MATHS

BOOKS - MBD MATHS (ODIA ENGLISH)

TRIGONOMETRIC FUNCTIONS

Question Bank

1. State which of the following are positive ? $\cos 271^\circ$

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2. State which of the following are positive ? $\sec 73^\circ$

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3. State which of the following are positive ? $\sin 302^\circ$

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4. State which of the following are positive ? $\cos ec159^\circ$

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5. State which of the following are positive ? $\sec 199^\circ$

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6. State which of the following are positive ? $\cos ec126^\circ$

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7. State which of the following are positive ? $\cos 315^\circ$

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8. State which of the following are positive ? $\cot 375^\circ$

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9. Express the following as trigonometric ratios of some acute angles. $\sin 1185^\circ$

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10. Express the following as trigonometric ratios of some acute angles. $\tan 235^\circ$

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11. Express the following as trigonometric ratios of some acute angles.

$\sin(-3333^\circ)$

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12. Express the following as trigonometric ratios of some acute angles.

$\cot(-3888^\circ)$

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13. Express the following as trigonometric ratios of some acute angles.

$\tan 458^\circ$

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14. Express the following as trigonometric ratios of some acute angles.

$\cos ec(-60^\circ)$

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15. Express the following as trigonometric ratios of some acute angles.

$\cos 500^\circ$

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16. Express the following as trigonometric ratios of some acute angles.

$\sec 380^\circ$

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17. Find the domains of tangent and cotangent functions.

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18. Determine the ranges of sine and cosine functions.

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19. Find a value of A when $\cos 2A = \sin 3A$

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20. Find the value of $\cos 1^\circ, \cos 2^\circ \ldots . \cos 100^\circ$

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21. Find the value of $\cos 24^\circ + \cos 5^\circ + \cos 175^\circ + \cos 204^\circ + \cos 300^\circ$

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22. Evaluate $\tan\left(\frac{\pi}{20}\right).\tan\left(\frac{3\pi}{20}\right).\tan\left(\frac{5\pi}{20}\right).\tan\left(\frac{7\pi}{20}\right).\tan\left(\frac{9\pi}{20}\right)$

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23. Show that $\frac{\sin^3(180^\circ + A).\tan(360^\circ - A)\sec^2(180 - A)}{\cos^2(90^\circ + A)\cos ec^2 A.\sin(180 - A)} = \tan^3 A$

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24. If $A = \cos^2\theta + \sin^4\theta$ then prove that for all values of θ, $\frac{3}{4} \leq A \leq 1$.

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25. In the following questions, write 'T' for truee and 'F' for false statements. If tanx + tany = 5 and tanx. tany =1/2 then cot(x+y) = 10

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26. In the following questions, write 'T' for ture and 'F' for false statements. $\sqrt{3}(1 + \tan 15^\circ) = 1 - \tan 15^\circ$

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27. In the following questions, write 'T' for true and 'F' for false statements. If θ lies in 3rd quadrant, then $\frac{\cos(\theta)}{2} + \frac{\sin(\theta)}{2}$ is positive.

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28. In the following questions, write 'T' for ture and 'F' for false statements. $2\sin 105^\circ . \sin 15^\circ = \frac{1}{2}$

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29. In the following questions, write 'T' for true and 'F' for false statements. If $\cos A = \frac{1}{2} . \cos B = 1$ then $\tan\left(\frac{A+B}{2}\right) . \tan\left(\frac{A-B}{2}\right) = 1$

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30. In the following questions, write 'T' for ture and 'F' for false statements. $\cos 15^\circ \cos 7\frac{1}{2}^\circ \sin 7\frac{1}{2}^\circ = 1$

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31. In the following questions, write 'T' for ture and 'F' for false statements. $\sin 20^\circ (3 - 4\cos 270^\circ) = \frac{\sqrt{3}}{2}$

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32. In the following questions, write 'T' for ture and 'F' for false statements. $\sqrt{3}\left(3\tan 10^\circ - \tan^3 (10)^\circ\right) = 1 - 3\tan^2 (10)^\circ$

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33. In the following questions, write 'T' for ture and 'F' for false statements. $\left(2\tan 7\frac{1^\circ}{2}\frac{\left(1-\tan^2 7\frac{1^\circ}{2}\right)}{\left(1+\tan^2 7\frac{1^\circ}{2}\right)^2}\right.$=1

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34. In the following questions, write 'T' for ture and 'F' for false statements. The minimum value of $\sin\theta\cos\theta is(-1)^2$.

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35. Fill in the gaps with correct answers. If α and β lie in 1st and 2nd quadrants respectively, and if sin α = (1)/2, sin β = (1)/3, then sin $(\alpha+\beta)$ = _____.

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36. Fill in the gaps with correct answer . $\tan\alpha$ = (1)/2, $\tan\beta$ = (1)/3, then $\alpha+\beta$ = _____

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37. Fill in the gaps with correct answer . The value of $\frac{\cos 15^\circ + \sin 15^\circ}{\cos 15^\circ - \sin 15^\circ}$ = ____

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38. Fill in the gaps with correct answer . If $\frac{1+\sin A}{\cos A} = \sqrt{2}+1$, then the value of $\frac{1-\sin A}{\cos A}$ is _____.

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39. Fill in the gaps with correct answer . $\sin 105^\circ . \cos 105^\circ$ = _____.

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40. Fill in the gaps with correct answer. $2 \sin 67 \frac{1^{\circ}}{2} \cos 22 \frac{1^{\circ}}{2}$ = ____.

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41. Fill in the gaps with correct answer . $\sin 35^{\circ} + \cos 5^{\circ}$ = _____.

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42. Fill in the gaps with correct answer . $\sin^2 (24)^{\circ} - \sin^2 (6)^{\circ}$ = _____.

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43. Fill in the gaps with correct answer . $\sin 70^{\circ} \left(4 \cos^2 (20)^{\circ} - 3\right)$ = _____.

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44. Fill in the gaps with correct answer choosing from the brackets. $\cos 3\theta + \sin 3\theta$ is maximum if theta = ____.$(60^\circ, 15^\circ, 45^\circ)$

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45. Fill in the gaps with correct answer. $\sin 15^\circ - \cos 15^\circ$ = ____

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46. Fill in the gaps with correct answer . If θ lies in the third quadrant and $\tan\theta = 2$ then the value of $\sin\theta$ is _____

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47. Fill in the gaps with correct answer choosing from the brackets. The correct expression is _____.$(\sin 1^0 > \sin 1, \sin 1^0 < \sin 1, \sin 1^0 = \sin 1)$

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48. Fill in the gaps with correct answer choosing from the brackets. The correct expression is _____.(sin 1^0 > sin1,sin1^0 < sin1, sin1^0 =sin1)

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49. Prove the sinA.sin(B-C) + sinB.sin(C-A) + sinC.sin(A-B) = 0

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50. Prove the cosA.sinB(B-C) + cosB.sin(C-A) + cosC.sin(A-B) = 0

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51. Prove that $\frac{\sin(B-C)}{\sin B.\sin C}+\frac{\sin(C-A)}{\sin C\sin A}+\frac{\sin(A-B)}{\sin A.\sin B}=0$

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52. Prove that $\tan^2 A - \tan^2 B = \dfrac{\sin(A+B).\sin(A-B)}{\cos^2 A.\cos^2 B}$

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53. Prove the $\tan 75^\circ + \cot 75^\circ = 4$

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54. Prove that $\sin^2 (18)^\circ + \cos^2 (36)^\circ = \dfrac{3}{4}$

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55. Prove that $\sin 18^\circ . \cos 36^\circ = \dfrac{1}{4}$

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56. Prove that $\sin 15^\circ = \dfrac{\sqrt{3}-1}{2\sqrt{2}}$

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57. Prove that $\cot\left(\frac{\pi}{8}\right) - \tan\left(\frac{\pi}{8}\right) = 2$

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

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59. Prove the $\tan 10^\circ + \tan 35^\circ + \tan 10^\circ . \tan 35^\circ = 1$

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60. Prove that $\cot 2A = \frac{\cot^2 A - 1}{2 \cot A}$

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61. Prove that $\frac{\sin B}{\sin A} = \frac{\sin(2A + B)}{\sin A} - 2\cos(A + B)$

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62. Prove that $\frac{\sin 2A + \sin 2B}{\sin 2A - \sin 2B} = \frac{\tan(A + B)}{\tan(A - B)}$

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63. Prove that $\frac{\cot A - \tan A}{\cot A + \tan A} = \cos 2A$

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64. Prove that $\frac{\sin 2A + \sin 5A - \sin A}{\cos 2A + \cos 5A + \cos A} = \tan 2A$

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65. Prove that $\cot A - \tan A = 2\cot 2A$

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66. Prove that $\cot A - \operatorname{cosec} 2A = \cot 2A$

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67. Prove that $\dfrac{\cos A - \sin A}{\cos A + \sin A} = \sec 2A - \tan 2A$

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68. Prove that $\tan\theta(1 + \sec 2\theta) = \tan 2\theta$

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69. Prove that $\dfrac{\sin A + \sin B}{\sin A - \sin B} = \tan\left(\dfrac{A+B}{2}\right).\cot\left(\dfrac{A-B}{2}\right)$

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70. Prove that $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ = 0$

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71. Prove that $\cos 80^\circ + \cos 40^\circ - \cos 20^\circ = 0$

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72. Prove that $8\sin 10^\circ . \sin 50^\circ . \sin 70^\circ = 1$

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73. Prove that $4 \sin A \sin(60^\circ - A)\sin(60^\circ + A) - \sin 3A = 0$

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74. Prove that $\tan 3A - \tan 2A - \tan A = \tan 3A \tan 2A \tan A$

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75. Prove that $\tan\frac{A}{2}=\sqrt{\frac{1-\cos A}{1+\cos A}}$

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76. Prove that $\sqrt{\frac{1+\sin A}{1-\sin A}}=\tan\left(\frac{\pi}{4}+\frac{A}{2}\right)$

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77. Prove that $\frac{1+\tan\left(\frac{A}{2}\right)}{1-\tan\left(\frac{A}{2}\right)}=\sec A+\tan A$

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

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79. Prove that $\cot\left(\frac{A}{2}\right) = \frac{\sin A}{1 - \cos A}$

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80. Find the maximum value of the $5\sin x + 12\cos x$

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81. Find the maximum value of the $24\sin x - 7\cos x$

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82. Find the maximum value of the $2 + 3\sin x + 4\cos x$

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83. Find the maximum value of the $8\cos x - 15\sin x - 2$

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84. If $\tan A = \frac{13}{27}, \tan B = \frac{7}{20}$ and A,B are acute, show that A+B $=45^\circ$

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85. If $\tan\theta = \frac{b}{a}$, find the value of $a\cos 2\theta + b\sin 2\theta$

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86. If $\sec A - \tan A = \frac{1}{2}$ and $\{0 < A < 90^\circ\}$ then show that $\sec A = \frac{5}{4}$

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87. If $\sin\theta + \sin\phi = a$ and $\cos\theta + \cos\phi = b$ then show that $\tan\left(\frac{\theta+\phi}{2}\right) = \frac{a}{b}$

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88. If $\tan\theta = \frac{a\sin x + b\sin y}{a\cos x + b\cos y}$ then show that $a\sin(\theta - x) + b\sin(\theta - y) = 0$

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89. If $\tan\theta = \frac{a\sin x + b\sin y}{a\cos x + b\cos y}$ then show that $a\sin(\theta - x) + b\sin(\theta - y) = 0$

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90. If A+C=B show that tanA.tanB.tanC=tanB-tanA-tanC

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91. If $\tan A = \frac{1}{5}, \tan B = \frac{2}{3}$ show that $\cos 2A = \sin 2B$

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92. If $\cos 2A = \tan^2 B$ then show that $\cos 2B = \tan^2 A$

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93. In triangle ABC, prove that tan(B+C)/2=cot(A/2)`

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94. In triangle ABC , prove that cos(A+B)+sinC=sin(A+B)-cosC

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95. If $A+B+C=\pi$ and cosA=cosB.cosC show that $\tan B+\tan C=\tan A$

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96. If $A+B+C=\pi$ and cosA=cosB.cosC show that $2\cot B.\cot C=1$

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97. Prove the following :

$\cos(A-D)\sin(B-C)+\cos(B-D)\sin(C-A)+\cos(C-D)\sin(A-$

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98. Prove the following : sin2A+sin2B+sin2(A-B)

= 4sinA.cosB.cos(A-B)

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99. Prove the following : cos2A+cos2B+cos2(A-B)+1

= 4cosA.cosB.cos(A-B)

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100. Prove the following : sin2A+sin2B+sin2C-sin2(A+B+C)

4sin(B+C)sin(C+A)sin(A+B)

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101. Prove the following : sinA+sin3A+sin5A

=sin3A(1+2cos2A)

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102. Prove the following :

$\sin A - \sin 3A + \sin 5A = \sin 3A(2\cos 2A - 1)$

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103. Prove the following : cos(A+B)+sin(A-B)

2sin$(45^\circ$+A)cos$(45^\circ$+B)

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104. Prove the following : cos4A-cos4B

= 8(cosA-cosB)(cosA+cosB)(cosA-sinB)(cosA+sinB)

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105. Prove the following : $\frac{1 - \tan^2(45^\circ - A)}{1 + \tan^2(45^\circ - A)}$ = sin2A

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106. Prove the following : $\frac{\cos A + \sin A}{\cos A - \sin A} - \frac{\cos A - \sin A}{\cos A + \sin A}$

= 2tan2A

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107. Prove the following : $\frac{1 - \cos 2A + \sin 2A}{1 + \cos 2A + \sin 2A} = \tan A$

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108. Prove the following : $\frac{\sin(A + B) + \cos(A - B)}{\sin(A - B) + \cos(A + B)}$

= sec2B+tan2B

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109. Prove the following : $\frac{\cos 7\alpha + \cos 3\alpha - \cos 5\alpha - \cos \alpha}{\sin 7\alpha - \sin 3\alpha - \sin 5\alpha + \sin \alpha}$

$= \cot 2\alpha$

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110. Prove the following : $\frac{\sin\theta + \sin 3\theta + \sin 5\theta + \sin 7\theta}{\cos\theta + \cos 3\theta + \cos 5\theta + \cos 7\theta} = \tan 4\theta$

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111. Prove the following : Express 4cosA.cosB.cosC as the sum of four cosines.

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112. Express cos2A+cos2B+cos2C+cos2(A+B+C) as the product of three cosines.

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113. Prove the following : $\cos^6 A - \sin^6 A$

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

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114. Prove the following : $\cos^6 A + \sin^6 A$

$= \frac{1}{4}(1 + 3\cos^2 2A)$

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115. Prove the following : $\cos^3 A.\cos 3A + \sin^3 A \sin 3A$

$= \cos^3 2A$

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116. Prove the following : $\sin^4\theta = \frac{3}{8} - \frac{1}{2}\cos 2\theta + \frac{1}{8}\cos 4\theta$

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117. Prove the following : $\cot 3A = \dfrac{\cot^3 A - 3\cot A}{3\cot^2 A - 1}$

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118. Prove the following : $\tan 4\theta = \dfrac{4\tan\theta - 4\tan^3\theta}{1 - 6\tan^2\theta + \tan^4\theta}$

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119. Prove the following : $\dfrac{1}{\tan 3A - \tan A} - \dfrac{1}{\cot 3A - \cot A}$

= cot2A`

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120. Prove the following : $\dfrac{\cot A}{\cot A - \cot 3A} - \dfrac{\tan A}{\tan 3A - \tan A}$ =1

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121. Find the value of

$\sin 3^\circ, \cos 3^\circ$

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122. If sinA+sinB=a and cosA+cosB=b, show that

$$\tan(A+B) = \frac{2ab}{b^2 - a^2}$$

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123. If sinA+sinB=a and cosA+cosB=b, show that

$$\sin(A+B) = \frac{2ab}{b^2 + a^2}$$

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124. If sinA+sinB=a and cosA+cosB=b, show that

$$\cos(A+B) = \frac{b^2 - a^2}{b^2 + a^2}$$

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125. Prove the following : $\frac{1+\sin A-\cos A}{1+\sin A+\cos A}=\tan A/2$

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126. Prove the following : $8\sin^4\left(\frac{1}{2}\theta\right)-8\sin^2\left(\frac{1}{2}\theta\right)+1=\cos 2\theta$

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127. Prove the following :

$\cos^4\left(\frac{\pi}{8}\right)+\cos^4\left(\frac{3\pi}{8}\right)+\cos^4\left(\frac{5\pi}{8}\right)+\cos^4\left(\frac{7\pi}{8}\right)$=3/2

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128. Prove the following :

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

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129. Prove the following : $\sin 20^\circ . \sin 40^\circ . \sin 60^\circ . \sin 80^\circ$ = 3/16

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130. Prove the following : $\cos 36^\circ . \cos 72^\circ . \cos 108^\circ . \cos 144^\circ = \frac{1}{16}$

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131. Prove the following : $\cos 10^\circ . \cos 30^\circ . \cos 50^\circ . \cos 70^\circ = \frac{3}{16}$

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132. Prove the following : $\cos 20^\circ . \cos 40^\circ . \cos 60^\circ . \cos 80^\circ = \frac{1}{16}$

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133. Prove the following : $\tan 6^\circ . \tan 42^\circ . \tan 66^\circ . \tan 78^\circ = 1$

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134. Prove the following : $\cot 7\left(\frac{1}{2}\right)^\circ = \sqrt{6} + \sqrt{3} + \sqrt{2} + 2$

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135. Prove the following : $\cot 22\left(\frac{1}{2}\right)^\circ = \sqrt{2} + 1$

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136. Prove the following : $\cot 37\left(\frac{1}{2}\right)^\circ = \sqrt{6} - \sqrt{3} - \sqrt{2} + 2$

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137. Prove the following : $\tan 37\left(\frac{1}{2}\right)^\circ = \sqrt{6} + \sqrt{3} - \sqrt{2} + 2$

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138. Prove the following : $\cos\left(\frac{\pi}{16}\right) = \frac{1}{2}\sqrt{2+\sqrt{2+\sqrt{2}}}$

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139. If $\sin A = K \sin B, prove the \tan\frac{1}{2}(A-B) = \frac{K-1}{K+1}\tan\frac{1}{2}(A+B)$

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140. If a $\cos(x+a) = b\cos(x-a)$ show that $(a+b)\tan x = (a-b)\cot a$

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141. An angle θ is divided into two partsα, β such that $\tan\alpha : \tan\beta = x : y$ prove that $\sin(\alpha - \beta) = \dfrac{x-y}{x+y}\sin\theta$

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142. If $\sin\theta + \sin\phi = a, \cos\theta + \cos\phi = b,$ show that $\dfrac{\sin\frac{\theta+\phi}{2}}{b} = \dfrac{\cos\frac{\theta+\phi}{2}}{b} = 2\dfrac{\cos\frac{\theta-\phi}{2}}{a^2+b^2}$

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143. If $a\cos\alpha + b\sin\alpha = c = a\cos\beta + b\sin\beta$ then prove that $\dfrac{a}{\cos\frac{1}{2}(\alpha+\beta)} = \dfrac{b}{\sin\frac{1}{2}(\alpha+\beta)} = \dfrac{c}{\cos\frac{1}{2}(\alpha-\beta)}$

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144. Prove that $\left(\dfrac{\cos A + \cos B}{\sin A - \sin B}\right)^n + \left(\dfrac{\sin A + \sin B}{\cos A - \cos B}\right)^n = 2\cot^n\dfrac{A-B}{2}$ or zero

according as n is even or odd.

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145. If (1-e)$\tan^2 \frac{\beta}{2} = (1+e)\tan^2 \frac{\alpha}{2}$.

prove that $\cos\beta = \frac{\cos\alpha - e}{1 - e\cos\alpha}$

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146. If $\cos\theta = \frac{\cos A - \cos B}{1 - \cos A \cdot \cos B}$

prove that one of the values of

$\tan\frac{\theta}{2}$ is $\tan\frac{A}{2} \cdot \tan\frac{B}{2}$

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147. If $\tan\theta = \frac{\sin x \cdot \sin y}{\cos x + \cos y}$

then prove that one of the values of

$\tan\frac{1}{2}\theta$ is $\tan\frac{1}{2}x . \tan\frac{1}{2}y$.

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148. If $\sec(\phi+\alpha)+\sec(\phi-\alpha)=2\sec\phi$

show that $\cos\phi=\pm\sqrt{2}\cos\frac{\alpha}{2}$

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149. If tanA+tanB=a

and cotA+cotB=b

then show that $\cot(A+B)=\frac{1}{a}-\frac{1}{b}$

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150. If $\cot\theta=\cos(x+y)$ and $\cot\phi=\cos(x-y)$

then show that $\tan(\theta-\phi)=\frac{2\sin x\cdot\sin y}{\cos^2 x+\cos^2 y}$

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151. If $\tan\beta = \dfrac{n^2 \sin\alpha \cdot \cos\alpha}{1 - n^2 \sin^2\alpha}$

then show that $\dfrac{\tan(\alpha - \beta)}{\tan\alpha} = 1 - n^2$

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152. If $2\tan\alpha = 3\tan\beta$,

then prove that

then show that $\tan(\alpha - \beta) = \dfrac{\sin 2\beta}{5 - \cos 2\beta}$

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153. If α, β are acute angles and

$\cos 2\alpha = \dfrac{3\cos 2\beta - 1}{3 - \cos 2\beta}$,

then prove that $\tan\alpha = \sqrt{2}\tan\beta$

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154. If $A + B + C = \pi$, then prove the following.

$\cos 2A + \cos 2B + \cos 2C + 1 + 4\cos A \cdot \cos B \cdot \cos C = 0$

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155. If $A + B + C = \pi$, then prove the following.

$\sin 2A + \sin 2B - \sin 2C = 4\cos A \cdot \cos B \cdot \sin C$

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156. If $A + B + C = \pi$, then prove the following.

$\cos A + \cos B + \cos C = 1 + 4\sin \frac{1}{2}A \cdot \sin \frac{1}{2}B \cdot \sin \frac{1}{2}C$

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157. If $A + B + C = \pi$, then prove the following.

$\sin A + \sin B - \sin C = 4\sin \frac{1}{2}A \cdot \sin \frac{1}{2}B.\cos \frac{1}{2}C$

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158. If $A + B + C = \pi$, then prove the following.

$$\cos^2 A + \cos^2 B + 2\cos A \cdot \cos B \cdot \cos C = \sin^2 C$$

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159. If $A + B + C = \pi$, then prove the following.

$$\sin^2 \frac{A}{2} + \sin^2 \frac{B}{2} + \sin^2 \frac{C}{2}$$
$$= 1 - 2\sin \frac{A}{2} \cdot \sin \frac{B}{2} \cdot \sin \frac{C}{2}$$

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160. If $A + B + C = \pi$, then prove the following.

$$\sin \frac{A}{2} + \sin \frac{B}{2} + \sin \frac{C}{2}$$
$$= 4\sin \frac{\pi - A}{4} \sin \frac{\pi - B}{4} \sin \frac{\pi - C}{4} + 1$$

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161. If $A+B+C=\pi$, then prove the following.

$$\cos^2\frac{A}{2}+\cos^2\frac{B}{2}-\cos^2\frac{C}{2}$$
$$=2\cos\frac{A}{2}\cdot\cos\frac{B}{2}\cdot\sin\frac{C}{2}$$

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162. If $A+B+C=\pi$, then prove the following.

$$\sin(B+2C)+\sin(C+2A)+\sin(A+2B)$$
$$=4\sin\frac{B-C}{2}\cdot\sin\frac{C-A}{2}\cdot\sin\frac{A-B}{2}$$

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163. Show that $(2\cos\theta-1)$

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

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164. Show that

$2^n \cos\theta \cdot \cos 2\theta \cdot \cos 2^2\theta \ldots\ldots \cos 2^{n-1}\theta = 1$

if $\theta = \dfrac{\pi}{2^n + 1}$

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165. Prove that $\dfrac{\tan 2^n\theta}{\tan\theta}$

$= (1 + \sec 2\theta)\left(1 + \sec 2^2\theta\right) \ldots . (1 + \sec 2^n\theta)$

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166. If $x + y + z = xyz$, prove that $\dfrac{x}{1 - x^2} + \dfrac{y}{1 - y^2} + \dfrac{z}{1 - z^2}$

$= \dfrac{4xyz}{(1 - x^2)(1 - y^2)(1 - z^2)}$

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167. If $x+y+z=xyz$, prove that $\frac{3x-x^3}{1-3x^2}+\frac{3y-y^3}{1-3y^2}+\frac{3z-z^3}{1-3z^2}=\frac{3x-x^3}{1-3x^2}\cdot\frac{3y-y^3}{1-3y^2}\cdot\frac{3z-z^3}{1-3z^2}$

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168. If $\frac{\sin^4\alpha}{a}+\frac{\cos^4\alpha}{b}=\frac{1}{a+b}$ show that $\frac{\sin^8\alpha}{a^3}+\frac{\cos^8\alpha}{b^3}=\frac{1}{(a+b)^3}$

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169. The number of solutions of $2\sin\theta-1=0$ is____.

A. one

B. two

C. infinite

D.

Answer:

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170. If $\cos\alpha = \cos\beta$, then $\alpha + \beta =$ ____

A. 0

B. 2π

C. π

D.

Answer:

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171. The number of solution(s) of

$2\sec\theta + 1 = 0$ is_____.

A. zero

B. one

C. infinite

D.

Answer:

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172. If $\tan\theta = \tan\alpha$ and $90 < \alpha < 180$, then ' theta ' can be in the ----- quadrant.

A. 1st

B. 3rd

C. 4th

D.

Answer:

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173. If $\tan x \cdot \tan 2x \cdot \tan 7x$

`=tanx+tan2x+tan7x, then x=_____

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

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

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

D.

Answer:

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174. For ___value of θ, $\sin\theta + \cos\theta = \sqrt{2}$

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

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

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

D.

Answer:

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175. The number of values of x for which $\cos^2 x = 1$ and $x^2 \leq 4$ is____

A. 1

B. 2

C. 3

D.

Answer:

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176. In the 1st quardrant the solution of $\tan^2\theta = 3$ is___

A. $\left(\frac{\pi}{2}\right.$

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

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

D.

Answer:

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177. The least positive value of theta for which $1 + \tan\theta = 0$ and $\sqrt{2}\cos\theta + 1 = 0$is ___

A. $\left(\frac{\pi}{4}\right.$

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

C. $\frac{5\pi}{4}\Big)$

D.

Answer:

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178. The least positive value of x for which $\tan 3x = \tan x$ is____

A. $\left(\frac{\pi}{}\right.$

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

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

D.

Answer:

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179. Find the principal solution of the following equations:$\sin\theta = \sin 2\theta$

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180. Find the principal solution of the following equations:

$\sqrt{3}\sin\theta - \cos\theta = 2$

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181. Find the principal solution of the following equations:

$\cos^2\theta + \sin\theta + 1 = 0$

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182. Find the principal solution of the following equations:

$\sin 4x + \sin 2x = 0$

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183. Find the principal solution of the following equations:

$\sin x + \cos x = \frac{1}{\sqrt{2}}$

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184. Find the general solutions of the following equations:$\cos 2x = 0$

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185. Find the general solutions of the following equations: $\sin(x^\circ + 40^\circ) = \frac{1}{\sqrt{2}}$

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186. Find the general solutions of the following equations:$\sin 5\theta = \sin 3\theta$

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187. Find the general solutions of the following equations: $\tan ax = \cot bx$

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188. Find the general solutions of the following equations:$\tan^2 3\theta = 3$

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189. Solve the following:$\tan^2 x + \sec^2 x = 3$

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190. Solve the following:$4\sin^2 x + 6\cos^2 x = 5$

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191. Solve the following:$3\sin x + 4\cos x = 5$

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192. Solve the following:$3\tan x + \cot x = 5\cos ecx$

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193. Solve the following:$\cos x + \sqrt{3}\sin x = \sqrt{2}$

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194. Solve the following:$\sin 2x - 2\cos^2 x = 0$

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195. Solve the following:$\sec\theta + \tan\theta = \sqrt{3}$

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196. Solve the following:$\cos 2\theta - \cos\theta = \sin\theta - \sin 2\theta$

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197. Solve the following:$\sin\theta + \sin 2\theta + \sin 3\theta + \sin 4\theta = 0$

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198. Solve the following:$\cos 2x^\circ + \cos x^\circ - 2 = 0$

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199. Solve the following:$\tan\theta + \tan 2\theta = \tan 3\theta$

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200. Solve the following:$\tan\theta + \tan\left(\theta + \frac{\pi}{3}\right) + \tan\left(\theta + \frac{2\pi}{3}\right) = 3$

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201. Solve the following:$\cot^2\theta - \tan^2\theta = 4\cot 2\theta$

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202. Solve the following:$\cos 2\theta = (\sqrt{2}+1)\left(\cos\theta - \frac{1}{\sqrt{2}}\right)$

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203. Solve the following:$\sec\theta - 1 = (\sqrt{2}-1)\tan\theta$

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204. Solve the following:$3\tan^2\theta - 2\sin\theta = 0$

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205. Solve the following:$4\cos x.\cos 2x.\cos 3x = 1$

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206. Solve the following:$\cos 3x - \cos 2x = \sin 3x$

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207. Solve the following:$\cos x + \sin x = \cos 2x + \sin 2x$

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208. Solve the following:$\tan x + \tan 4x + \tan 7x$=tan x tan 4x tan 7x`

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209. Solve the following:$2\left(\sec^2\theta + \sin^2\theta\right) = 5$

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210. Solve the following: $(\cos x)^{\sin^2 x - \frac{3}{2}\sin x + \frac{1}{2}} = 1$

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211. Fill int the blanks choosing correct answer from the bracket.

In Δ ABC, b is _____

A. b cosB + c cosC

B. a cosA + c cosC

C. c cosA + a cosC

D.

Answer: A

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212. Fill int the blanks choosing correct answer from the bracket.

If a cot A = b cot B then triangle ABC is _____

A. isosceles

B. right angled

C. equilateral

D.

Answer: A

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213. Fill int the blanks choosing correct answer from the bracket.

In a ΔABC if b sinC + c sinB = 2 then b sinC = _____.

A. 0

B. 1

C. 2

D.

Answer: B

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214. Fill int the blanks choosing correct answer from the bracket.

In triangle ABC if

$\cos A/a = \cos B/b = \cos C/c$

then the triangle is _____.

A. equilateral

B. isosceles

C. scalene

D.

Answer: A

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215. Fill int the blanks choosing correct answer from the bracket.

If $\sin A = \sin B$ and $b = 1/2$ then $a =$ _____.

A. 2

B. 1/2

C. 1

D.

Answer: B

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216. Fill int the blanks choosing correct answer from the bracket.

In ΔABC if A = 60°, B = 45° , a:b = _____.

A. $\left(\sqrt{2}:\sqrt{3}\right)$

B. $\left(\sqrt{6}:2\right)$

C. $\left(\sqrt{3}:2\right)$

D.

Answer: B

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217. Fill int the blanks choosing correct answer from the bracket.

In ΔABC if $b^2 + c^2 < a^2$ then ____ angle is obtuse.

A. A

B. B

C. C

D.

Answer: A

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218. Fill int the blanks choosing correct answer from the bracket.

If a cosB = b cosA, then cosB = _____.

A. c/a

B. $\frac{a}{2c}$

C. $\frac{c}{2a}$

D.

Answer: C

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219. Fill int the blanks choosing correct answer from the bracket.

Ifa = b cosC , then _____ angle is a right angle.

A. A

B. B

C. C

D.

Answer: B

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220. Fill int the blanks choosing correct answer from the bracket.

If a = 12, b = 7 , C = 30° , then Δ = _____.

A. 42

B. 84

C. 21

D.

Answer: C

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221. Prove that

a sinA - b sinB = c sin(A-B)

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222. Prove that

b cosB + c cosC = a cos (B-C)

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223. Prove that

if (a + b+ c)(b + c - a) = 3bc

then A = 60°

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224. Prove that

If $\frac{b+c}{5} = \frac{c+a}{6} = \frac{a+b}{7}$

then sinA : sinB : sinC = 4:3:2

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225. Prove that

If A : B: C = 1: 2: 3

then $\sin A : \sin B : \sin C = 1 : \sqrt{3} : 2$

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226. Prove that

$b^2 + c^2 - a^2 = bc$, then A = 60°

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227. Prove that

If A: B: C = 1: 2: 7, then c:a = $\left(\sqrt{5}+1\right) : \left(\sqrt{5}-1\right)$

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228. If cosA = 12/13 , cosB = 5/13, then find a:b.

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229. If a = 7 , b= 3, c=5 then find A.

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230. If a = 8,b=6 , C= 4 find tan B/2.

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231. If $\frac{a}{\sec A} = \frac{b}{\sec B}$ and a $\neq$ b then find C.

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232. If a = 48, b= 35 ,$\angle C = 60^\circ$ then find c.

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233. In ΔABC prove that

a sin(B-C) + bsin(C-A) + c sin(A-B) = 0

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234. In ΔABC prove that

a sin(B-C) + bsin(C-A) + c sin(A-B) = 0

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235. In ΔABC prove that

$$\sin(B-C)/\sin(B+C) = (b\cos C - c\cos B)/(b\cos C + c\cos B)$$

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236. In ΔABC prove that

$$\sum a^2 \sin(B-C)/\sin(B+C) = 0$$

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237. In ΔABC prove that

$$a^2\left(\cos^2 B-\cos^2 C\right)+b^2\left(\cos^2 C-\cos^2 A\right)+c^2\left(\cos^2 A-\cos^2 B\right)=0$$

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238. In ΔABC prove that

$$\frac{b^2-c^2}{a^2}\sin 2A+\frac{c^2-a^2}{b^2}\sin 2B+\frac{a^2-b^2}{c^2}\sin 2C=0$$

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239. In ΔABC prove that

$$a^2\frac{b^2+c^2-a^2}{\sin 2A}=b^2\frac{c^2+a^2-b^2}{\sin 2B}=c^2\frac{a^2+b^2-c^2}{\sin 2C}$$

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240. In ΔABC prove that

$$\sum \frac{\cos A}{\sin B \sin C} = 2$$

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241. In ΔABC prove that

$$(a^2 - b^2 + c^2)\tan B = (a^2 + b^2 - c^2)\tan C$$

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242. In ΔABC prove that

$$(b^2 - c^2)\cot A + (c^2 - a^2)\cot B + (a^2 - b^2)\cot C = 0$$

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243. In ΔABC prove that

$$\frac{b + c}{a} = \frac{\cos B + \cos C}{1 - \cos A}$$

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244. In ΔABC prove that

$$\sum a^3 \sin(B - C) = 0$$

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245. In ΔABC prove that

(b+c)cosA + (c+a)cosB + (a+b)cosC = a+b+c

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246. In ΔABC prove that

2(bc cosA + ca cosB + ab cosC) = $a^2 + b^2 + c^2$

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247. In ΔABC prove that

$$a\left(b^2+c^2\right)\cos A+b\left(c^2+a^2\right)\cos B+c\left(a^2+b^2\right)\cos C=3abc$$

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248. In ΔABC prove that

$$a^3\cos(B-C)+b^3\cos(C-A)+c^3\cos(A-B)=3abc$$

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249. In ΔABC prove that

$$a(\cos B+\cos C)=2(b+c)\sin^2\left(\frac{A}{2}\right)$$

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250. In ΔABC prove that

$$(b+c-a)\frac{\tan A}{2}=(c+a-b)\frac{\tan B}{2}=(a+b-c)\frac{\tan C}{2}$$

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251. In ΔABC prove that

$$(b+c-a)\left(\frac{\cot B}{2}+\frac{\cot C}{2}\right)=2a\frac{\cot A}{2}$$

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252. In ΔABC prove that

$$(a-b)^2\cos^2\left(\frac{C}{2}\right)+(a+b)^2\sin^2\left(\frac{C}{2}\right)=c^2$$

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253. In ΔABC prove that

$$1-\tan\left(\frac{A}{2}\right)\tan\left(\frac{B}{2}\right)=\frac{c}{s}$$

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254. In ΔABC prove that

$$(b-c)\cot\left(\frac{A}{2}\right)+(c-a)\cot\left(\frac{B}{2}\right)+(a-b)\cot\left(\frac{C}{2}\right)=0$$

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255. In ΔABC prove that

$$\cot A+\cot B+\cot C=\frac{a^2+b^2+c^2}{4\Delta}$$

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256. If $\frac{1}{a+c}+\frac{1}{b+c}=\frac{3}{a+b+c}$

Then prove $C=60^\circ$.

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257. If $a=2b$ and $A=3B$

find the measure of the angle of the triangle.

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258. If $a^4 + b^4 + c^4 = 2c^2(a^2 + b^2)$, prove that angle ACB = 45° or 135°.

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259. If $x^2 + x + 1, 2x + 1$ and $x^2 - 1$ are lengths of sides of a triangle, then prove that the measure of the greatest angle is 120°.

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260. If cosB = (sinA)/(2sinC) prove that the triangle is isosceles.

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261. If $a\tan A + b\tan B = (a+b)\tan\left(\frac{A+B}{2}\right)$ prove that the triangle is isosceles.

Watch Video Solution

262. If (cosA + 2cosC) : (cosA + 2cosB) = sinB : sinC

prove that the triangle either isosceles or right angled.

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263. If $\cos A = \sin B - \cos C$ prove triangle is right angled.

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264. If a^2, b^2, c^2 being A.P prove that cotA,cotB,cotC are also In A.P.

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265. If sinA : sinC = sin(A-B): sin(B-C) prove that `a^2,b^2,c^2 are in A.P.

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266. If the side lengths a,b and c are in A.P. then prove that

$$\cos\left(\frac{A-C}{2}\right) = 2\sin\left(\frac{B}{2}\right)$$

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267. If the side lengths a,b and c are in A.P. prove that

cot (A/2),cot (B/2),cot (C/2) are in A.P `.

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