



## MATHS

# BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

## TRANSFORMATION FORMULAE

### Question Bank

1. Express  $\sin 4\theta + \sin 7\theta$  as a product.



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



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3. Prove that

$$(\sin 3A + \sin A)\sin A + (\cos 3A - \cos A)\cos A = 0$$



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4. If three angles A, B and C are in A.P. Prove that

$$\cot B = \frac{\sin A - \sin C}{\cos C - \cos A}.$$



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5. Prove that  $\sin 38^\circ + \sin 22^\circ = \sin 82^\circ$ .



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6. Prove that

$$\frac{\sin A + \sin B}{\sin A - \sin B} = \tan\left(\frac{A + B}{2}\right) \cot\left(\frac{A - B}{2}\right)$$



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7. Prove that  $\frac{\sin A + \sin 3A}{\cos A + \cos 3A} = \tan 2A$ .



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8. Evaluate:  $\sin 75^\circ \cdot \cot 15^\circ$



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9. Prove that  $\frac{\sin A + \sin B}{\cos A + \cos B} = \tan\left(\frac{A + B}{2}\right)$



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10. Prove that  $2\sin\frac{5\pi}{12}\cos\frac{\pi}{12} = \frac{\sqrt{3} + 2}{2}$



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11. If  $\frac{\sin(\theta + \alpha)}{\cos(\theta - \alpha)} = \frac{1 - m}{1 + m}$  Prove that

$$\tan\left(\frac{\pi}{4} - \theta\right)\tan\left(\frac{\pi}{4} - \alpha\right) = m.$$

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12. If  $\cos ec A + \sec A = \cos ec B + \sec B$  Prove that

$$\tan A \tan B = \cot\left(\frac{A + B}{2}\right).$$

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13. Prove that

$$\frac{\sin(\theta + \phi) - 2\sin\theta + \sin(\theta - \phi)}{\cos(\theta + \phi) - 2\cos\theta + \cos(\theta - \phi)} = \tan\theta$$

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14.

Show

that

$$\sin \alpha + \sin \beta + \sin \gamma - \sin(\alpha + \beta + \gamma) = 4 \sin\left(\frac{\alpha + \beta}{2}\right) \sin\left(\frac{\beta + \gamma}{2}\right) \sin\left(\frac{\gamma + \alpha}{2}\right)$$



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15. Prove that  $\cos 10^\circ \cos 30^\circ \cos 50^\circ \cos 70^\circ = \frac{3}{16}$ .



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16. Prove that  $\sin 20^\circ \sin 40^\circ \sin 80^\circ = \frac{\sqrt{3}}{8}$ .



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17. Prove that  $\sin 10^\circ \sin 50^\circ \sin 60^\circ \sin 70^\circ = \frac{\sqrt{3}}{16}$

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18. Prove that  $\tan 20^\circ \tan 30^\circ \tan 40^\circ \tan 80^\circ = 1$

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19. Prove that

$$\frac{\sin 5A - \sin 7A + \sin 8A - \sin 4A}{\cos 4A + \cos 7A - \cos 5A - \cos 8A} = \cot 6A$$

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20.

Prove

that

$$(\cos \alpha + \cos \beta)^2 + (\sin \alpha + \sin \beta)^2 = 4 \cos^2 \left( \frac{\alpha - \beta}{2} \right)$$



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21.

Prove

that

$$\sin \alpha + \sin \left( \alpha + \frac{2\pi}{3} \right) + \sin \left( \alpha + \frac{4\pi}{3} \right) = 0.$$



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$$22. 2 \cos \frac{\pi}{13} \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$$



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23. Show that  $\tan 20^\circ \tan 40^\circ \tan 80^\circ = \sqrt{3}$

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24. If  $\cos A + \cos B = \frac{1}{2}$  and  $\sin A + \sin B = \frac{1}{4}$  Prove that  $\tan\left(\frac{A+B}{2}\right) = \frac{1}{2}$

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25. If  $\sin 2A = \lambda \sin 2B$ . Prove that

$$\frac{\tan(A+B)}{\tan(A-B)} = \frac{\lambda+1}{\lambda-1}$$

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