



MATHS

BOOKS - KALYANI MATHS (ASSAMESE ENGLISH)

Complementary Angles and there Trigonamytry Ratios

Exercise

1. Using geometry prove that

$$\sin(90 - \theta) = \cos \theta.$$



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2. Using geometry prove that

$$\tan(90 - \theta) = \cot \theta.$$

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3. Using geometry prove that

$$\sec(90 - \theta) = \operatorname{cosec} \theta.$$

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4. Evaluate

$$\frac{\cos 54^\circ}{\sin 36^\circ}.$$

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5. Evaluate

$$\frac{\sin 11^\circ}{\cos 79^\circ}.$$

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6. Evaluate

$$\frac{\sin(90 - \theta) \cdot \cos(90 - \theta)}{\sin \theta \cos \theta}$$

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7. Evaluate

$$\tan 1^\circ \tan 45^\circ \tan 89^\circ.$$

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8. Evaluate

$$\sec 50^\circ \sin 40^\circ + \cos 40^\circ \csc 50^\circ.$$

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9. Evaluate

$$\sin \theta \sec(90 - \theta) + \cos \theta \csc(90 - \theta).$$

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10. Evaluate

$$\cos \theta \sin \theta + \cos \theta \cos(90 - \theta) + \{(\sin \theta - \sin(90 - \theta))\}^2.$$

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11. If $\sin 3\theta = \cos(\theta - 26^\circ)$ where 3θ and $(\theta - 26^\circ)$ are acute angles. Find the value of θ .

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12. If $\cot 5\theta = \tan 10\theta$, then find the value of θ .

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13. If $\cos(20^\circ + \theta) = \sin 30^\circ$, then find the value of θ .

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14. If $\cos 9\theta = \sin \theta$ and $9\theta < 90^\circ$ then find the value of $\tan 5\theta$.

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15. If $\tan 2\theta = \cot(\theta - 18^\circ)$, then the value of θ .

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16. Prove that:

$$\tan 5^\circ \tan 85^\circ \tan 30^\circ \tan 65^\circ \tan 25^\circ = \frac{1}{\sqrt{3}}.$$

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17. Prove that:

$$\tan 4^\circ \tan 43^\circ \tan 47^\circ \tan 86^\circ = 1.$$

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18. Prove that:

$$\tan 35^\circ \tan 40^\circ \tan 45^\circ \tan 50^\circ \tan 55^\circ = 1.$$

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19. Prove that:

$$\operatorname{cosec}(65^\circ + \theta) - \sec(25^\circ - \theta) - \tan(55^\circ - \theta) + \cot(35^\circ + \theta) = 0$$

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20. Prove that:

$$\frac{2 \sin 68^\circ}{\cos 22^\circ} - \frac{2 \cot 15^\circ}{5 \tan 75^\circ} - 3 \frac{\tan 45^\circ \tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ}{5} = 1$$

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21. Prove that:

$$\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sin^2 20^\circ + \sin^2 70^\circ} + \sin^2 64^\circ + \cos 64^\circ \sin 26^\circ = 2.$$

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22. Prove that:

$$\frac{\tan 50^\circ + \sec 50^\circ}{\cot 40^\circ + \csc 40^\circ} + \cos 40^\circ \csc 50^\circ = 2.$$

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23. In a ΔABC prove that

$$\sin\left(\frac{A+B}{2}\right) = \cos\left(\frac{c}{2}\right).$$

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24. In a ΔABC prove that

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

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25. In a ΔABC prove that

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

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26. In a ΔABC prove that

$$\frac{\sec^2(B+C)}{2} - 1 = \frac{\cot^2 A}{2}.$$

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27. If $A + B = 90$, prove that

$$\frac{\cos A + \cos B}{\sin A + \sin B} = 1.$$

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28. If $A + B = 90$, prove that

$$(\tan A + \operatorname{cosec} B)^2 = \frac{1 + \sin A}{1 - \cos B}.$$

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29. If $A + B = 90$, prove that

$$(\sin A - \sin B)^2 = 1 - 2 \sin A \cos A.$$

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30. If $A + B = 90$, prove that

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

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31. If $A + B = 90$, prove that

$$1 + \frac{\tan A}{\tan B} + \sin^2 A + \sin^2 B = 1 + \sec^2 A.$$

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32. If $\sin A = \cos B$, then show that $A + B = 90$.

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33. If $\sin \theta + \cos \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = q$, show that $q(p^2 - 1) = 2p$.

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34. If $\sec \theta = \frac{\sqrt{p^2 + q^2}}{q}$, then the value of $\frac{p \sin \theta - q \cos \theta}{p \sin \theta + q \cos \theta}$.

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35. Express $\cos 75^\circ + \cot 75^\circ$ in terms of angle between 0° and 30° .

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36. Express $\sin 81^\circ + \tan 81^\circ$ in terms of angle between 0° and 45° .

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37. Express $\tan 15^\circ + \cos 15^\circ$ in terms of angle between 45° and 90° .

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