# MATHS

# BOOKS - ICSE

# COMPLEMENTARY ANGLES

## Question

**1.** Evaluate:

$$\left(\frac{\cos 47^\circ}{\sin 43^\circ}\right)^2 + \left(\frac{\sin 72^2}{\cos 18^\circ}\right)^2 - 2\cos^2 45^\circ$$

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**2.** Evaluate : (i) $\cos ec82^\circ - \sec 8^\circ$ (ii) $\sec 70^\circ \sin 20^\circ + \cos 20^\circ \cos ec70^\circ$

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**3.** Prove that: (i) $\cos 55^\circ \sin 35^\circ + \sin 55^\circ \cos 35^\circ = 1$

(ii) $\frac{\tan 72^\circ}{\cot 18^\circ} - \frac{\cot 72^\circ}{\tan 18^\circ} = 0$

(iii) $\sec 70^\circ \sin 20^\circ + \cos ec70^\circ \cos 20^\circ = 2$

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**4.** Evaluate: $\frac{2\tan 53^\circ}{\cot 37^\circ} - \frac{\cot 80^\circ}{\tan 10^\circ}$

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**5.** Prove that (i) $\sin\left(90^2 - A\right)\cos(90^\circ - A) = \frac{\tan A}{1 + \tan^2 A}$

(ii) $\frac{\cos(90^\circ - A).\cos A}{\cot A} - \sin^2 A = 0$

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**6.** Given: $\cos 38^\circ \sec(90^\circ - 2A) = 1,$ find the value of angle A.

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**7.** For triangle ABC prove that $\sec\left(\frac{A+B}{2}\right) = \operatorname{cosec}\frac{C}{2}$

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**8.** Evaluate:

$$\left(\frac{\cos 47^\circ}{\sin 43^\circ}\right)^2 + \left(\frac{\sin 72^2}{\cos 18^\circ}\right)^2 - 2\cos^2 45^\circ$$

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**9.** Evaluate : (i) $\cos ec 82^\circ - \sec 8^\circ$ (ii) $\sec 70^\circ \sin 20^\circ + \cos 20^\circ \cos ec 70^\circ$

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**10.** Prove that: (i)

$$\cos 55^\circ \sin 35^\circ + \sin 55^\circ \cos 35^\circ = 1$$

(ii) $$\frac{\tan 72^\circ}{\cot 18^\circ} - \frac{\cot 72^\circ}{\tan 18^\circ} = 0$$

(iii) $\sec 70^\circ \sin 20^\circ + \cos ec 70^\circ \cos 20^\circ = 2$

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**11.** Evaluate: $$\frac{2\tan 53^\circ}{\cot 37^\circ} - \frac{\cot 80^\circ}{\tan 10^\circ}$$

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**12.** Prove that (i)

$$\sin\left(90^2 - A\right)\cos(90^\circ - A) = \frac{\tan A}{1 + \tan^2 A}$$

(ii) $$\frac{\cos(90^\circ - A).\cos A}{\cot A} - \sin^2 A = 0$$

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**13.** Given: $\cos 38^\circ \sec(90^\circ - 2A) = 1,$ find the value of angle A.

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**14.** For triangle ABC prove that $\sec\left(\frac{A+B}{2}\right) = \operatorname{cosec}\frac{C}{2}$

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## Exercise

**1.** Evaluate:

$$\frac{\cos 22^\circ}{\sin 68^\circ}$$

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**2.** Evaluate:

$$\frac{\tan 47^\circ}{\cot 43^\circ}$$

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**3.** Evaluate:

$$\frac{\sec 75^\circ}{\cos ec 15^\circ}$$

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**4.** Evaluate:

$$\frac{\cos 55^\circ}{\sin 35^\circ} + \frac{\cot 35^\circ}{\tan 55^\circ}$$

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**5.** Evaluate:

$$\sin^2 40^\circ - \cos^2 50^\circ$$

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**6.** Evaluate:

$\sec^2 18^\circ - \cos ec^2 72^\circ$

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**7.** Evaluate:

$\sin 15^\circ \cos 15^\circ - \cos 75^\circ \sin 75^\circ$

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**8.** Evaluate:

$\sin 42^\circ \sin 48^\circ - \cos 42^\circ \cos 48^\circ$

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**9.** Evaluate:

$\sin(90^\circ - A)\sin A - \cos(90^\circ - A)\cos A$

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**10.** Evaluate:

$$\sin^2 35^\circ - \cos^2 55^\circ$$

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**11.** Evaluate:

$$\frac{\cot 54^\circ}{\tan 36^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ} - 2$$

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**12.** Evaluate:

$$\frac{2\tan 54^\circ}{\cot 36^\circ} - \frac{\cot 80^\circ}{\tan 10^\circ}$$

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**13.** Evaluate:

$$\cos^2 25^\circ - \sin^2 65^\circ - \tan^2 45^\circ$$

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**14.** Evaluate:

$$\left(\frac{\sin 77^\circ}{\cos 13^\circ}\right)^2 + \left(\frac{\cos 77^\circ}{\sin 13^\circ}\right)^2 - 2\cos^2 45^\circ$$

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**15.** Show that:

$$\tan 10^\circ \tan 15^\circ \tan 75^\circ \tan 80^\circ = 1$$

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**16.** Show that:

$\sin 42^\circ \sec 48^\circ + \cos 42^\circ \cos ec48^\circ = 2$

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**17.** Express the following in terms of angles between $0^\circ$ and $45^\circ$

$\sin 59^\circ + \tan 63^\circ$

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**18.** Express the following in terms of angles between $0^\circ$ and $45^\circ$

$\cos ec68^\circ + \cot 72^\circ$

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**19.** Express the following in terms of angles between $0^\circ$ and $45^\circ$

$\cos 74^\circ + \sec 67^\circ$

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**20.** For triangle ABC, show that

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

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**21.** For triangle ABC, show that

$$\tan\frac{B+C}{2} = \cot\frac{A}{2}$$

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**22.** Evaluate :

$$3\frac{\sin 72^\circ}{\cos 18^\circ} - \frac{\sec 32^\circ}{\cos ec58^\circ}$$

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**23.** Evaluate :

$$3\cos 80^\circ \cos ec10^\circ + 2\sin 59^\circ \sec 31^\circ$$

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**24.** Evaluate :

$$\frac{\sin 80^\circ}{\cos 10^\circ} + \sin 59^\circ \sec 31^\circ$$

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**25.** Evaluate :

$$\tan(55^\circ - A) - \cot(35^\circ + A)$$

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**26.** Evaluate :

$$\cos ec(65^\circ + A) - \sec(25^\circ - A)$$

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**27.** Evaluate :

$$2\frac{\tan 57^\circ}{\cot 33^\circ} - \frac{\cot 70^\circ}{\tan 20^\circ} - \sqrt{2}\cos 45^\circ$$

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**28.** Evaluate :

$$\frac{\cot^2 41^\circ}{\tan^2 49^\circ} - 2\frac{\sin^2 75^\circ}{\cos^2 15^\circ}$$

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**29.** Evaluate :

$$\frac{\cos 70^\circ}{\sin 20^\circ} + \frac{\cos 59^\circ}{\sin 31^\circ} - 8\sin^2 30^\circ$$

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**30.** Evaluate :

$14\sin 30^\circ + 6\cos 60^\circ - 5\tan 45^\circ$

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**31.** A triangle ABC is right angled at B, find the value of $\frac{\sec A.\ \sin C - \tan A - \tan C}{\sin B}$

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**32.** In each case given below, find the value of angle A where $0^\circ \leq A \leq 90^\circ$

(i) $\sin(90^\circ - 3A).\ \cos ec42^\circ = 1$

(ii) $\cos(90^\circ - A).\ \sec 77^\circ = 1$

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**33.** Evaluate:

$$\frac{\cos 22^\circ}{\sin 68^\circ}$$

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**34.** Evaluate:

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**36.** Evaluate:

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**37.** Evaluate:

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**41.** Evaluate:

$$\sin(90^\circ - A)\sin A - \cos(90^\circ - A)\cos A$$

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**42.** Evaluate:

$$\sin^2 35^\circ - \cos^2 55^\circ$$

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**43.** Evaluate:

$$\frac{\cot 54^\circ}{\tan 36^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ} - 2$$

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**44.** Evaluate:

$$\frac{2\tan 54^\circ}{\cot 36^\circ} - \frac{\cot 80^\circ}{\tan 10^\circ}$$

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