MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

TRIGONOMETRIC RATIOS OF COMPOUND ANGLES

Others

1. If angle θ is divided into two parts such that the tangents of one part is λ times the tangent of other, and ϕ is their difference, then show that $\sin\theta = \frac{\lambda+1}{\lambda-1}\sin\phi$.

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2. If $\tan\alpha = \dfrac{1}{1+2^{-x}}$ and $\tan\beta = \dfrac{1}{1+2^{x+1}}$, then write the value of $\alpha+\beta$ lying in the interval $(0, \pi/2)$.

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3. If $\alpha and \beta$ are acute angles such that $tan\alpha = \dfrac{m}{m+1} and tan\beta = \dfrac{1}{2m+1}$, prove that $\alpha+\beta = \dfrac{\pi}{4}$.

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4. Find a and b such that the following inequality holds good for all θ. $a \le 3\cos\theta + 5\sin\left(\theta - \dfrac{\pi}{6}\right) \le b$

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5. Prove that $(2\sqrt{3}+3)\sin x + 2\sqrt{3}\cos x$ lies between $-(2\sqrt{3}+\sqrt{15})$ and $(2\sqrt{3}+\sqrt{15})$,

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6. Prove that: $\frac{\sin(x+\theta)}{\sin(x+\phi)} = \cos(\theta-\phi) + \cot(x+\phi)\sin(\theta-\phi)$.

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7. It $\cos(\alpha+\beta) = \frac{4}{5}, \sin(\alpha-\beta) = \frac{5}{13} and \alpha, \beta$ lie between $0 and \frac{\pi}{4}$, prove that $\tan 2\alpha = \frac{56}{33}$

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8. If $\tan A - \tan B = x and \cot B - \cot A = y$, prove that $\cot(A-B) = \frac{1}{x} + \frac{1}{y}$

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9. If $\cos(\alpha-\beta)+\cos(\beta-\gamma)+\cos(\gamma-\alpha)=-\frac{3}{2}$, prove that $\cos\alpha+\cos\beta+\cos\gamma=\sin\alpha+\sin\beta+\sin\gamma=0$

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10. If $\sin B=3\sin(2A+B)$, *prove*: $2\tan A+\tan(A+B)=0$.

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11. If $2\tan\beta+\cot\beta=\tan\alpha$, prove that $\cot\beta=2\tan(\alpha-\beta)$.

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12. If the system of linear equations $x=cy+bz$, $y=az+cx$, $z=bx+ay$ has a non trivial solution show that

$a^2 + b^2 + c^2 + 2abc = 1$

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13. Prove that: $\tan 3A \tan 2A \tan A = tan3A - \tan 2A - tanA$

$\cot A \cot 2A - \cot 2A \cot 3A - \cot 3A \cot A = 1$

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

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15. Prove that:

$\sin^2 A = \cos^2(A - B) + \cos^2 B - 2\cos(A - B)\cos A \cos B$.

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16. If $3tanAtanB = 1,$ prove that $2\cos(A+B) = \cos(A-B)$.

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17. Prove that: $\tan 75^0 + \cot 75^0 = 4$

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18. If $\alpha and \beta$ are the solutions of $a\cos\theta + b\sin\theta = c,$ then show that

$\cos(\alpha+\beta) = \dfrac{a^2-b^2}{a^2+b^2}$ (ii) $\cos(\alpha-\beta) = \dfrac{2c^2-(a^2+b^2)}{a^2+b^2}$

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19. If $\alpha and \beta$ are the solutions of the equation $atan\theta + bsec\theta = c,$ then show that $\tan(\alpha+\beta) = \dfrac{2ac}{a^2-c^2}$

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20. If $\frac{\sin(x+y)}{\sin(x-y)} = \frac{a+b}{a-b}$, show that $\frac{\tan x}{\tan y} = \frac{a}{b}$.

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21. If $tan(\pi/4+\theta) + tan(\pi/4-\theta) = a,$ then $tan^2(\pi/4+\theta) + tan^2(\pi/4-\theta)$ = (a) a^2+1 (b) a^2+2 (c) a^2-2 (d) none of these

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22. If $tanx + \tan\left(x+\frac{\pi}{3}\right) + \tan\left(x+\frac{2\pi}{3}\right) = 3,$ then prove that $\frac{3\tan x - tan^3 x}{1-3tan^2 x} = 1.$

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23. If θ lies in the first quadrant and $\cos\theta = \frac{8}{17}$, then prove that $\cos\left(\frac{\pi}{6}+\theta\right)+\cos\left(\frac{\pi}{4}-\theta\right)+\cos\left(\frac{2\pi}{3}-\theta\right)=\left(\frac{\sqrt{3}-1}{2}+\frac{1}{\sqrt{2}}\right)\frac{23}{17}$

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24. If $\tan(A-B)=1, \sec(A+B)=\frac{2}{\sqrt{3}}$, then the smallest positive value of B is. $(a)\frac{25\pi}{24}$ (b) $\frac{19\pi}{24}$ (c) $\frac{13\pi}{24}$ (d) $\frac{11\pi}{24}$

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25. If $tan\beta = \frac{n\sin\alpha\cos\alpha}{1-n\sin^2\alpha}$, show that $\tan(\alpha-\beta)=(1-n)tan\alpha\cdot$

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26. If $A+B=\frac{\pi}{4}$, prove that: $(1+tanA)(1+tanB)=2$

$(\cot A-1)(\cot B-1)=2$

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27. Prove that: $\cot\theta\cot 2\theta + \cot 2\theta\cot 3\theta + 2 = \cot\theta(\cot\theta - \cot 3\theta)$

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28. If $\tan(\alpha+\theta) = n\tan(\alpha-\theta)$, show that $(n+1)\sin 2\theta = (n-1)\sin 2\alpha$.

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

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30. If $\tan(\pi\cos\theta) = \cot(\pi\sin\theta)$ then $\sin\left(\theta + \frac{\pi}{4}\right)$ equals

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31. Find the values of the following: $\sin 75^0$ (ii) $\cos 75^0$ (iii) $\sin 15^0$ (iv) $\cos 15^0$

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32. If $\cot \alpha = \frac{1}{2}$,$\sec \beta = -\frac{5}{3}$,where $\pi < \alpha < \frac{3\pi}{2}$ and $\frac{\pi}{2} < \beta < \pi$ .find the value of $\alpha + \beta$ terminates

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33. If `sin A=3/5,0

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34. Prove that:

$$\frac{\sin x}{\cos 3x}+\frac{\sin 3x}{\cos 9x}+\frac{\sin 9x}{\cos 27x}=\left(\frac{1}{2}\right)(\tan 27x-\tan x)$$

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35. Prove that: $\frac{1}{\cos(x-a)\cos(x-b)}=\frac{\tan(x-b)-\tan(x-a)}{\sin(a-b)}$

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36. If $\sin(\pi\cos\theta)=\cos(\pi\sin\theta)$, $then\ \sin 2\theta=$

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37. If $atan\alpha+btan\beta=(a+b)\tan\left(\frac{\alpha+\beta}{2}\right)$, where $\alpha\neq\beta$, prove that $a\cos\beta=b\cos\alpha$.

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38. Prove that: $\frac{1}{\sin(x-a)\sin(x-b)} = \frac{\cot(x-a)-\cot(x-b)}{\sin(a-b)}$

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39. If $\tan\theta = \frac{1}{2} and tan\varphi = \frac{1}{3}$, then the value of $\theta+\varphi$ is $\frac{\pi}{6}$ (b) π (c) 0 (d) $\frac{\pi}{4}$

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40. If $\tan\theta = \frac{\sin\alpha - \cos\alpha}{\sin\alpha + \cos\alpha}$ then show that $\sin\alpha + \cos\alpha = \sqrt{2}\cos\theta$

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41. Prove that: $\frac{1}{\sin(x-a)\cos(x-b)} = \frac{\cot(x-a)+\tan(x-b)}{\cos(a-b)}$

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42. Find the maximum and minimum values of the following expressions. (i) $3\cos\theta + 5\sin\left(\theta - \frac{\pi}{6}\right)$ (ii) $4\sin\theta - 3\cos\theta + 7$

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43. If $\sin A = \frac{3}{5}$ and $\cos B = \frac{9}{41}, 0 < A < \frac{\pi}{2}$ and $0 < B < \frac{\pi}{2}$ then find the values of $(i)\sin(A+B)(ii)\sin(A-B)(iii)\cos(A+B)(iv)\cos(A-B)$

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44. If $\cos A = \frac{4}{5}, \cos B = \frac{12}{13}$ and $\frac{3\pi}{2} < A, B < 2\pi$ then find the value of $\cos(A+B)$

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45. Find the values of the following: $tan15^0$ ii. $tan75^0$

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46. Find the values of the following: (i)$\tan 105^0$ (ii.) $\tan\left(\frac{13\pi}{12}\right)$

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47. Evaluate the following: $\frac{\sin(7\pi)}{12}\frac{\cos\pi}{4} - \frac{\cos(7\pi)}{12}\frac{\sin\pi}{4}$

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48. Evaluate the following: $\cos\left(2\frac{\pi}{3}\right)\cos\left(\frac{\pi}{4}\right) - \sin\left(2\frac{\pi}{3}\right)\sin\left(\frac{\pi}{4}\right)$

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49. Prove that:

$$\cos\left(\frac{\pi}{4}-A\right)\cos\left(\frac{\pi}{4}-B\right)-\sin\left(\frac{\pi}{4}-A\right)\sin\left(\frac{\pi}{4}-B\right)=\sin(A+B)$$

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50. Prove that:

$$\sin(n+1)A\sin(n+2)A+\cos(n+1)A\cos(n+2)A=\cos A$$

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51. Prove that: $\cos\left(\frac{\pi}{4}+x\right)+\cos\left(\frac{\pi}{4}-x\right)=\sqrt{2}\cos x$

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

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53. Prove that: $\frac{\sin(x+y)}{\sin(x-y)} = \frac{\tan x + \tan y}{\tan x - \tan y}$

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54. Prove that $\frac{\tan\left(\frac{\pi}{4}+x\right)}{\tan\left(\frac{\pi}{4}-x\right)} = \left(\frac{1+tanx}{1-tanx}\right)^2$

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55. if $\tan\alpha = \frac{1}{\sqrt{x(x^2+x+1)}}, \tan\beta = \frac{\sqrt{x}}{\sqrt{x^2+x+1}}$ and $\tan\gamma = \sqrt{x^{-3}+x^{-2}+x^{-1}}$ then $\alpha+\beta =$

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56. Prove that : $\frac{\tan(A+B)}{\cot(A-B)} = \frac{\sin^2 A - \sin^2 B}{\cos^2 A - \sin^2 B}$

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57. Prove that : $\sin^2 6x - \sin^2 4x = \sin 2x \sin 10x$

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58. Prove that: $\cos^2 2x - \cos^2 6x = \sin 4x \sin 8x$

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59. Prove that: $\frac{\cos^2 33^\circ - \cos^2 57^\circ}{\sin^2\left(\frac{21}{2}\right)^\circ - \sin^2\left(\frac{69}{2}\right)^\circ} = -\sqrt{2}$

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60. Prove that:

$\cos 2\alpha \cos 2\beta + \sin^2(\alpha - \beta) - \sin^2(\alpha + \beta) = \cos 2(\alpha + \beta)$.

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61. Prove that: $tan70^0 = tan20^0 + 2tan50^0$.

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62. If $\sin\alpha + \sin\beta = a \; and \; \cos\alpha + \cos\beta = b,$ show that : $\cos(\alpha+\beta) = \dfrac{b^2 - a^2}{b^2 + a^2}$

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63. If $\sin\alpha + \sin\beta = a \; and \; \cos\alpha + \cos\beta = b,$ show that : $\sin(\alpha+\beta) = \dfrac{2\mathrm{a\,b}}{a^2 + b^2}$

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64. If sinA=4/5 and cosB=5/13, find the value of the following : $\sin(A+B)$

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65. If sinA=4/5 and cosB=5/(13), where 0 < A,B < pi/2 ,find the value of the cos(A+B)

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66. If $\sin A = \frac{4}{5}$ and $\cos B = \frac{5}{13}$,where $0 < A < \frac{\pi}{2}$;$0 < B < \frac{\pi}{2}$, find the value of the following : $(iii).\ \sin(A-B)$

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67. If $\sin A = \frac{4}{5}$ and $\cos B = \frac{5}{13}$,where $0 < A < \frac{\pi}{2}$;$0 < B < \frac{\pi}{2}$, find the value of the following : $\cos(A - B)$

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68. If $\sin A = \frac{12}{13}$ and $\sin B = \frac{4}{5}$ where $\frac{\pi}{2} < A < \pi$ and $0 < B < \frac{\pi}{2}$ then find the following $(i)\sin(A + B)(ii)\cos(A + B)$

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69. Prove that $\frac{\sin x}{\cos(3x)} + \frac{\sin(3x)}{\cos(9x)} + \frac{\sin(9x)}{\cos(27x)} = \frac{1}{2}(\tan 27x - \tan x)$

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70. If $\sin A = \frac{3}{5}, \cos B = -\frac{12}{13}$, *where* A and B both lie in second quadrant, find the value of $\sin(A+B)$.

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71. If $\cos A = -\frac{24}{25}$ and $\cos B = \frac{3}{5}$ where $\pi < A < \frac{3\pi}{2}$ and $\frac{3\pi}{2} < B < 2\pi$ then find $\sin(A+B)$

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72. If $\cos A = -\frac{24}{25}$ and $\cos B = \frac{3}{5}$ where $\pi < A < \frac{3\pi}{2}$ and $\frac{3\pi}{2} < B < 2\pi$ then find $\cos(A+B)$

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73. If $\tan A = \frac{3}{4}, \cos B = \frac{9}{41}$, where $\pi < A < \frac{3\pi}{2}$ and $0 < B < \frac{\pi}{2}$, find $\tan(A + B)$

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74. If $\sin A = \frac{1}{2}, \cos B = \frac{12}{13}$, *where* $\pi < A < \frac{3\pi}{2}$ and $\frac{3\pi}{2} < B < 2\pi$, *find* $\tan(A - B)$

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75. If $\sin A = \frac{1}{2}, \cos B = \frac{\sqrt{3}}{2}$, where $\frac{\pi}{2} < A < \pi$ and $0 < B < \frac{\pi}{2}$ find $\tan(A + B)$

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76. If $\sin A = \frac{1}{2}, \cos B = \frac{\sqrt{3}}{2}, where \frac{\pi}{2} < A < \pi$ and $0 < B < \frac{\pi}{2}$ find the following: $\tan(A - B)$

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77. Evaluate the following: $\sin 78^0 \cos 18^0 - \cos 78^0 \sin 18^0$

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78. Evaluate the following: $\sin 36^0 \cos 9^0 + \cos 36^0 \sin 9^0$

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79. Evaluate the following: $\cos 47^0 \cos 13^0 - \sin 47^0 \sin 13^0$

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80. Evaluate the following: $\cos 80^0 \cos 20^0 + \sin 80^0 \sin 20^0$

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81. If $\cos A = -\frac{12}{13}$ and $\cot B = \frac{24}{7}$ where A lies in second quadrant and B lies in third quadrant then find the values of $(i)\sin(A+B)(ii)\cos(A+B)(iii)\tan(A+B)$

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82. Prove that: $\cos 105^\circ + \cos 15^\circ = \sin 75^\circ - \sin 15^\circ$

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

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84. Prove that: $\frac{\cos 11^\circ + \sin 11^\circ}{\cos 11^\circ - \sin 11^\circ} = \tan 56^\circ$

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85. Prove that: $\frac{\cos 8^\circ + \sin 8^\circ}{\cos 8^\circ - \sin 8^\circ} = tan 53^\circ$

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86. The value of : $\frac{\cos 9^\circ + \sin 9^\circ}{\cos 9^\circ - \sin 9^\circ}$ is:

A. (a) $\tan 54^\circ$

B. (b) $\tan 36^\circ$

C. (c) $\tan 18^\circ$

D. (d) none of these

Answer: null

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87. Prove that:

$$\sin(60^0 - \theta)\cos(30^0 + \theta) + \cos(60^0 - \theta)\sin(30^0 + \theta) = 1.$$

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88. Prove that:

$$\sin\left(\frac{4\pi}{9} + 7\right)\cos\left(\frac{\pi}{9} + 7\right) - \cos\left(\frac{4\pi}{9} + 7\right)\sin\left(\frac{\pi}{9} + 7\right) = \frac{\sqrt{3}}{2}$$

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89. Prove that:

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

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90. Prove that : $\frac{\tan 69^\circ + \tan 66^\circ}{1 - \tan 69^\circ \tan 66^\circ} = -1$

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91. $If \tan A = \frac{5}{6}$ and $\tan B = \frac{1}{11}$, $prove\ that\ A + B = \frac{\pi}{4}$

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92. If $\tan A = \frac{m}{m-1}\ and \tan B = \frac{1}{2m-1}$, then prove that $A - B = \frac{\pi}{4}$

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93. Prove that: $\cos^2 45^0 - \sin^2 15^0 = \frac{\sqrt{3}}{4}$

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94. Prove that: $\sin^2(n+1)A - \sin^2 nA = \sin(2n+1)A \sin A$

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95. Prove that: $\frac{\sin(A+B)+\sin(A-B)}{\cos(A+B)+\cos(A-B)} = tanA$

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

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

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98. Prove that:

$$\sin^2 B = \sin^2 A + \sin^2(A - B) - 2\sin A \cos B \sin(A - B)$$

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99. Prove that:

$$\cos^2 A + \cos^2 B - 2\cos A \cos B \cos(A + B) = \sin^2(A + B)$$

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100. Prove that: $\frac{\tan(A + B)}{\cot(A - B)} = \frac{\tan^2 A - \tan^2 B}{1 - \tan^2 A \tan^2 B}$

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101. If $\tan A = x \tan B$ then prove that $\frac{\sin(A - B)}{\sin(A + B)} = \frac{x - 1}{x + 1}$

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102. If $\tan(A+B)=x$ and $\tan(A-B)=y$ then find the values of $\tan 2A$ and $\tan 2B$

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103. If $\cos A+\sin B=m$ and $\sin A+\cos B=n$, prove that $2\sin(A+B)=m^2+n^2-2$.

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104. If $\tan A+\tan B=a$ and $\cot A+\cot B=b$, prove that: $\cot(A+B)=\frac{1}{a}-\frac{1}{b}$

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105. If $\sin(\alpha+\beta)=1$ and $\sin(\alpha-\beta)=\frac{1}{2}$, where $0\le\alpha,\beta\le\frac{\pi}{2}$, then find the values of $\tan(\alpha+2\beta)$ and $\tan(2\alpha+\beta)$.

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106. If α,β are two different values of x lying between 0 and 2π which satisfy the equation $6\cos x+8\sin x=9$, find the value of $\sin(\alpha+\beta)$

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107. Prove that $\frac{\tan^2(2\theta)-\tan^2\theta}{1-\tan^2(2\theta)\tan^2\theta}=\tan(3\theta)\tan\theta$

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108. If $\sin\alpha\sin\beta - \cos\alpha\cos\beta + 1 = 0,$ then prove that $1 + \cot\alpha\tan\beta = 0$

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109. If $tan\alpha = x + 1, \tan\beta = x - 1,$ show that $2\cot(\alpha - \beta) = x^2.$

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110. Find the maximum and minimum values of $7\cos\theta + 24\sin\theta$

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111. Prove that $5\cos\theta + 3\cos\left(\theta + \frac{\pi}{3}\right) + 3$ lies between $-4 and 10.$

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112. Reduce $\sqrt{3}\sin\theta + \cos\theta$ as a single term consisting sine only

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113. Express: $3\cos\theta - 4\sin\theta$ as $cosine$ of a single expression.

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114. Find the maximum and minimum values of each of the following trigonometrical expression: $12\sin\theta - 5\cos\theta$

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115. Find the maximum and minimum values of each of the following trigonometrical expression: $5\cos\theta + 3\sin\left(\frac{\pi}{6} - \theta\right) + 4$

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116. Find the maximum and minimum values of each of the following trigonometrical expression: $12\cos\theta + 5\sin\theta + 4$

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117. Find the maximum and minimum values of the trigonometrical expression: $\sin\theta - \cos\theta + 1$

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118. Reduce the expression to the sine or cosine of a single expression: $\sqrt{3}\sin\theta - \cos\theta$

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119. Reduce the expression to the sine and cosine of a single expression: $\cos\theta - \sin\theta$

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120. Reduce each of the following expressions to the sine and cosine of a single expression: $24\cos\theta + 7\sin\theta$

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121.. Show that $\sin 100^\circ - \sin 10^\circ$ is positive

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122. If $\alpha + \beta - \gamma = \pi$ and $\sin^2\alpha + \sin^2\beta - \sin^2\gamma = \lambda\sin\alpha\sin\beta\cos\gamma,$ then write the value of

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123. If $x\cos\theta = y\cos\left(\theta + \frac{2\pi}{3}\right) = z\cos\left(\theta + \frac{4\pi}{3}\right)$, then write the value of $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$.

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124. Write the maximum and minimum values of $3\cos x + 4\sin x + 5$.

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125. Write the maximum value of 12sinθ.

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126. If $12\sin\theta - 9\sin^2\theta$ attains its maximum value at $\theta = \alpha$, then write the value of $\sin\alpha$.

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127. Write the interval in which the values of $5\cos\theta + 3\cos\left(\theta + \frac{\pi}{3}\right) + 3$ lie.

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128. If $\tan(A+B) = p\, and tan(A-B) = q$ then write the value of $\tan 2B$.

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129. If $\frac{\cos(x-y)}{\cos(x+y)} = \frac{m}{n}$, then write the value of $tanx\ tany$.

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130. If $a = b\cos\left(\frac{2\pi}{3}\right) = c\cos\left(\frac{4\pi}{3}\right)$, then write the value of $ab + bc + ca$

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131. If $A + B = C$, then write the value of $tanA\ tanB\ tanC$.

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132. If $\sin\alpha - \sin\beta = a$ and $\cos\alpha + \cos\beta = b$ then write the value of $\cos(\alpha + \beta)$.

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133. The value of $\sin^2 75^0 - \sin^2 15^0$ is a.$1/2$ b. $\sqrt{3}/2$ c. 1 d. 0

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134. If $A + B + C = 180^0$, then $secA(\cos B \cos C - \sin B \sin C)$ is equal to:

A. (a) 0 (b) -1 (c) 1 (d). none of these

B. null

C. null

D. null

Answer: null

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135. $\tan 20^\circ + \tan 40^\circ + \sqrt{3}\tan 20^\circ \tan 40^\circ =$

$(a). \frac{\sqrt{3}}{4} (b). \frac{\sqrt{3}}{2} (c). \sqrt{3} (d). 1$

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136. If $\tan A = \frac{a}{a+1}$ and $\tan B = \frac{1}{2a+1}$ then the value of $A + B$ is: (a).0 (b). $\frac{\pi}{2}$ (c). $\frac{\pi}{3}$ (d). $\frac{\pi}{4}$

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137. If $3\sin\theta + 4\cos\theta = 5$ then find the value of: $4\sin\theta - 3\cos\theta$

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138. The value of: $\tan 3A - \tan 2A - \tan A$ =

A. (a). $\tan 3A \tan 2A \tan A$

B. (b). $-\tan 3A \tan 2A \tan A$

C. (c). $\tan A \tan 2A - \tan A \tan 3A - \tan 2A \tan 3A$,

D. (d). 'none of these'

Answer: null

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139. If $A+B+C=180^0$, then $\frac{tanA+tanB+tanC}{tanA\,tanB\,tanC}$ is equal to a. $tanAtanBtanC$ b. 0 c. 1 d. none of these

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140. If $\cos P=\frac{1}{7} and \cos Q=\frac{13}{14} where\ P\ and\ Q$ both are acute angles. Then, the value of $P-Q$ is a.30^0 b. 60^0 c. 45^0 d. 75^0

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141. If $\cot(\alpha+\beta)=0\ then\ \sin(\alpha+2\beta)$ is equal to a. $\sin\alpha$ b. $\cos 2\beta$ c. $\cos\alpha$ d. $\sin 2\alpha$

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142. $\frac{\cos 10^0 + \sin 10^0}{\cos 10^0 - \sin 10^0}$ is equal to $\tan 55^0$ b. $\cos 55^0$ c.$-\tan 35^0$ d. $-\cot 35^0$

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143. 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. $-\cot 35^0$

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144. If $tan\theta_1 tan\theta_2 = k$, then $\frac{\cos(\theta_1 - \theta_2)}{\cos(\theta_1 + \theta_2)} = a.\ \frac{1+k}{1-k}$ b. $\frac{1-k}{1+k}$ c. $\frac{k+1}{k-1}$ d. $\frac{k-1}{k+1}$

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145. If $A - B = \pi/4$, then $(1 + tanA)(1 - tanB)$ is equal to 2 b. 1 c. 0 d. 3

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146. The maximum value of $\sin^2(120^0 + \theta) + \sin^2(120^0 - \theta)$ is a.$1/2$ b. 3/2 c. $1/4$ d. $3/4$

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147. If cos(A-B)=3/5 and tanA tanB=2, then a.cos A cosB=1/5 b. cosA cos B= -1/5 c. sin A sin B= -1/5 d. sin A sin B= -1/5

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148. If $\frac{\tan 69^0 + tan66^0}{1 - \tan 69^\circ \tan 66^\circ} = 2k,\ then\ k =$ -1 b. $1/2$ c. $-1/2$ d. 17

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149. If $tan\alpha = \frac{x}{x+1} and tan\beta = \frac{1}{2x+1}$, $then\, \alpha + \beta$ is equal to

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

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