\pi)}{16} + \frac{\cos^2(7\pi)}{16}$.

A. 2

B. 1

C. 0

D. none of these

Answer: A

Watch Video Solution

8. $\sin^2 17.5^\circ + \sin^2 72.5^\circ$ is equal to

A. $\cos^\circ 90^\circ$

B. $\tan^\circ 45^\circ$

C. $\cos^2 30^\circ$

D. $\sin^2 45^\circ$

Answer: B

Watch Video Solution

9. If $\cos\theta = -\frac{\sqrt{3}}{2}$ and $\sin\propto = -\frac{3}{5}$, where θ does not lie and $\propto$ lies in the third quadrant, then $\frac{2\tan\propto + \sqrt{3}\tan\theta}{\cot^2\theta + \cos\propto}$ is equal to

A. $\frac{7}{22}$

B. $\frac{5}{22}$

C. $\frac{9}{22}$

D. $\frac{22}{5}$

Answer: B

Watch Video Solution

10. If $\tan\theta = \frac{1}{\sqrt{7}}$ then $\frac{(\cos ec^2\theta - \sec^2\theta)}{(\cos ec^2\theta + \sec^2\theta)}$ is equal to

A. $\frac{1}{2}$

B. $\frac{3}{4}$

C. $\frac{5}{4}$

D. 2

Answer: B

Watch Video Solution

11. $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots + \cos 180^\circ$ is equal to

A. 1

B. 0

C. 2

D. -1

Answer: D

Watch Video Solution

12. If ΔABC if$\angle A = \frac{\pi}{2}$ then $\cos^2 B + \cos^2 C$ equals

A. -2

B. -1

C. 1

D. 0

Answer: C

Watch Video Solution

13. If ΔABC is a right angled at C, then tan A + tan B is equal to

A. $\frac{b^2}{ac}$

B. a+b

C. $\frac{a^2}{bc}$

D. $\frac{c^2}{ab}$

Answer: D

Watch Video Solution

14. If $\sin A - \sqrt{6}\cos A = \sqrt{7}\cos A$, then $\cos A + \sqrt{6}\sin A$ is equal to

A. $\sqrt{6}\sin A$

B. $-\sqrt{7}\sin A$

C. $\sqrt{6}\cos A$

D. $\sqrt{42}\cos A$

Answer: B

Watch Video Solution

15. If sin A + sin B + sin C = 3, then

cos A + cos B + cos C is equal to

A. 3

B. 2

C. 1

D. 0

Answer: D

Watch Video Solution

16. If a ΔPQR if $3\sin P + 4\cos Q = 6$ and $4\sin Q + 3\cos P = 1$, then $\angle R$ is equal to

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

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

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

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

Answer: B

Watch Video Solution

17. The value of $\cos(270^\circ + \theta)\cos(90^\circ - \theta) - \sin(270^\circ - \theta)\cos\theta$ is

A. 0

B. -1

C. $1/2$

D. 1

Answer: D

Watch Video Solution

18. The value of the expression $\cos 1^\circ \cos 2^\circ \ldots \cos 179^\circ$ is

A. 0

B. 1

C. $1/\sqrt{2}$

D. -1

Answer: A

Watch Video Solution

Exercise 2 Miscellaneous Problems

1. If $\cos ec\theta = x + \frac{1}{4x}$ then the value of $\cos ec\theta + \cot\theta$ is

A. 2x

B. $-2x$

C. $\frac{2}{x}$

D. $-\frac{1}{2x}$

Answer: A

Watch Video Solution

2. If ΔABC right angle at B, BC = 5 cm and AC -AB =1 cm. then $\frac{1+\sin C}{\cos C}$ is equal to

A. 5

B. 4

C. $\frac{1}{5}$

D. $\frac{1}{4}$

Answer: A

Watch Video Solution

3. If $\tan\theta + \cot\theta = 2, \quad \text{then} \quad \tan^2\theta + \cot^2\theta$ is equal to

A. 4

B. 3

C. 2

D. none of these

Answer: C

Watch Video Solution

4. If $\cos(81^\circ + \theta) = \sin\left(\frac{k}{3} - \theta\right)$, then k is equal to

A. 9°

B. 30°

C. 27°

D. 45°

Answer: C

Watch Video Solution

Watch Video Solution

5. If $\sin\theta = \cos\theta$,then the value of $2\tan^2\theta + \sin^2\theta - 1$ is equal to

A. $\frac{1}{2}$

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

C. $\frac{3}{2}$

D. 2

Answer: C

Watch Video Solution

6. If $\tan x = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$ then x is equal to

A. 30°

B. 45°

C. 60°

D. 15°

Answer: B

Watch Video Solution

7. $\sin^6\theta + \cos^6\theta$ is equal to

A. $3\sin^2\theta\cos^2\theta$

B. $\left(\sin^3\theta + \cos^3\theta\right)^2$

C. $\dfrac{3\sin^3\theta\cos^3\theta}{\cos ec\theta\sec\theta}$

D. $1 - 3\sin^2\theta\cos^2\theta$

Answer: D

Watch Video Solution

8. $\cos^2 5^\circ + \cos^2 10^\circ + \cos^2 15^\circ + \ldots\ldots + \cos^2 85^\circ + \cos^2 90^\circ$ is equal to

A. 10

B. $\frac{19}{2}$

C. $\frac{9}{2}$

D. $\frac{17}{2}$

Answer: D

Watch Video Solution

9. $\frac{\sin(90^\circ - \theta)\sin\theta}{\tan\theta} + \sin^2\theta$ is equal to

A. 2

B. 1

C. 0

D. None of these

Answer: B

Watch Video Solution

10. If $\tan\theta = \frac{20}{21}$, show that $\frac{1-\sin\theta+\cos\theta}{1+\sin\theta+\cos\theta} = \frac{3}{7}$

A. $\frac{4}{7}$

B. $\frac{3}{7}$

C. $\frac{20}{21}$

D. $\frac{11}{21}$

Answer: B

Watch Video Solution

11. For $0 \leq \theta \leq \frac{\pi}{2}$ the maximum value of $\sin\theta + \cos\theta$ is

A. 1

B. 2

C. $\sqrt{2}$

D. 0

Answer: C

Watch Video Solution

12. $\frac{\cos 70^\circ}{\sin 20^\circ} + \frac{\cos 59^\circ}{\sin 31^\circ} - 8\sin^2 30^\circ$ is equal to

A. 1

B. -1

C. 0

D. 2

Answer: C

Watch Video Solution

13. If $\sin\theta = \frac{1}{2}$ and θ is acute then $\left(3\cos\theta - 4\cos^3\theta\right)$ is equal to

A. 0

B. $\frac{1}{2}$

C. $\frac{1}{6}$

D. -1

Answer: A

Watch Video Solution

14. If $3\sin\theta + 4\cos\theta = 5$, then value of $\sin\theta$ is

A. $\frac{2}{3}$

B. $\frac{4}{5}$

C. $\frac{3}{5}$

D. $\frac{5}{3}$

Answer: C

Watch Video Solution

15. If $\theta$is theta and $\frac{\cos^2\theta}{\cot^2\theta - \cos^2\theta} = 3$ then θ is equal to

A. 60°

B. 30°

C. 90°

D. none of these

Answer: A

Watch Video Solution

16. The value of $\left(1+\cos\left(\frac{\pi}{6}\right)\right)\left(1+\cos\left(\frac{\pi}{3}\right)\right)\left(1+\cos\left(\frac{2\pi}{3}\right)\right)\left(1+\cos\left(\frac{7\pi}{6}\right)\right) =$

A. $\frac{3}{16}$

B. $\frac{3}{8}$

C. $\frac{3}{4}$

D. $\frac{1}{2}$

Answer: A

Watch Video Solution

17. If $\cos 20^\circ - \sin 20^\circ = p$ then $\cos 40^\circ$ is equal to

A. $p^2\sqrt{2-p^2}$

B. $p\sqrt{2-p^2}$

C. $p+\sqrt{2-p^2}$

D. $p-\sqrt{2-p^2}$

Answer: B

Watch Video Solution

18. If $S_n = \cos^n\theta + \sin^n tehta$ then find teh value of $3S_4 - 2S_6$

A. 4

B. 0

C. 1

D. 7

Answer: C

Watch Video Solution

19. If $\cos x + \cos^2 x = 1$ then the value of $\sin^{12} x + 3\sin^{10} x + 3\sin^8 x + \sin^6 x - 1$ is

A. 2

B. 1

C. -1

D. 0

Answer: D

Watch Video Solution

20. If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$ Find the value of $x^2 + y^2$

A. 2

B. 0

C. 3

D. 1

Answer: D

Watch Video Solution

21. If θ in the first quadrant and $5\tan\theta = 4$ then $\frac{5\sin\theta - 3\sin\theta}{\sin\theta + 2\cos\theta}$ is equal to

A. $\frac{5}{14}$

B. $\frac{3}{14}$

C. $\frac{1}{14}$

D. 0

Answer: A

Watch Video Solution

22. If $\sin A + \cos A = m$ and $\sin^3 A + \cos^3 A = n$ then

A. $m^3 - 3m + n = 0$

B. $n^3 - 3n + 2m = 0$

C. $m^3 - 3m + 2n = 0$

D. $m^3 + 3m + 2n = 0$

Answer: C

Watch Video Solution

23. If $\sin\theta + \cos ec\theta = 2$ then the value of $\sin^{10}\theta + \cos ec^{10}\theta$ is

A. 2

B. 2^{10}

C. 2^9

D. 10

Answer: A

Watch Video Solution

24. $\sec^2\theta = \frac{4xy}{(x+y)^2}$ is true if and only if $x + y \neq 0$ (b) $x = y, x \neq 0$ $x = y$ (d) $x \neq 0, y \neq 0$

A. $x + y \neq 0$

B. $x = y, x \neq 0, y \neq 0$

C. x=y

D. $x \neq 0, y \neq 0$

Answer: B

Watch Video Solution

25. If $\sec\theta + \tan\theta = k$, $\cos\theta$ equals to

A. $\frac{k^2+1}{2k}$

B. $\frac{2k}{k^2+1}$

C. $\frac{k}{k^2+1}$

D. $\frac{k}{k^2-1}$

Answer: B

Watch Video Solution

26. ABC is a right angled isosceles triangle with $\angle B = 90^\circ$ If D is a point on AB such that $\angle CDB = 15^\circ$ and if $AD = 35cm$ then CD is equal to

A. $35\sqrt{2}$ cm

B. $70\sqrt{2}cm$

C. $\frac{35\sqrt{3}}{2}cm$

D. $35\sqrt{6}$ cm

Answer: A

Watch Video Solution

27. If $\sin A + \sin B = C, \cos A + \cos B = D,$ then the value of $\sin(A + B)$=

A. CD

B. $\frac{CD}{C^2+D^2}$

C. $\frac{C^2+D^2}{2CD}$

D. $\frac{2CD}{C^2+D^2}$

Answer: D

Watch Video Solution

28. If θ lies in the first quardrant and $\cos\theta = \frac{8}{17}$, then find the value of $\cos(30^\circ+\theta)+\cos(45^\circ-\theta)+\cos(120^\circ-\theta)$.

A. $\frac{23}{17}\left(\frac{\sqrt{3}-1}{2}+\frac{1}{\sqrt{2}}\right)$

B. $\frac{23}{17}\left(\frac{\sqrt{3}+1}{2}+\frac{1}{\sqrt{2}}\right)$

C. $\frac{23}{17}\left(\frac{\sqrt{3}-1}{2}-\frac{1}{\sqrt{2}}\right)$

D. $\frac{23}{17}\left(\frac{\sqrt{3}+1}{2}-\frac{1}{\sqrt{2}}\right)$

Answer: A

Watch Video Solution

29. If $\tan x + \tan\left(\frac{\pi}{3} - x\right) + \tan\left(\frac{2\pi}{3} + x\right) = 3$, then

A. tan x =1

B. tan 2x =1

C. tan 3x = 1

D. None of these

Answer: C

Watch Video Solution

30. If $\sin(\theta+\alpha)=a$ and $\sin(\theta+\beta)=b$, then prove that $\cos(\alpha+\beta)-4ab\cos(\alpha-\beta)=1-2a^2-2b^2$.

A. $1-a^2-b^2$

B. $1-2a^2-2b^2$

C. $2+a^2+b^2$

D. $2-a^2-b^2$

Answer: B

Watch Video Solution

31. The expression $\cos^2(A-B)+\cos^2 B-2\cos(A-B)\cos A\cos B$ is

A. dependent on B

B. dependent on A and B

C. dependent on A

D. independent of A and B

Answer: C

Watch Video Solution

32. If $\tan\alpha, \tan\beta$ are the roots of the equation $x^2 + px + q = 0 (p \neq 0)$, then

A. $\sin^2(\alpha+\beta) + p\sin(\alpha+\beta)\cos(\alpha+\beta) + q\cos^2(\alpha+\beta) = q$

B. $\tan(\alpha+\beta) = \frac{q}{p-1}$

C. $\cos(\alpha+\beta) = 1 - q$

D. $\sin(\alpha+\beta) = -p$

Answer: A

View Text Solution

33. If $\cos(A-B)=\frac{3}{5} and tan A tan B=2$, then $\cos A \cos B=\frac{1}{5}$

(b) $s \in As \in B=-\frac{2}{5}$ $\cos A \cos B=-\frac{1}{5}$ (d) $s \in As \in B=-\frac{1}{5}$

A. $\cos A \cos B=\frac{1}{5}$

B. $\sin A \sin B=-\frac{2}{5}$

C. $\cos A \cos B=-\frac{1}{5}$

D. $\sin A \sin B=-\frac{1}{5}$

Answer: A

Watch Video Solution

34. $\tan 100^0+\tan 125^0+\tan 100^0 \tan 125^0$ is equal to 0 (b) $\frac{1}{2}$ (c) -1 (d) 1

A. 0

B. $\frac{1}{2}$

C. -1

D. 1

Answer: D

Watch Video Solution

35. If $\frac{\pi}{2} < \alpha < \pi, \pi < \beta < 3\frac{\pi}{2}; \sin\alpha = \frac{15}{17}$ and $\tan\beta = \frac{12}{5}$, then the value of $\sin(\beta - \alpha)$ is (A) $-\frac{171}{221}$ (B) $-\frac{21}{221}$ (C) $\frac{21}{221}$ (D) $\frac{171}{221}$

A. $-\frac{171}{221}$

B. $-\frac{21}{221}$

C. $\frac{21}{221}$

D. $\frac{171}{221}$

Answer: D

Watch Video Solution

36. If $\sin\theta = \frac{12}{13}, \left(0 < \theta < \frac{\pi}{2}\right)$ and $\cos\phi = -\frac{3}{5}, \left(\pi < \phi < \frac{3\pi}{2}\right)$.

Then , $\sin(\theta + \phi)$ will be

A. $\frac{-56}{61}$

B. $\frac{-56}{65}$

C. $\frac{1}{65}$

D. -56

Answer: B

Watch Video Solution

37. If $\tan A - \tan B = x$, and $\cot B - \cot A = y$, then find the value of $\cot(A - B)$.

A. $\frac{1}{x} + y$

B. $\frac{1}{xy}$

C. $\frac{1}{x} - \frac{1}{y}$

D. $\frac{1}{x} + \frac{1}{y}$

Answer: D

Watch Video Solution

38. $\sin 4\theta$ can be written as

A. $4\sin\theta(1 - 2\sin^2\theta)\sqrt{1 - \sin^2\theta}$

B. $2\sin\theta\cos\theta\sin^2\theta$

C. $4\sin\theta - 6\sin^3\theta$

D. None of the above

Answer: A

Watch Video Solution

39. If $\cos 2B = \dfrac{\cos(A+C)}{\cos(A-C)}$, then $\tan A$, $\tan B$, $\tan C$ are in

A. AP

B. GP

C. HP

D. None of these

Answer: B

Watch Video Solution

40. If $\frac{2\sin\alpha}{\{1+\cos\alpha+\sin\alpha\}}=y$, then $\frac{\{1-\cos\alpha+\sin\alpha\}}{1+\sin\alpha}$=

A. $\frac{1}{y}$

B. y

C. 1-y

D. 1+y

Answer: B

Watch Video Solution

41. $\frac{\sin\theta+\sin 2\theta}{1+\cos\theta+\cos 2\theta}$=

A. $\frac{1}{2}\tan\theta$

B. $\frac{1}{2}\cot\theta$

C. $\tan\theta$

D. $\cot\theta$

Answer: C

Watch Video Solution

42. $\frac{\sin 3\theta - \cos 3\theta}{\sin\theta + \cos\theta} + 1 =$

A. $2\sin 2\theta$

B. $2\cos 2\theta$

C. $\tan 2\theta$

D. $\cot 2\theta$

Answer: A

Watch Video Solution

43. If $\tan\alpha = \frac{1}{7}$ and $\tan\beta = \frac{1}{3}$, then $\cos 2\alpha$ is equal to

A. $\sin 2\beta$

B. $\sin 4\beta$

C. $\sin 3\beta$

D. Note of these

Answer: B

Watch Video Solution

44. If $\tan\beta = \cos\theta \tan\alpha$, then $\tan^2\frac{\theta}{2}$=

A. $\frac{\sin(\alpha+\beta)}{\sin(\alpha-\beta)}$

B. $\frac{\cos(\alpha-\beta)}{\cos(\alpha+\beta)}$

C. $\frac{\sin(\alpha-\beta)}{\sin(\alpha+\beta)}$

D. $\frac{\cos(\alpha+\beta)}{\cos(\alpha-\beta)}$

Answer: C

Watch Video Solution

45. $\sec^2 A(1+\sec 2A) = 2\sec 2A$

A. secA

B. 2 secA

C. sec2A

D. 2 sec 2A

Answer: D

Watch Video Solution

46. $2\sin A\cos^3 A - 2\sin^3 A\cos A =$

A. sin 4A

B. $\frac{1}{2}\sin 4A$

C. $\frac{1}{4}\sin 4A$

D. None of these

Answer: B

Watch Video Solution

Exercise 1 Topical Problems

1. If $\sin A + \cos A = \sqrt{2},$ then the value of $\cos^2$ A is

A. $\sqrt{2}$

B. $1/2$

C. 4

D. -1

Answer: B

Watch Video Solution

2. If $0 < \beta < \frac{\pi}{4}, \cos(\alpha + \beta) = \frac{3}{5}$ and $\cos(\alpha - \beta) = \frac{4}{5}$, then sin 2α is equal to

A. 0

B. 1

C. 2

D. None of these

Answer: B

Watch Video Solution

3. The value of $\tan 20^\circ + \tan 40^\circ + \sqrt{3}\tan 20^\circ \tan 40^\circ$ is

A. $\sqrt{12}$

B. $\frac{1}{\sqrt{3}}$

C. $\sqrt{3}$

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

Answer: C

Watch Video Solution

4. If $\alpha, \beta \in \left(0, \frac{\pi}{2}\right), \sin\alpha = \frac{4}{5}$ and $\cos(\alpha + \beta) = -\frac{12}{13}$, then $\sin\beta$ is equal to

A. $\frac{63}{65}$

B. $\frac{61}{65}$

C. $\frac{3}{5}$

D. $\frac{5}{13}$

Answer: A

Watch Video Solution

5. If $\cos(\alpha+\beta)=\frac{4}{5}$ and $\sin(\alpha-\beta)=\frac{5}{13}$, were $0\leq,\beta\leq\frac{\pi}{4}$, then tan 2α is equal to

A. $\frac{25}{16}$

B. $\frac{56}{33}$

C. $\frac{19}{12}$

D. $\frac{20}{7}$

Answer: B

Watch Video Solution

6. If $A + B = 45^\circ$, then $(\cot A - 1)(\cot B - 1)$ is equal to

A. 3

B. $\frac{1}{2}$

C. -1

D. 2

Answer: D

Watch Video Solution

7. If $\tan\alpha = k\cot\beta$, then $\frac{\cos(\alpha - \beta)}{\cos(\alpha + \beta)}$ is equal to

A. $\frac{1+k}{1-k}$

B. $\frac{1-k}{1+k}$

C. $\frac{k+1}{k-1}$

D. $\frac{k-1}{k+1}$

Answer: A

Watch Video Solution

8. If $\alpha+\beta=\frac{\pi}{2}$ and $\beta+\gamma=\alpha$, then find the value of $\tan\alpha$.

A. $\tan\beta+\tan\gamma$

B. $2(\tan\beta+\tan\gamma)$

C. $\tan\beta+2\tan\gamma$

D. $2\tan\beta+\tan\gamma$

Answer: C

Watch Video Solution

9. $\frac{\cos 9^\circ + \sin 9^\circ}{\cos 9^\circ - \sin 9^\circ} = \tan 54^\circ$

A. $\tan 26^\circ$

B. $\tan 81^\circ$

C. $\tan 51^\circ$

D. $\tan 54^\circ$

Answer: D

Watch Video Solution

10. $\frac{\tan 80^\circ - \tan 10^\circ}{\tan 70^\circ}$

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

11. यदि tan x =(3)/(4), pi lt xlt (3pi)/(2), तो sin ""(x)/(2), cos""(x)/(2) तथा tan""(x)/(2)` के मान ज्ञात कीजिए |

A. $-\frac{1}{\sqrt{10}}$

B. $\frac{3}{\sqrt{10}}$

C. $\frac{1}{\sqrt{10}}$

D. $-\frac{3}{\sqrt{10}}$

Answer: A

Watch Video Solution

12. $\cos^4\theta - \sin^4\theta$ is equal to

A. $1 + 2\sin^2\left(\frac{\theta}{2}\right)$

B. $\cos^2\theta - 1$

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

D. $1 + 2\cos^2\theta$

Answer: B

Watch Video Solution

13. If A,B and C are the angles of a triangle ,such that sec (A-B), sec A and sec (A+B) are in arithmatic progression ,then

A. $\cos ec^2 A = 2\cos ec^2\frac{B}{2}$

B. $2\sec^2 A = \sec^2\frac{B}{2}$

C. $\cos ec^2 A = \cos ec^2 \frac{B}{2}$

D. $\sec^2 B = \sec^2 \frac{A}{2}$

Answer: B

Watch Video Solution

14. The value of $\frac{\cot x - \tan x}{\cot 2x}$ is

A. 1

B. 2

C. `-1

D. 4

Answer: B

Watch Video Solution

15. $\sqrt{3}\cos\sec 20^0 - \sec 20^0$

A. 2

B. $\sin 20^\circ \cos ec40^\circ$

C. 4

D. $4\sin 20^\circ \cos ec40^\circ$

Answer: C

Watch Video Solution

16. Let α and β be such that $\pi < \alpha - \beta < 3\pi$. If $\sin\alpha + \sin\beta = -\frac{21}{65}$ and $\cos\alpha + \cos\beta = -\frac{27}{65}$, then the value of $\cos\frac{(\alpha-\beta)}{2}$ is

A. $-\frac{3}{\sqrt{130}}$

B. $\frac{6}{\sqrt{130}}$

C. $\frac{6}{65}$

D. $-\frac{6}{65}$

Answer: A

Watch Video Solution

17. If $x + \frac{1}{x} = 2\cos\theta$, then $x^n + \frac{1}{x^n}$ is equal to

A. $2\sin n\theta$

B. $2\cos n\theta$

C. $\sin(2n\theta)$

D. $\cos(2n\theta)$

Answer: B

Watch Video Solution

18. $\frac{1-\tan^2(45^\circ - A)}{1+\tan^2(45^\circ - A)}$ is equal to

A. sin 2A

B. cos 2A

C. tan 2A

D. cot 2A

Answer: A

Watch Video Solution

19. If $\sqrt{\frac{1+\cos A}{1-\cos A}} = \frac{x}{y}$ then the value of tan A is

A. $\frac{x^2+y^2}{x^2-y^2}$

B. $\frac{2xy}{x^2+y^2}$

C. $\frac{2xy}{x^2-y^2}$

D. $\frac{2xy}{y^2 - x^2}$

Answer: C

Watch Video Solution

20. If $\cos 2\alpha = \frac{3\cos 2\beta - 1}{3 - \cos 2\beta}$, then $\tan \alpha$ is equal to

A. $\sqrt{2}\tan\beta$

B. $\tan\beta$

C. $\sin 2\beta$

D. $\sqrt{2}\cot\beta$

Answer: A

Watch Video Solution

21. If $\tan A \& \tan B$ are the roots of the quadratic equation $x^2 - ax + b = 0$, then the value of $\sin^2(A+B)$ is:

A. $\frac{a^2}{a^2 + (1-b)^2}$

B. $\frac{a^2}{a^2 + b^2}$

C. $\frac{a^2}{(a+b)^2}$

D. $\frac{b^2}{a^2 + (a-b)^2}$

Answer: A

Watch Video Solution

22. If $\sin 4A - \cos 2A = \cos 4A - \sin 2A \left(\text{where, } 0 < A < \frac{\pi}{4}\right)$, then the value of tan 4A is

A. 1

B. $\frac{1}{\sqrt{3}}$

C. $\sqrt{3}$

D. $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

Answer: C

Watch Video Solution

23. For any angle θ the expression $\frac{2\cos 8\theta+1}{2\cos\theta+1}$ is eqaul to

A. $(2\cos\theta+)(2\cos 2\theta+1)(2\cos 4\theta+1)$

B. $(\cos\theta-1)(\cos 2\theta-1)(\cos 4\theta-1)$

C. $(2\cos\theta-1)(2\cos 2\theta-1)(2\cos 4\theta-1)$

D. $(2\cos\theta+1)(2\cos 2\theta+1)(\cos 4\theta+1)$

Answer: C

Watch Video Solution