MATHS

BOOKS - CBSE COMPLEMENTARY MATERIAL MATHS (HINGLISH)

INTRODUCTION TO TRIGONOMETRY

Very Short Answer Type Questions

1. If $\sin\theta = \cos\theta$, find the value of θ

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2. If $\tan\theta = \cot(30^\circ + \theta)$, Find the value of θ.

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3. If $\sin\theta = \cos(\theta - 6^\circ)$, find the value of θ

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4. If $\cos A = \frac{7}{25}$, find the value of $\tan A + \cot A$

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5. If $\tan\theta = \frac{4}{3}$ then find the value of $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta}$

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6. If $3x = \operatorname{cosec}\theta$ and $\frac{3}{x} = \cot\theta$, find the value of $3\left(x^2 - \frac{1}{x^2}\right)$.

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7. If $x = a\sin\theta$ and $y = a\cos\theta$ then find the value of $x^2 + y^2$

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8. Find the value of $\text{cosec}70^\circ - \sec 20^\circ$

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9. If $5x = \sec\theta$ and $\frac{5}{x} = \tan\theta$, find the value of $5\left(x^2 - \frac{1}{x^2}\right)$.

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10. Find the value of $9\sec^2 A - 9\tan^2 A$

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11. Express $\sec\theta$ in terms of $\cot\theta$

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12. Find the value of $\cos\theta\cos(90^\circ - \theta) - \sin\theta\sin(90^\circ - \theta)$

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

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14. Find the value of $\dfrac{1 + \tan^2\theta}{1 + \cot^2\theta}$

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15. Find the value of $\dfrac{\sin\theta}{\sqrt{1 - \sin^2\theta}}$

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16. Given $\tan\theta = \dfrac{1}{\sqrt{3}}$, find the value of $\dfrac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta}$.

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17. If $\theta = 45^\circ$, then find the value of $\text{cosec}^2\theta$.

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18. If $\cos\theta = \frac{2}{3}$, then find the value of $2\sec^2\theta + 2\tan^2\theta - 7$.

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19. Find the value of $6\tan^2\theta - 6\sec^2\theta$

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20. Express $\text{cosec}48^\circ + \tan 88^\circ$ in terms of trigonometric ratios of angle between 0° and 45°.

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21. If $5\tan\theta - 4 = 0$, then value of $\frac{5\sin\theta - 4\cos\theta}{5\sin\theta + 4\cos\theta}$ is

A. $\frac{5}{3}$

B. $\frac{5}{6}$

C. 0

D. $\frac{1}{6}$

Answer: C

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22. If A and B are complementary angles, then $\sin A = \sin B$ (b) $\cos A = \cos B$ (c) $\tan A = \tan B$ (d) $\sec A = \cos ec\, B$

A. $\sin A = \sin B$

B. $\cos A = \cos B$

C. $\tan A = \tan B$

D. $\sec A = \text{cosec} B$

Answer: D

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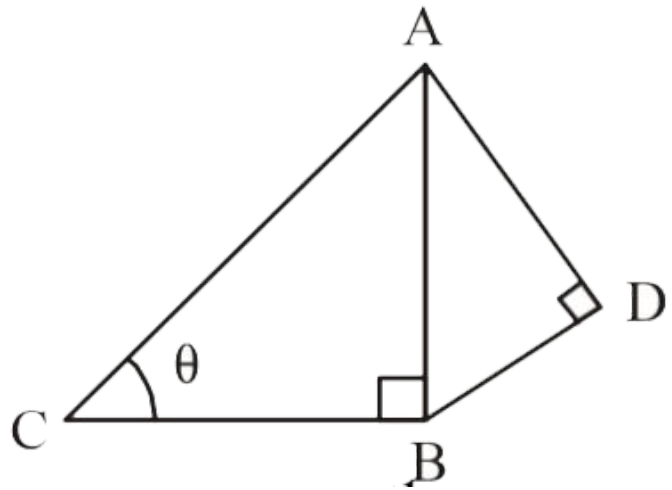
23. In Fig. if AD = 4cm, BD = 3 cm and CB = 12 cm. then $\cot\theta =$



A. $\frac{12}{5}$

B. $\frac{5}{12}$

C. $\frac{13}{12}$

D. $\frac{12}{13}$

Answer: A

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24. The value of $\tan 1^\circ \tan 2^\circ \tan 3^\circ \ldots \tan 89^\circ$ is

A. 1

B. -1

C. 0

D. None of these

Answer: A

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25. If θ and $2\theta - 45^\circ$ are acute angles such that $\sin\theta = \cos(2\theta - 45^\circ)$ then $\tan\theta$ is

A. 1

B. -1

C. $\sqrt{3}$

D. $\frac{1}{\sqrt{3}}$

Answer: A

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Short Answer Type I Questions

1. Prove the identities $\sec^4\theta - \sec^2\theta = \tan^4\theta + \tan^2\theta$

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2. $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}}$ = ___.

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3. If $x = p\sec\theta + q\tan\theta \& y = p\tan\theta + q\sec\theta$ then prove that $x^2 - y^2 = p^2 - q^2$

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4. If $7\sin^2\theta + 3\cos^2\theta = 4$ then show that $\tan\theta = \frac{1}{\sqrt{3}}$

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5. If $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$, `0o B`, find A and B.

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6. Find the value of $\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sin^2 59^\circ + \sin^2 31^\circ}$.

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7. Prove that : $\tan 1^\circ \tan 11^\circ \tan 21^\circ \tan 69^\circ \tan 79^\circ \tan 89^\circ = 1$

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8. If sec4A $= \operatorname{cosec}(A - 20^\circ)$ where 4A is an acute angle , find the value of A.

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9. If $3 \cot A = 4$, find the value of $\frac{\operatorname{cosec}^2 A + 1}{\operatorname{cosec}^2 A - 1}$.

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10. If $\tan(3x - 15^\circ) = 1$ then find the value of x.

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11. If A, B, C are interior angles of ΔABC, the prove that $\cos ec\left(\frac{A+B}{2}\right) = \sec\left(\frac{C}{2}\right)$.

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12. In ΔABC, right angled at B, AB = 5 cm and $\angle ACB = = 30^\circ$. Find BC and AC.

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13. If $\tan\theta = \cot(30^\circ + \theta)$, Find the value of θ.

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14. Show that : $\frac{1-\sin 60^\circ}{\cos 60^\circ} = 2 - \sqrt{3}$.

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15. Find the value of θ, if $\frac{\cos\theta}{1-\sin\theta}+\frac{\cos\theta}{1+\sin\theta}=4, \theta \leq 90^{\circ}$.

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Short Answer Type Questions

1. $\frac{\tan A+\sec A-1}{\tan A-\sec A+1}=\frac{1+\sin A}{\cos A}$

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2. Prove $\frac{1}{\sec x-\tan x}-\frac{1}{\cos x}=\frac{1}{\cos x}-\frac{1}{\sec x+\tan x}$

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3. $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\tan\theta+\cot\theta=\sec\theta\text{cosec}\theta+1$

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4. Prove that

$(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = \left(7 + \tan^2\theta + \cot^2\theta\right).$

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5. $\sec A(1 - \sin A)(\sec A + \tan A) = 1$

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6. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, then prove that: $m^2 - n^2 = 4\sqrt{mn}$

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7. If $\sec\theta = x + \frac{1}{4x}$,prove that $\sec\theta + \tan\theta = 2x$ or $\frac{1}{2x}$.

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8. If $\sin\theta + \sin^2\theta = 1$, prove that $\cos^2\theta + \cos^4\theta = 1$

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9. Without using trigonometric table, the value of

$\cot\theta\tan(90^\circ - \theta) - \sec(90^\circ - \theta)\operatorname{cosec}\theta + \sin^2 65^\circ + \sin^2 25^\circ + \sqrt{3}\tan 5^\circ$

.

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10. Prove that : $\dfrac{\cot(90^\circ - \theta)}{\tan\theta} + \dfrac{\operatorname{cosec}(90^\circ - \theta)\sin\theta}{\tan(90^\circ - \theta)} = \sec^2\theta$

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11. Without using trigonometric tables, evaluate each of the following:

$\dfrac{\cos^2 20^0 + \cos^2 70^0}{\sec^2 50^0 - \cot^2 40^0} + 2\cos ec^2 58^0 - 2\cot 58^0\tan 32^0 - 4\tan 13^0\tan 37^0\tan 4$

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12. If A, B, C are the angles of ΔABC then prove that $\operatorname{cosec}^2\left(\frac{B+C}{2}\right) - \tan^2\frac{A}{2} = 1$

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13. Find the value of $\sec^2 10^\circ - \cot^2 80^\circ + \frac{\sin 15^\circ \cos 75^\circ + \cos 15^\circ \sin 75^\circ}{\cos\theta \sin(90^\circ - \theta) + \sin\theta \cos(90^\circ - \theta)}$.

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14. Prove the following identities:

$$\frac{\tan\theta - \cot\theta}{\sin\theta\cos\theta} = \sec^2\theta - \operatorname{cosec}^2\theta = \tan^2\theta - \cot^2\theta$$

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15. If $\sin\theta + \cos\theta = \sqrt{2}\cos\theta then \cos\theta - \sin\theta$ is equal to

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16. Evaulate : $4 - \frac{\sin 30^\circ + \tan 45^\circ - \text{cosec} 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$

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17. Prove that : $1 - \frac{\sin A \sin(90^\circ - A)}{\cot(90^\circ - A)} = \sin^2 A$

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18. i) If $a\cos\theta + b\sin\theta = m$ and $a\sin\theta - b\cos\theta = n$, then prove that: $a^2 + b^2 = m^2 + n^2$

ii) If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, then prove that: $x^2 + y^2 = 1$

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19. If $a\cos\theta - b\sin\theta = c$, then prove that:

$$a\sin\theta + b\cos\theta = \pm\sqrt{a^2 + b^2 - c^2}$$

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20. Without using trigonometric tables, evaluate each of the following:

$$\frac{\sec^2 54^0 - \cot^2 36^0}{\cos ec^2 57^0 - \tan^2 33^0} + 2\sin^2 38^0 \sec^2 52^0 - \sin^2 45^0$$

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Long Answer Type Questions

1. $\left(1 + \frac{1}{\tan^2\theta}\right)\left(1 + \frac{1}{\cot^2\theta}\right) = \frac{1}{\sin^2\theta - \sin^4\theta}$

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2. Prove : $2\left(\sin^6\theta + \cos^6\theta\right) - 3\left(\sin^4\theta + \cos^4\theta\right) + 1 = 0.$

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3. Prove

$(1+\cot A+\tan A)(\sin A-\cos A)=\sin A\tan A-\cot A\cos A$

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4. If $\sin\theta+\cos\theta=m$ and $\sec\theta+\operatorname{cosec}\theta=n$, prove that

$n\left(m^2-1\right)=2m.$

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5. Prove that

$$\frac{1}{(\operatorname{cosec}\theta-\cot\theta)}-\frac{1}{\sin\theta}=\frac{1}{\sin\theta}-\frac{1}{(\operatorname{cosec}\theta+\cot\theta)}.$$

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6. If $\frac{\cos\alpha}{\cos\beta} = m$ and $\frac{\cos\alpha}{\sin\beta} = n$ then prove that $(m^2 + n^2)\cos^2\beta = n^2$.

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7. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, then prove that: $m^2 - n^2 = 4\sqrt{mn}$

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8. $\sec^2\theta - \frac{\sin^2\theta - 2\sin^4\theta}{2\cos^4\theta - \cos^2\theta} = 1$

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9.

$\cot\theta\tan(90^\circ - \theta) - \sec(90^\circ - \theta)\cos ec\theta + \sqrt{3}\tan 12^\circ\tan 60^\circ\tan 78^\circ = 2$

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10. Without using trigonometric tables, find the value of the following expression : (sec (90º-theta).cosec theta — tan (90º-theta) cot theta + cos^2 25º + cos^2 65º)/(3tan27^@.tan63^@)

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Practics Test Section A

1. If $\sin\theta = \frac{4}{5}$ what is the value of $\cos\theta$.

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2. Find the value of $\sin(45^\circ + \theta) - \cos(45^\circ - \theta)$

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3. If $\cos 9\alpha = \sin\alpha$ and $9\alpha < 90^\circ$, then the value of $\tan 5\alpha$ is

A. $\frac{1}{\sqrt{3}}$

B. $\sqrt{3}$

C. 1

D. 0

Answer:

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4. If $\sin A + \sin^2 A = 1,$ then the value of $\cos^2 A + \cos^4 A$ is 2 (b) 1 (c) -2 (d) 0

A. 1

B. $\frac{1}{2}$

C. 2

D. 3

Answer:

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Practics Test Section B

1. If $5\tan\theta = 4$ then find the value of $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$

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2. Evaluate : $\tan 35^0 \tan 40^0 \tan 45^0 \tan 50^0 \tan 55^0$

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3. Prove that $(\sin\alpha + \cos\alpha)(\tan\alpha + \cot\alpha) = \sec\alpha + \operatorname{cosec}\alpha$

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Practics Test Section C

1. Prove that $\frac{\sin\theta}{1+\cos\theta}+\frac{1+\cos\theta}{\sin\theta}=2\text{cosec}\theta$

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

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Practics Test Section D

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

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