



MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

MULTIPLE AND SUB-MULTIPLE ANGLES

Question Bank

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

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

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

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4. Find the value of $\cos^2 48^\circ - \sin^2 12^\circ$

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5. Find the value of $\sin^2 24^\circ - \sin^2 6^\circ$.

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6. Find the value of $\cos 22\frac{1}{2}^\circ$

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



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



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9. prove that $\sin^4 \frac{\pi}{8} + \sin^4 \frac{3\pi}{8} + \sin^4 \frac{5\pi}{8} + \sin^4 \frac{7\pi}{8} = \frac{3}{2}$



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10. Prove that $\cos^2 \alpha + \cos^2(120^\circ - \alpha) + \cos^2(120^\circ + \alpha) = \frac{3}{2}$



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11. Prove that $\cos \frac{2\pi}{15} \cdot \cos \frac{4\pi}{15} \cdot \cos \frac{8\pi}{15} \cos \frac{14\pi}{15} = \frac{1}{16}$



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

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13. Prove that $\tan A + \tan(60^\circ + A) - \tan(60^\circ - A) = 3 \tan 3A$

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14. Show that $\cot 7\left(\frac{1^\circ}{2}\right) = 2 + \sqrt{2} + \sqrt{3} + \sqrt{6}$

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15. Prove that

$$\tan A \cdot \tan(A + 60^\circ) + \tan A \cdot \tan(A - 60^\circ) + \tan(A + 60^\circ) \tan(A - 60^\circ) = 3$$

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

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17. Prove that if $\tan A = \frac{1}{7}$ and $\tan B = \frac{1}{3}$ then $\cos 2A = \sin 4B$

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18. Prove that $\tan 6^\circ \tan 42^\circ \tan 66^\circ \tan 78^\circ = 1$

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19. Prove that

$$\left(1 + \cos \frac{\pi}{10}\right) \left(1 + \cos \frac{3\pi}{10}\right) \left(1 + \cos \frac{7\pi}{10}\right) \left(1 + \cos \frac{9\pi}{10}\right) = \frac{1}{16}.$$

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20. If $\sin x = \frac{\sqrt{5}}{3}$ and x lies in the 2nd quadrant then find the value of $\cos \frac{x}{2}$, $\sin \frac{x}{2}$, and $\tan \frac{x}{2}$.

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21. Prove that $\sin \frac{\pi}{5} \sin \frac{2\pi}{5} \sin \frac{3\pi}{5} \sin \frac{4\pi}{5} = \frac{5}{16}$

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