MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

TRIGONOMETRIC RATIOS OF MULTIPLE AND SUBMULTIPLE ANGLES

Others

1. If $n-1,2,3,;then\cos\alpha\cos2\alpha\cos4\alpha\cos2^{n-1}\alpha isequa<o\ \frac{\sin2n\alpha}{2n\sin\alpha}$

(b) $\frac{\sin2^n\alpha}{2^n\sin2^{n-1}\alpha}$ (c) $\frac{\sin4^{n-1}\alpha}{4^{n-1}\sin\alpha}$ (d) $\frac{\sin2^n\alpha}{2^n\sin\alpha}$

Watch Video Solution

2. If $5\sin\alpha=3\sin(\alpha+2\beta)\neq0,$ then $\tan(\alpha+\beta)$ is equal to

Watch Video Solution

3. If $\tan\theta = \frac{a}{b}$,then $b\cos 2\theta + a\sin 2\theta$ is equal to (a) a (b) b (c) $\frac{a}{b}$ (d) $\frac{b}{a}$

Watch Video Solution

4. Prove that: $\cos^2 A + \cos^2\left(A + \frac{2\pi}{3}\right) + \cos^2\left(A - \frac{2\pi}{3}\right) = \frac{3}{2}$

Watch Video Solution

5. If $2\tan\alpha = 3tan\beta, then\, \tan(\alpha - \beta) =$ (a) $\frac{\sin 2\beta}{5 - \cos 2\beta}$ (b) $\frac{\cos 2\beta}{5 - \cos 2\beta}$ (c) $\frac{\sin 2\beta}{5 + \cos 2\beta}$ (d) none of these

Watch Video Solution

6. Prove that: $\sin^2 24^0 - \sin^2 6^0 = \frac{\sqrt{5} - 1}{8}$

Watch Video Solution

7. Prove that: $\cos 36^0 = \frac{\sqrt{5}+1}{4}$.

Watch Video Solution

8. Prove that: $\sin^2 24^0 - \sin^2 6^0 = \frac{\sqrt{5}-1}{8}$

Watch Video Solution

9. Prove that: $\cos 18^0 = \frac{\sqrt{10+2\sqrt{5}}}{4}$.

Watch Video Solution

10. If $tan\frac{\theta}{2} = \sqrt{\frac{1-e}{1+e}}\tan\left(\frac{\alpha}{2}\right)$, then $\cos\alpha =$ (a) $1 - e\cos(\cos\theta + e)$ (b) $\frac{1+e\cos\theta}{\cos\theta - e}$ (c) $\frac{1-e\cos\theta}{\cos\theta - e}$ (d) $\frac{\cos\theta - e}{1-e\cos\theta}$

Watch Video Solution

11. If $\cos 2x + 2\cos x = 1 then, \left(2 - \cos^2 x\right)\sin^2 x$ is equal to

Watch Video Solution

12. If α and β are acute angles satisfying $\cos 2\alpha = \frac{3\cos 2\beta - 1}{3 - \cos 2\beta}$, then $\tan\alpha = \sqrt{2}\tan\beta$ (b) $\frac{1}{\sqrt{2}} tan\beta$ (c) $\sqrt{2}\cot\beta$ (d) $\frac{1}{\sqrt{2}}\cot\beta$

Watch Video Solution

13. Prove that: $\cos^2 A + \cos^2\left(A + \frac{\pi}{3}\right) + \cos^2\left(A - \frac{\pi}{3}\right) = \frac{3}{2}$

Watch Video Solution

14. Prove that:

$$\cos^2 48^\circ - \sin^2 12^\circ = \frac{\sqrt{5}+1}{8}$$

Watch Video Solution

15. The value of $\frac{\sin 5\alpha - \sin 3\alpha}{\cos 5\alpha + 2\cos 4\alpha + \cos 3\alpha}$ is

Watch Video Solution

16. If $\cos\theta = \frac{1}{2}\left(a + \frac{1}{a}\right), \cos 3\theta = \lambda\left(a^3 + \frac{1}{a^3}\right), then\lambda =$ (a)$-\frac{1}{4}$ (b) $\frac{1}{4}$ (c) 1 (d) none of these

Watch Video Solution

17. Prove that: $tanA + \tan\left(60^0 + A\right) - tan\left(60^0 - A\right) = 3tan3A$

Watch Video Solution

18. If $tan^2\theta = 2\tan^2\phi + 1$, prove that $\cos 2\theta + \sin^2\phi = 0.$

Watch Video Solution

19. If $\theta = \frac{\pi}{2^n + 1}$, prove that: $2^n \cos\theta \cos 2\theta \cos 2^2\theta \cos 2^{n-1}\theta = 1.$

Watch Video Solution

20. Prove that: $\cot A + \cot\left(60^0 + A\right) - \cot\left(60^0 - A\right) = 3\cot 3A$

Watch Video Solution

21. Prove that: $\cos^2 48^0 - \sin^2 12^0 = \frac{\sqrt{5}+1}{8}$

Watch Video Solution

22. Find $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $\tan\frac{x}{2}$ of the following : $\tan x = -\frac{4}{3}$, x in quadrant II

Watch Video Solution

23. Find the values of $\frac{\cos \pi}{8}$

Watch Video Solution

24. Prove that:

$$\sin\left(\frac{\pi}{14}\right)\sin\left(\frac{3\pi}{14}\right)\sin\left(\frac{5\pi}{14}\right)\sin\left(\frac{7\pi}{14}\right)\sin\left(\frac{9\pi}{14}\right)\sin\left(\frac{11\pi}{14}\right)\sin\left(\frac{13\pi}{14}\right) =$$

Watch Video Solution

25. Prove that:

$$(1+\sec 2\theta)(1+\sec 4\theta)(1+\sec 8\theta)\ldots.(1+\sec 2^n\theta) = tan2^n\theta \cot\theta, n \in N$$

Watch Video Solution

26. If $\theta = \frac{\pi}{2^n+1}$, prove that: $2^n \cos\theta \cos 2\theta \cos 2^2 \cos 2^{n-1}\theta = 1.$

Watch Video Solution

27. Prove that: $\cos\left(\frac{\pi}{7}\right)\cos\left(\frac{2\pi}{7}\right)\cos\left(\frac{4\pi}{7}\right) = -\frac{1}{8}$

Watch Video Solution

28. If α and β are distinct roots of $a\cos\theta + b\sin\theta = c$, prove that $\sin(\alpha+\beta) = \frac{2ab}{a^2+b^2}$

Watch Video Solution

29. Prove that: $\sin^2\left(\frac{A}{2}+\frac{\pi}{8}\right) - \sin^2\left(\frac{A}{2}-\frac{\pi}{8}\right) = \frac{1}{\sqrt{2}}\sin A$

Watch Video Solution

30. Prove that: $\sin 4A = 4\cos^3 A\sin A - 4\sin^3 A\cos A$

Watch Video Solution

31. If $\tan A = \frac{1}{7} and \tan B = \frac{1}{3}$, show that $\cos 2A = \sin 4B$.

Watch Video Solution

32. If $2tan\frac{\alpha}{2} = \tan\left(\frac{\beta}{2}\right)$, prove that $\cos\alpha = \frac{3+5\cos\beta}{5+3\cos\beta}$

Watch Video Solution

33. If $a\cos 2\theta + b\sin 2\theta = c, \alpha$ and β as its roots, then prove that $\tan\alpha + tan\beta = \frac{2b}{a+c}, \tan\alpha \cdot tan\beta = \frac{c-a}{c+a}, \tan(\alpha+\beta) = \frac{b}{a}$

Watch Video Solution

34. If $\cos\alpha + \cos\beta = 0 = s \in \alpha + s \in \beta$, then prove that $\cos 2\alpha + \cos 2\beta = -2\cos(\alpha+\beta)$.

Watch Video Solution

35. Prove that:

$$15\frac{\sin(5\pi)}{12}+15\frac{\cos(5\pi)}{12}-20\frac{\sin^3(5\pi)}{12}-20\frac{\cos(5\pi)}{12}=0$$

Watch Video Solution

36. Prove that: $\sin\left(\frac{\pi}{5}\right)\sin\left(\frac{2\pi}{5}\right)\sin\left(3\frac{\pi}{5}\right)\sin\left(4\frac{\pi}{5}\right)=\frac{5}{16}$

Watch Video Solution

37. Find general solution of the trigonometric equation $\sin 5\theta = 1$

Watch Video Solution

38. Prove that: $\sin^4\left(\frac{\pi}{8}\right)+\sin^4\left(\frac{3\pi}{8}\right)+\sin^4\left(\frac{5\pi}{8}\right)+\sin^4\left(\frac{7\pi}{8}\right)=\frac{3}{2}$

Watch Video Solution

39. Prove that:$\tan 6^0 \tan 42^0 \tan 66^0 \tan 78^0 = 1$.

Watch Video Solution

40. If $\tan \alpha = \frac{1 - \cos \beta}{\sin \beta}$, *then* (a)$\tan 3\alpha = \tan 2\beta$ (b) $\tan 2\alpha = \tan \beta$ (c) $\tan 2\beta = \tan \alpha$ (d) none of these

Watch Video Solution

41. Prove that: $\sin 36^0 = \frac{\sqrt{10 - 2\sqrt{5}}}{4}$.

Watch Video Solution

42. The value of $\frac{\cos 3\theta}{2\cos 2\theta - 1}$ is equal to (a) $\cos \theta$ (b) $\sin \theta$ (c) $\tan \theta$ (d) none of these

Watch Video Solution

43. The value of $\cos^4\theta + \sin^4\theta - 6\cos^2\theta$ is (a) $\cos 2\theta$ (b) $\sin 2\theta$ (c) $\cos 4\theta$ (d) none of these

Watch Video Solution

44. Prove that: $\sin\left(\frac{\pi}{10}\right) + \sin\left(\frac{13\pi}{10}\right) = -\frac{1}{2}$

Watch Video Solution

45. If $\tan(\pi/4+\theta) + \tan(\pi/4-\theta) = \lambda \sec 2\theta, then\lambda = (a)3(b)4(c)1$ $(d)2$`

Watch Video Solution

46. Prove that: $\frac{1+\cos 4x}{\cot x - \tan x} = \frac{1}{2}\sin 4x$

Watch Video Solution

47. Prove that: $\frac{\cos 7x - \cos 8x}{1 + 2\cos 5x} = \cos 2x - \cos 3x$

Watch Video Solution

48. To prove $\frac{\cos 5x + \cos 4x}{1 - 2\cos 3x} = -\cos 2x - \cos x$

Watch Video Solution

49. If $\tan\theta = t, then \tan 2\theta + \sec 2\theta$ is equal to (a) $\frac{1+t}{1-t}$ (b) $\frac{1-t}{1+t}$ (c) $\frac{2t}{1-t}$ (d) $\frac{2t}{1+t}$

Watch Video Solution

50. Prove that: $\cot\frac{\pi}{24} = \sqrt{2} + \sqrt{3} + \sqrt{4} + \sqrt{6}$

Watch Video Solution

51. $\frac{\sec 8A - 1}{\sec 4A - 1}$ is equal to (A) $\frac{\tan 2A}{\tan 8A}$ (B) $\frac{\tan 8A}{\tan 2A}$ (C) $\frac{\cot 8A}{\cot 2A}$ (D) none of these

Watch Video Solution

52. If $A = 2\sin^2\theta - \cos 2\theta, then A$ lies in the interval (a) $[-1, 3]$ (b) $[1, 2]$ (c) $[-2, 4]$ (d) none of these

Watch Video Solution

53. Prove that $\frac{\tan 3x}{\tan x}$ never lies between $\frac{1}{3} and 3$.

Watch Video Solution

54. The value of $\left(\cot\left(\frac{x}{2}\right) - tan\left(\frac{x}{2}\right)\right)^2 (1 - 2\tan x \cot 2x)$ is (a)1 (b) 2 (c) 3 (d) 4

Watch Video Solution

55. Prove that $\cos^3 A + \cos^3(120^0 + A) + \cos^3(240^0 + A) = \frac{3}{4}\cos 3A$

Watch Video Solution

56. Simplify $2\sin^2\beta + 4\cos(\alpha+\beta)\sin\alpha\sin\beta + \cos 2(\alpha+\beta)$

Watch Video Solution

57. Prove that: $\tan\frac{\pi}{16} = \sqrt{4+2\sqrt{2}} - (\sqrt{2}+1)$

Watch Video Solution

58. Prove that: $\tan 142\frac{1^0}{2} = 2 + \sqrt{2} - \sqrt{3} - \sqrt{6}$

Watch Video Solution

59. Prove that: $\frac{\sec 8\theta - 1}{\sec 4\theta - 1} = \frac{\tan 8\theta}{\tan 2\theta}$

Watch Video Solution

60. Prove that: $(\cos A + \cos B)^2 + (\sin A - \sin B)^2 = 4\cos^2\left(\frac{A+B}{2}\right)$

.

Watch Video Solution

61. Prove that:

$$\left(1 + \cos.\frac{\pi}{8}\right)\left(1 + \cos.\frac{3\pi}{8}\right)\left(1 + \cos.\frac{5\pi}{8}\right)\left(1 + \cos.\frac{7\pi}{8}\right) = \frac{1}{8}$$

Watch Video Solution

62. If $\sin A = \frac{3}{5}$, where $0^0 < A < 90^0$, then find the values of $\sin 2A, \cos 2A, \tan 2A$ and $\sin 4A$

Watch Video Solution

63. Prove that: $\sin\left(\frac{\pi}{10}\right)\sin\left(\frac{13\pi}{10}\right) = -\frac{1}{4}$

Watch Video Solution

64. `Show that: sqrt(2+sqrt(2+sqrt(2+2cos8theta)))=2costheta,0 `

Watch Video Solution

65. If $\tan\alpha = \frac{1}{7}, \sin\beta = \frac{1}{\sqrt{10}},$ prove that$\alpha + 2\beta = \frac{\pi}{4}$, where `0

Watch Video Solution

66. If $\tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right) = \tan^3\left(\frac{\pi}{4} + \frac{\alpha}{2}\right)$ then $\sin(\theta) = \frac{\sin(\alpha)\left(3 + \sin^2(\alpha)\right)}{1 + 3\sin^2(\alpha)}$

Watch Video Solution

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

Watch Video Solution

68. Prove that: $tan\alpha+2\tan 2\alpha+4\tan 4\alpha+8\cot 8\alpha=\cot\alpha$

Watch Video Solution

69. If $tan\alpha=\frac{p}{q}$, where $\alpha=6\beta, \alpha$ being acute angle, prove that $\frac{1}{2}\{p\cos ec2\beta-q\sec 2\beta\}=\sqrt{p^2+q^2}$

Watch Video Solution

70. If $\cos\theta=\cos\alpha\cos\beta$, prove that $tan\frac{\theta+\alpha}{2}tan\frac{\theta-\alpha}{2}=tan^2\frac{\beta}{2}$.

Watch Video Solution

71. If $tan\frac{\theta}{2} = \sqrt{\frac{a-b}{a+b}}\frac{\tan\varphi}{2}$, prove that $\cos\theta = \frac{a\cos\varphi + b}{a + b\cos\varphi}$.

Watch Video Solution

72. Prove that:

$$\frac{2\cos 2^n\theta + 1}{2\cos\theta + 1} = (2\cos\theta - 1)(2\cos 2\theta - 1)\left(2\cos 2^2\theta - 1\right)\ldots\left(2\cos 2^{n-1}\theta - 1\right.$$

Watch Video Solution

73. If $tan\frac{\theta}{2} = \sqrt{\frac{a-b}{a+b}}\frac{\tan\varphi}{2}$, prove that $\cos\theta = \frac{a\cos\varphi + b}{a + b\cos\varphi}$.

Watch Video Solution

74. Prove that: $\sin 3e\sin^3 e + \cos 3e\cos^3 e = \cos^3 2e$

Watch Video Solution

75. If $\cos\alpha + \cos\beta + \cos\gamma = 0$, then prove that $\cos 3\alpha + \cos 3\beta + \cos 3\gamma = 12\cos\alpha\cos\beta\cos\gamma$

Watch Video Solution

76. If $\cos\theta = \frac{\cos\alpha\cos\beta}{1-\sin\alpha\sin\beta}$, prove that one value of $tan\frac{\theta}{2} = \frac{tan\frac{\alpha}{2} - tan\frac{\beta}{2}}{1 - tan\frac{\alpha}{2}tan\frac{\beta}{2}}$

Watch Video Solution

77. If $\cos\theta = \frac{\cos\alpha - \cos\beta}{1 - \cos\alpha.\cos\beta}$, prove that $tan\frac{\theta}{2} = \pm\frac{\tan\alpha}{2}\frac{\cot\beta}{2}$.

Watch Video Solution

78. $\sin 5A = 5\cos^4 A\sin A - 10\cos^2 A\sin^3 A + \sin^5 A$

Watch Video Solution

79. Prove that: $\cos 5A = 16\cos^5 A - 20\cos^3 A + 5\cos A$

Watch Video Solution

80. Prove that: $\sin 18^0 = \frac{\sqrt{5}-1}{4}$.

Watch Video Solution

81. Prove that: $|\sin\theta.\ \sin(60-\theta).\ \sin(60+\theta)| \leq \frac{1}{4}$ for all values of θ.

Watch Video Solution

82. Prove that: $\frac{\sin 2\theta}{1+\cos 2\theta} = tan\theta$

Watch Video Solution

83. Prove that $\frac{\sin(2\theta)}{1-\cos 2\theta} = \cot\theta$

Watch Video Solution

84. Prove that: $\frac{\cos 2\theta}{1+\sin 2\theta} = \tan\left(\frac{\pi}{4} - \theta\right)$

Watch Video Solution

85. Prove that: $\frac{1+\sin 2\theta + \cos 2\theta}{1+\sin 2\theta - \cos 2\theta} = \cot\theta$

Watch Video Solution

86. Prove that: $\frac{1+\sin\theta - \cos\theta}{1+\sin\theta + \cos\theta} = \tan\left(\frac{\theta}{2}\right)$

Watch Video Solution

87. Prove that: $\frac{\cos\theta}{1+\sin\theta} = \tan\left(\frac{\pi}{4} - \frac{\theta}{2}\right)$

Watch Video Solution

88. Prove that: $\sin 10^0 \sin 30^0 \sin 50^0 \sin 70^0 = \frac{1}{16}$.

Watch Video Solution

89. Prove that : $\cos 4x = 1 - 8\sin^2 x \cos^2 x$

Watch Video Solution

90. Prove that: $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

Watch Video Solution

91. Prove that : $\frac{\sin x - \sin 3x}{\sin^2 x - \cos^2 x} = 2\sin x$

Watch Video Solution

92. Express each of the following as the sum or difference of sines and cosines: $2\sin 4\theta \sin 3\theta$

Watch Video Solution

93. Show that $\sqrt{3}\cos ec\, 20^0 - \sec 20^0 = 4.$

Watch Video Solution

94. Prove that: $\tan 4\theta = \dfrac{4tan\theta\left(1-\tan^2\theta\right)}{1-6\tan^2\theta+\tan^4\theta}$

Watch Video Solution

95. If $\tan x = \dfrac{3}{4}, \pi < x < \dfrac{3\pi}{2}$, find the values of $\sin\dfrac{x}{2}, \cos\dfrac{x}{2}$ and $\tan\dfrac{x}{2}.$

Watch Video Solution

96. Prove that : $\cos 20^0 \cos 40^0 \cos 60^0 \cos 80^0 = \frac{1}{16}$

Watch Video Solution

97. Prove that : $\cos\left(\frac{\pi}{7}\right)\cos\left(\frac{2\pi}{7}\right)\cos\left(\frac{3\pi}{7}\right) = \frac{1}{8}$

Watch Video Solution

98. Show that: $\sin 50^0 \cos 95^0 = \frac{\sqrt{2}\sin 35^0 - 1}{2\sqrt{2}}$

Watch Video Solution

99. Prove that $\cos\left(\frac{2\pi}{15}\right)\cos\left(\frac{4\pi}{15}\right)\cos\left(\frac{8\pi}{15}\right)\cos\left(\frac{14\pi}{15}\right) = \frac{1}{16}$

Watch Video Solution

100. $\sin\left(\frac{\pi}{18}\right) \cdot \sin\left(5\frac{\pi}{18}\right) \cdot \sin\left(7\frac{\pi}{18}\right)$

Watch Video Solution

101. Prove:

$\cos\left(\frac{\pi}{15}\right)\cos\left(\frac{2\pi}{15}\right)\cos\left(\frac{3\pi}{15}\right)\cos\left(\frac{4\pi}{15}\right)\cos\left(\frac{5\pi}{15}\right)\cos\left(\frac{6\pi}{15}\right)\cos\left(\frac{7\pi}{15}\right) = \frac{1}{2^7}$

Watch Video Solution

102. If $\sin\alpha + \sin\beta = a$ and $\cos\alpha + \cos\beta = b$ prove that: $\cos(\alpha - \beta) = \left(\frac{a^2 + b^2 - 2}{2}\right)$

Watch Video Solution

103. If $\sin\alpha + \sin\beta = a, \cos\alpha + \cos\beta = b \Rightarrow \sin(\alpha + \beta)$=

Watch Video Solution

104. Prove that $\sqrt{\frac{1-\cos 2\theta}{1+\cos 2\theta}} = \tan\theta$ where $\tan\theta > 0$

Watch Video Solution

105. Prove that: $\frac{\sin 2\theta}{1-\cos 2\theta} = \cot\theta$

Watch Video Solution

106. Prove that: $\frac{\sin 2\theta}{1+\cos 2\theta} = tan\theta$

Watch Video Solution

107. Prove that: $\sqrt{2+\sqrt{2+2\cos 4\theta}} = 2\cos\theta$

Watch Video Solution

108. Prove : $\frac{1+\sin 2\theta-\cos 2\theta}{1+\sin 2\theta+\cos 2\theta}=\tan\theta$

Watch Video Solution

109. Prove that : $\frac{\sin\theta+\sin 2\theta}{1+\cos\theta+\cos 2\theta}=\tan\theta$

Watch Video Solution

110. Prove that: $\frac{\cos 2\theta}{1+\sin 2\theta}=\tan\left(\frac{\pi}{4}-\theta\right)$

Watch Video Solution

111. Prove that: $\frac{\cos\theta}{1+\sin\theta}=\tan\left(\frac{\pi}{4}-\frac{\theta}{2}\right)$

Watch Video Solution

112. Prove that: $\sin^2\left(\frac{\pi}{8}\right)+\sin^2\left(\frac{3\pi}{8}\right)+\sin^2\left(\frac{5\pi}{8}\right)+\sin^2\left(\frac{7\pi}{8}\right)=2$

Watch Video Solution

113. Prove that: $(\cos\alpha+\cos\beta)^2+(\sin\alpha+\sin\beta)^2=4\cos^2\left(\frac{\alpha-\beta}{2}\right)$

Watch Video Solution

114. Prove that: $1+\cos^2 2\theta=2\left(\cos^4\theta+\sin^4\theta\right)$

Watch Video Solution

115. Prove that :$\cos^3 2\theta+3\cos 2\theta=4\left(\cos^6\theta-\sin^6\theta\right)$

Watch Video Solution

116. Prove that : $(\sin 3A+\sin A)\sin A+(\cos 3A-\cos A)\cos A=0$

Watch Video Solution

117. Prove that:$\cos^2\left(\frac{\pi}{4}-\theta\right)-\sin^2\left(\frac{\pi}{4}-\theta\right)=\sin 2\theta$

Watch Video Solution

118. Prove that: $\cos 4A = 1 - 8\cos^2 A + 8\cos^4 A$

Watch Video Solution

119. Prove that

$3(\sin x - \cos x)^4 + 4(\sin^6 x + \cos^6 x) + 6(\sin x + \cos x)^2 = 13$

Watch Video Solution

120. $\cos^6 A - \sin^6 A = \cos 2A\left(1 - \frac{1}{4}\sin^2 2A\right)$

Watch Video Solution

121. Prove that: $\tan\left(\frac{\pi}{4}+\theta\right)+\tan\left(\frac{\pi}{4}-\theta\right)=2\sec 2\theta$.

Watch Video Solution

122. Prove that: $\cot^2 A-\tan^2 A=4\cot 2A\cos ec2A$

Watch Video Solution

123. $\sin 4A=4\sin A\cos^3 A-4\cos A\sin^3 A$

Watch Video Solution

124. Prove that: $\sin 3x+\sin 2x-\sin x=4\sin x\cos\left(\frac{x}{2}\right)\cos\left(\frac{3x}{2}\right)$

Watch Video Solution

125. If $\cos x = -\frac{3}{5} and\ x$ lies in the IIIrd quadrant, find the values of $\cos\left(\frac{x}{2}\right), \sin\left(\frac{x}{2}\right) and\ \sin 2x$.

Watch Video Solution

126. If $\cos x = -\frac{3}{5} and\ x$ lies in IInd quadrant, find the values of $\sin 2x\ and \sin\left(\frac{x}{2}\right)$.

Watch Video Solution

127. If $\sin x = \frac{\sqrt{5}}{3} and\ x$ lies in IInd quadrant, find the values of $\cos\left(\frac{x}{2}\right), \sin\left(\frac{x}{2}\right) and \tan\left(\frac{x}{2}\right)$.

Watch Video Solution

128. Prove that $1 + \cos^2 2\theta = 2\left(\cos^4\theta + \sin^4\theta\right)$

Watch Video Solution

129. If $\cos\theta = \frac{4}{5} and\ \theta$ is acute, find the $tan2\theta$

Watch Video Solution

130. If $\sin\theta = \frac{4}{5}$ and $0 < \theta < \frac{\pi}{2}$, find the value of $\sin 4\theta$

Watch Video Solution

131. Prove that: $\cos 7^0 \cos 14^0 \cos 28^0 \cos 56^0 = \frac{\sin 68^0}{16\cos 83^0}$

Watch Video Solution

132. Prove that: $\cos\left(\frac{\pi}{5}\right)\cos\left(\frac{2\pi}{5}\right)\cos\left(\frac{4\pi}{5}\right)\cos\left(\frac{8\pi}{5}\right) = \frac{-1}{16}$

Watch Video Solution

133.

$$\cos\left(\frac{\pi}{65}\right)\cos\left(\frac{2\pi}{65}\right)\cos\left(\frac{4\pi}{65}\right)\cos\left(\frac{8\pi}{65}\right)\cos\left(\frac{16\pi}{65}\right)\cos\left(\frac{32\pi}{64}\right)=\frac{1}{64}$$

Watch Video Solution

134. If $2\,tan\alpha = 3tan\beta$, prove that $\tan(\alpha-\beta)=\dfrac{\sin 2\beta}{5-\cos 2\beta}$

Watch Video Solution

135. $\sin\alpha+\sin\beta=a, \cos\alpha+\cos\beta=b \Rightarrow \sin(\alpha+\beta)$

Watch Video Solution

136. If $\sin\alpha+\sin\beta=a$ and $\cos\alpha+\cos\beta=b$ prove that:

$$\cos(\alpha-\beta)=\left(\frac{a^2+b^2-2}{2}\right)$$

Watch Video Solution

137. If $\cos\theta = \frac{\cos\alpha + \cos\beta}{1 + \cos\alpha\cos\beta}$, prove that $\frac{\tan\theta}{2} = = -\frac{\tan\alpha}{2}\frac{\tan\beta}{2}$

Watch Video Solution

138. If $\sec(\theta+\alpha) + \sec(\theta-\alpha) = 2\,sec\theta$, prove that $\cos\theta = \pm\sqrt{2}\frac{\cos\alpha}{2}$.

Watch Video Solution

139. If $\cos\alpha = \frac{4}{5}$ and $\cos\beta = \frac{5}{13}$, prove that $\frac{\cos(\alpha-\beta)}{2} = \frac{28}{65}$.

Watch Video Solution

140. Prove that: $8\frac{\cos^3\pi}{9} - 6\frac{\cos\pi}{9} = 1.$

Watch Video Solution

141. Prove that: $108\frac{\sin\pi}{18} - 144\frac{\sin^3\pi}{18} = 18$

Watch Video Solution

142. Prove that $\cos 6A = 32\cos^6 A - 48\cos^4 A + 18\cos^2 A - 1$

Watch Video Solution

143. Prove that : $\cos A\cos(60 - A)\cos(60 + A) = \frac{1}{4}\cos 3A$

Watch Video Solution

144. Prove that: $\sin A\sin(60 - A)\sin(60 + A) = \frac{1}{4}\sin 3A$.

Watch Video Solution

145. Prove that: $\sin 20^0\sin 40^0\sin 60^0\sin 80^0 = \frac{3}{16}$

Watch Video Solution

146. prove $\sin(5\theta) = 16\sin^5(\theta) - 20\sin^3(\theta) + 5\sin(\theta)$

Watch Video Solution

147. Prove that $4\left(\cos^3 10^\circ + \sin^3 20^\circ\right) = 3(\cos 10^\circ + \sin 20^\circ)$.

Watch Video Solution

148. Prove the following identity: $\cos^3\theta \sin 3\theta + \sin^3\theta \cos 3\theta = \frac{3}{4}\sin 4\theta$.

Watch Video Solution

149. Prove the following identity:

$tan\theta tan\left(\theta + 60^0\right) + tan\theta \tan\left(\theta - 60^0\right) + \tan\left(\theta + 60^0\right)\tan\left(\theta - 60^0\right) = -$

Watch Video Solution

150. Prove that: $tanA + \tan(60^0 + A) - tan(60^0 - A) = 3tan3A$

Watch Video Solution

151. Prove that: $\cot A + \cot(60^0 + A) - \cot(60^0 - A) = 3\cot 3A$

Watch Video Solution

152. Prove the following identity:

$\cot A + \cot(60^0 + A) + \cot(120^0 + A) = 3\cot 3A$

Watch Video Solution

153. Prove that:

$\sin^3 A + \sin^3\left(\frac{2\pi}{3} + A\right) + \sin^3\left(\frac{4\pi}{3} + A\right) = -\frac{3}{4}\sin 3A.$

Watch Video Solution

154. Prove that: $\left|\cos\theta\cos\left(60^0-\theta\right)\cos\left(60^0+\theta\right)\right| \leq \frac{1}{4}$ for all values of θ.

Watch Video Solution

155. Prove that: $\sin\left(\frac{\pi}{5}\right)\sin 2\frac{\pi}{5}\sin 3\frac{\pi}{5}\sin 4\frac{\pi}{5} = \frac{5}{16}$

Watch Video Solution

156. Prove that $\cos\left(\frac{2\pi}{15}\right)\cos\left(\frac{4\pi}{15}\right)\cos\left(\frac{8\pi}{15}\right)\cos\left(\frac{16\pi}{15}\right) = \frac{1}{16}$

Watch Video Solution

157. Prove that: $\sin 12^0\sin 48^0\sin 54^0 = \frac{1}{8}$.

Watch Video Solution

158. The value oif the expressin $\left(1+\frac{\cos\pi}{10}\right)\left(1+\frac{\cos(3\pi)}{10}\right)\left(1+\frac{\cos(7\pi)}{10}\right)\left(1+\frac{\cos(9\pi)}{10}\right)$ is

Watch Video Solution

159. Prove that ; $4\sin 27^\circ = (5+\sqrt{5}) - \sqrt{(3-\sqrt{5})}$ we have

Watch Video Solution

160. Prove that : $\sin^2(72^\circ) - \sin^2(60^\circ) = \frac{\sqrt{5}-1}{8}$

Watch Video Solution

161. Prove that: $\sin^2 24^0 - \sin^2 6^0 = \frac{\sqrt{5}-1}{8}$

Watch Video Solution

162. Prove that: $\sin^2 42^0 - \cos^2 78^0 = \frac{\sqrt{5}+1}{8}$

Watch Video Solution

163. Prove that: $\cos 78^0 \cos 42^0 \cos 36^0 = \frac{1}{8}$

Watch Video Solution

164. Show that $\cos\left(\frac{\pi}{15}\right)\cos\left(\frac{2\pi}{15}\right)\cos\left(\frac{3\pi}{15}\right)\cos\left(\frac{4\pi}{15}\right)\cos\left(\frac{5\pi}{15}\right)\cos\left(\frac{6\pi}{15}\right)\cos\left(\frac{7\pi}{15}\right) = \frac{1}{2^7}$

Watch Video Solution

165. Prove that $\cos 6^\circ . \cos 42^\circ . \cos 66^\circ \cos 78^\circ = \frac{1}{16}$

Watch Video Solution

166. Prove that: $\sin 6^0 \sin 42^0 \sin 66^0 \sin 78^0 = \frac{1}{16}$

Watch Video Solution

167. Prove that: $\sin 36^0 s \in 72^0 s \in 108^0 s \in 144^0 = \frac{5}{16}$.

Watch Video Solution

168. If $\cos 4x = 1 + k \sin^2 x \cos^2 x$, then write the value of k.

Watch Video Solution

169. If $\frac{\tan x}{2} = \frac{m}{n}$, then write the the value of $m \sin x + n \cos x$.

Watch Video Solution

170. If $\frac{\pi}{2} < \theta < \frac{3\pi}{2}$ then write the value of $\sqrt{\frac{1 + \cos 2\theta}{2}}$

Watch Video Solution

171. If pi/2

Watch Video Solution

172. If `pi/2

Watch Video Solution

173. If `pi

Watch Video Solution

174. Write the value of $\cos^2 76^\circ + \cos^2 16^\circ - \cos 76^\circ \cos 16^\circ$

Watch Video Solution

175. If $\left(\frac{\pi}{4}\right) < \theta < \left(\frac{\pi}{2}\right)$,then write the value of $\sqrt{1-\sin 2\theta}$

Watch Video Solution

176. Prove that: $\cos\left(\frac{\pi}{7}\right)\cos\left(2\frac{\pi}{7}\right)\cos\left(4\frac{\pi}{7}\right) = -\frac{1}{8}$,

Watch Video Solution

177. If $\sin x + \cos x = a$, find the value of $\sin^6 x + \cos^6 x$.

Watch Video Solution

178. If $\sin x + \cos x = a$, find the maximum and minimum value of a

Watch Video Solution

179. $8 \cdot \sin\left(\frac{x}{8}\right) \cdot \cos\left(\frac{x}{2}\right) \cdot \cos\left(\frac{x}{4}\right) \cdot \cos\left(\frac{x}{8}\right) =$

Watch Video Solution

180. Show that $\cos\left(\frac{\pi}{65}\right)\cos\left(\frac{2\pi}{65}\right)\cos\left(\frac{4\pi}{65}\right)\cos\left(\frac{8\pi}{65}\right)\cos\left(\frac{16\pi}{65}\right)\cos\left(\frac{32\pi}{65}\right)=\frac{1}{64}$

Watch Video Solution

181. For all real values of x, $\cot x - 2\cot 2x$ is equal to a.$\tan 2x$ b. $tanx$ c. $\cot 3x$ d. none of these

Watch Video Solution

182. The value of $2\frac{\tan\pi}{10}+3\frac{\sec\pi}{10}-4\frac{\cos\pi}{10}$ is 0 b. 1 c. $\sqrt{5}$ d. none of these

Watch Video Solution

183. If in a $\Delta ABC, \tan A + \tan B + \tan C = 6$ then $\cot A \cot B \cot C =$ $a.6, b.\ 1, c.\ \frac{1}{6}, d.$ none of these

Watch Video Solution

184. If $\sin\alpha + \sin\beta = a\ and\ \cos\alpha - \cos\beta = b,$ then $\frac{\tan(\alpha-\beta)}{2} =$ $-\frac{a}{b}$ b. $\frac{b}{a}$ c. $\sqrt{a^2+b^2}$ d. none of these

Watch Video Solution

185. The value of $tan\theta \sin\left(\frac{\pi}{2}+\theta\right)\cos\left(\frac{\pi}{2}-\theta\right)$ is -1 b. 1 c. $\frac{1}{2}\sin 2\theta$ d. none of these

Watch Video Solution

186. Prove that: $\frac{\sin^2\pi}{18} + \frac{\sin^2\pi}{9} + \frac{\sin^2(7\pi)}{18} + \frac{\sin^2(4\pi)}{9} = 2$

Watch Video Solution

187. If $A = 2\sin^2\theta - \cos 2\theta, then A$ lies in the interval (a)$[-1, 3]$ (b) $[1, 2]$ (c) $[-2, 4]$ (d) none of these

Watch Video Solution

188. The value of $\cos^2\left(\frac{\pi}{6} + \theta\right) - \sin^2\left(\frac{\pi}{6} - \theta\right)$ is $(a)\frac{1}{2}\cos 2\theta$ $(b)0$ $(c) -\frac{1}{2}\cos 2\theta$ $(d).\ \frac{1}{2}$

A. (a).$\frac{1}{2}\cos 2\theta$ (b). 0

B. null

C. null

D. null

Answer: null

Watch Video Solution

189. The value of $\frac{\cos 3\theta}{2\cos 2\theta - 1}$ is equal to (a) $\cos\theta$ (b) $\sin\theta$ (c) $\tan\theta$ (d) none of these

Watch Video Solution

190. The value of $\frac{2\left(\sin 2\theta + 2\cos^2\theta - 1\right)}{\cos\theta - \sin\theta - \cos 3\theta + \sin 3\theta}$ is $a.\ \cos\theta$ b. $\sec\theta$ c. $\cos ec\theta$ d. $\sin\theta$

Watch Video Solution

191. $2\left(1 - 2\sin^2 7\theta\right)\sin 3\theta$ is equal to $a.\ \sin 17\theta - \sin 11\theta$ b. $\sin 11\theta - \sin 17\theta$ c. $\cos 17\theta - \cos 11\theta$ d. $\cos 17\theta + \cos 11\theta$

Watch Video Solution

192. $\cos(36^\circ - A)\cos(36^\circ + A) + \cos(54^\circ + A)\cos(54^\circ - A) = \cos 2A$

Watch Video Solution

193. Prove that: $tan\theta \tan\left(60^0 - \theta\right)\tan\left(60^0 + \theta\right) = \tan 3\theta$.

Watch Video Solution

194. $\tan\theta + \tan\left(60^0 + \theta\right) + \tan\left(120^0 + \theta\right) = 3\tan 3\theta$

Watch Video Solution

195. $\dfrac{\sin(5\theta)}{\sin\theta}$ is equal to

$a.16\cos^4\theta - 12\cos^2\theta + 1,\ b.16\cos^4\theta + 12\cos^2\theta + 1,\ c.16\cos^4\theta - 12\cos^2\theta$

Watch Video Solution