MATHS

BOOKS - VK GLOBAL PUBLICATION MATHS (HINGLISH)

INTRODUCTION TO TRIGONOMETRY

Very Short Answer Questions

1. Express $s \in 67 \oplus \cos 75o$ in terms of trigonometric ratios of angles between $0o \; and \; 45o$.

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2. Evaluate :

$$\frac{\sin 18^\circ}{\cos 72^\circ}$$

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3. Evaluate :

$$\frac{\tan 26^\circ}{\cot 64^\circ}$$

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4. Evaluate :

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

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5. Evaluate :

$\text{cosec} 31^\circ - \sec 59^\circ$

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6. In ΔABC right angled at C, find the value of cos (A + B).

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7. Can the value of the expression $(\cos 80^\circ - \sin 80^\circ)$ be negative ? Justify your answer.

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8. If $\sin A + \sin^2 A = 1$, then show that $\cos^2 A + \cos^4 A = 1$.

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9. Write the value of $\cot^2 \theta - \dfrac{1}{\sin^2 \theta}$.

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10. If $\sin \theta = \dfrac{1}{3}$ then find the value of $2 \cot^2 \theta + 2$.

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11. If $\sec^2\theta(1+\sin\theta)(1-\sin\theta)=k$, then find the value of k.

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12. Write the acute angle θ satisfying $\sqrt{3}\sin\theta=\cos\theta$.

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13. If : $A+B=90^\circ$, and $\tan A=\frac{3}{4}$ then : $\cot B=$

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Short Answer Questions I

1. Evaluate $\cos 48^\circ\cos 42^\circ-\sin 48^\circ\sin 42^\circ$

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2. Find the value of : $3\sin^2 20^\circ - 2\tan^2 45^\circ + 3\sin^2 70^\circ$.

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3. If $\sin^2 A = 2 \sin A$ then find the value of A.

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4. Find maximum value of $\frac{1}{\sec\theta}, 0^\circ \leq \theta \leq 90^\circ$.

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5. Given that $\sin\theta = \frac{a}{b}$, find the value of $\tan\theta$.

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6. If $\sin\theta = \cos\theta$, then find the value of $2\tan\theta + \cos^2\theta$.

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7. If $\sin(x-20)^\circ = \cos(3x-10)^\circ$, then find the value of x.

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8. If $\sin^2 A = \frac{1}{2}\tan^2 45^\circ$, where A is an acute anlge, then find the value of A.

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9. If x = a cos θ,y = b $\sin\theta$, then find the value of $b^2x^2 + a^2y^2 - a^2b^2$.

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10. If tan A = cot B , prove that A + B = 90° .

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11. if $\sec A = 2x$ and $\tan A = \frac{2}{x}$,find the value of $2\left(x^2 - \frac{1}{x^2}\right)$

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12. In a ΔABC, if $\angle C = 90^\circ$, prove that $\sin^2 A + \sin^2 B = 1$.

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13. If sec 4A = cosec $(A - 20^\circ)$, where 4A is an acute angle, find the value of A.

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Short Answer Questions Ii

1. If $s \in A = \frac{3}{4}$, calculate cos A and tan A.

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2. Given $15\ \cot\ A\ = \ 8$, find sin A and sec A.

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3. Find $tan\ P\ \ \cot\ R$.

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4. If $\sin\theta + \cos\theta = \sqrt{3},$ then prove that $\tan\theta + \cot\theta = 1$

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5. Prove the following identities: $\frac{1-\sin\theta}{1+\sin\theta} = (\sec\theta - \tan\theta)^2$

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

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

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7.

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

is equal to

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8. $\frac{\sin^2 20^\circ + \sin^2 70^\circ}{\cos^2 20^\circ + \cos^2 70^\circ} + \left[\frac{\sin(90^\circ - \theta).\sin\theta}{\tan\theta} + \frac{\cos(90^\circ - \theta).\cos\theta}{\cot\theta}\right].$

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9. Evaluate: $\sin 25^\circ \cos 65^\circ + \cos 25^\circ \sin 65^\circ$.

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10. Without using tables, evaluate the following:

$3\cos 68^\circ . \operatorname{cosec} 22^\circ - \frac{1}{2}\tan 43^\circ . \tan 47^\circ . \tan 12^\circ . \tan 60^\circ . \tan 78^\circ .$

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11. If $\sin 3\theta = cso(\theta - 6^\circ)$ where 3θ and $\theta - 6^\circ$ are both acute angles, find the value of θ.

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12. If $\sec\theta = x + \frac{1}{4x}$, $provethat: \sec\theta + \tan\theta = 2x$ or , $\frac{1}{2x}$

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13. Find an acute angle θ , when $\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$

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14. The altitude AD of a $ABC,$ in which $\angle A$ obtuse and, $AD = 10cm.$ If $BD = 10cmandCD = 10\sqrt{3}cm,$ determine $\angle A.$

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15. If $\cos ec\,\theta = \frac{13}{12}$, find the value of $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$

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16. Prove that $\frac{\tan A}{1+\sec A} - \frac{\tan A}{1-\sec A} = 2\text{cosec A.}$

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17. Prove: $\frac{\cos^3\theta + \sin^3\theta}{\cos\theta + \sin\theta} + \frac{\cos^3\theta - \sin^3\theta}{\cos\theta - \sin\theta} = 2$

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18. सिद्ध करें कि

$$\cot\theta - \tan\theta = \frac{2\cos^2\theta - 1}{\sin\theta \cdot \cos\theta}.$$

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19. Prove that $\frac{\cot^2\theta}{\cos ec\theta + 1} = \cos ec\theta - 1$

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20. Evaluate the

$$\frac{\sin 30^\circ + \tan 45^\circ - \text{cosec}60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$$

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21. Evaluate the following (i)

$s \in \backslash\ 60o\backslash\ \cos\backslash\ 30o\backslash\ + \backslash\ s \in \backslash\ 30o\backslash\ \cos\backslash\ 60o$ (ii)

$2\tan^2 45 \oplus \cos^2 30o - \sin^2 60o$ (iii) $\frac{\cos 45o}{\sec 30 \oplus \operatorname{cosec} 30o}$ (iv)

$\frac{\sin 30 \oplus \tan 45o - \operatorname{cosec} 60o}{\sec 30 \oplus \cos 60 \oplus \cot 45o}$ (v) `(5cos^2 6

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22. If $\tan(A+B) = \sqrt{3}$ and $tan(AB) = \frac{1}{\sqrt{3}}$; `0o B ,` find A and B.

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23. If A, B and C are interior angles of a triangle ABC, then show that $\sin\left(\frac{B+C}{2}\right) = \frac{\cos A}{2}$.

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24. Prove that $(\operatorname{cosec}\theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

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25. Prove that: $\left(\sin\theta - 2\sin^3\theta\right) = \left(2\cos^3\theta - \cos\theta\right)\tan\theta.$

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26. $(\sin A + \cos ecA)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

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27. Prove each of the following identities :

$$\frac{1 + \cos\theta - \sin^2\theta}{\sin\theta(1 + \cos\theta)} = \cot\theta$$

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

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29. Prove that $\frac{\cos A}{1+\sin A}+\frac{1+\sin A}{\cos A}=2\sec A$

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30. Evaluate : $\frac{\sec^2\theta-\cot^2(90^\circ-\theta)}{\text{cosec}^2 67^\circ-\tan^2 23^2}+\left(\sin^2 40^\circ+\sin^2 50^\circ\right)$

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31. Evaluate :

$$\frac{\sec\theta.\,\text{cosec}(90^\circ-\theta)-\tan\theta.\,\cot(90^\circ-\theta)+\sin^2 55^\circ+\sin^2 35^\circ}{\tan 10^\circ.\tan 20^\circ.\tan 60^\circ.\tan 70^\circ.\tan 80^\circ}$$

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Long Answer Questions

1. In ΔPQR , right - angled at Q , PR +QR = 25 cm and PQ = 5cm .

Determine the values of sin P , cos P and tan P.

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2. In triangle ABC, right-angled at B. if $\tan A = \frac{1}{\sqrt{3}}$ find the value of:

$(i) \quad s \in A \cos C + \cos As \in C (ii) \quad \cos A \cos Cs \in As \in C$

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3. If $\cot \theta = \frac{7}{8}$, evaluate:(i) $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$ (ii) $\cot^2 \theta$

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4. If $3 \cot A = 4$, check whether $\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A$or not.

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5. Write all the other trigonometric ratios of $\angle A$in terms of sec A.

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6. Prove that $\frac{1+\tan^2 A}{1+\cot^2 A} = \left(\frac{1-\tan A}{1-\cot A}\right)^2 = \tan^2 A$

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7. Prove the following identities:

$\tan^2 A - \tan^2 B = \frac{\cos^2 B - \cos^2 A}{\cos^2 B \cos^2 A} = \frac{\sin^2 A - \sin^2 B}{\cos^2 A \cos^2 B}$

$\frac{\sin A - \sin B}{\cos A + \cos B} + \frac{\cos A - \cos B}{\sin A + \sin B} = 0$

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8. $\frac{cosecA}{\cos ecA - 1} + \frac{cosecA}{cosecA + 1} = 2 + 2\tan^2 A$

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9. $(\sin\theta + \sec\theta)^2 + (\cos\theta + cosec\theta)^2 = (1 + \cos ec\theta \sec\theta)^2$

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10. $\frac{1}{cosec\theta - \cot\theta} - \frac{1}{\sin\theta} = \frac{1}{\sin\theta} - \frac{1}{cosec\theta + \cot\theta}$

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11. Prove that:

$$\frac{\text{cosec}\theta + \cot\theta}{\text{cosec}\theta - \cot\theta} = (\text{cosec}\theta + \cot\theta)^2 = 1 + 2\cot^2\theta + 2\text{cosec}\theta\cot\theta.$$

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12. Prove that: $2\sec^2\theta - \sec^4\theta - 2\text{cosec}^2\theta = \cot^4\theta - \tan^4\theta.$

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13. Prove that

$$(\text{cosec}A - \sin A)(\sec A - \cos A) = \frac{1}{(\tan A + \cot A)}.$$

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Hots Higher Order Thinking Skills

1. Prove that :

$$\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\sec\theta\cos ec\theta\,.$$

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2. If tanA=ntanB and sinA=msinB, prove that $\cos^2 A=\frac{m^2-1}{n^2-1}$

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3. Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (v)

$$\frac{\cos A-\sin A+1}{\cos A+\sin A-1}=\mathrm{cosec\,A}+\mathrm{cot\,A}$$

$$using\ the\ identify\ \mathrm{cosec}^2 A=1+\cot^2 A$$

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4. If $x \sin^3 \theta + y \cos^3 \theta - \sin \theta \cos \theta and x \sin \theta = y \cos \theta,$ prove that $x^2 + y^2 = 1$

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5. If $tan\theta + s\int h\eta = mandth\eta - s\int h\eta = n,$ show $m^{2-}n^2 = 4\sqrt{mn}.$

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6. If $\cos ec\theta - \sin \theta = l$ and $\sec \theta - \cos \theta = m,$ prove that $l^2 m^2 \left(l^2 + m^2 + 3\right) = 1$

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Proficiency Exercise Very Short Answer Questions

1. If $\sin\theta = \frac{12}{13}$, then find $\operatorname{cosec}\theta$.

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2. Find the value of $\sin^2 48^\circ + \cos^2 48^\circ$.

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

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4. If $\tan\alpha = \sqrt{3}$ and $\tan\beta = \frac{1}{\sqrt{3}}$, then find the value of $\cot(\alpha + \beta)$.

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5. Find the value of $\frac{\tan 30^\circ}{\cot 60^\circ}$.

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6. If ΔABC is right angled at C, then find the value of cos (A + B)

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7. If sin A = $\frac{1}{2}$, then find the value of cos A.

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8. A pole of height 6 m casts a shadow $2\sqrt{3}$ m long on the ground. Find the sun's elevation.

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Proficiency Exercise Short Answer Questions I

1. If tan 3A = cot $(A - 25^\circ)$, 3A $< 90^\circ$, then find the value of $\angle$A.

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

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3. What is the value of $\left(1 + \cot^2\theta\right)\sin^2\theta$?

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4. What is the value of $\sin^2\theta + \frac{1}{1 + \tan^2\theta}$?

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5. Write the value of $\sin\theta\cos(90^\circ - \theta) + \cos\theta\sin(90^\circ - \theta)$.

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6. What is the maximum value of $\frac{2}{\text{cosec}\theta}$? Justify your answer.

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Proficiency Exercise Short Answer Questions Ii

1. Given $\text{cosec}\theta = \frac{4}{3}$, calculate all other trigonometric ratios.

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2. If 12 sec A = 13, find sin A and cot A.

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3. In ΔABC, right-angled at C, find cos A, tan A and cosec B if sin A = $\frac{24}{25}$.

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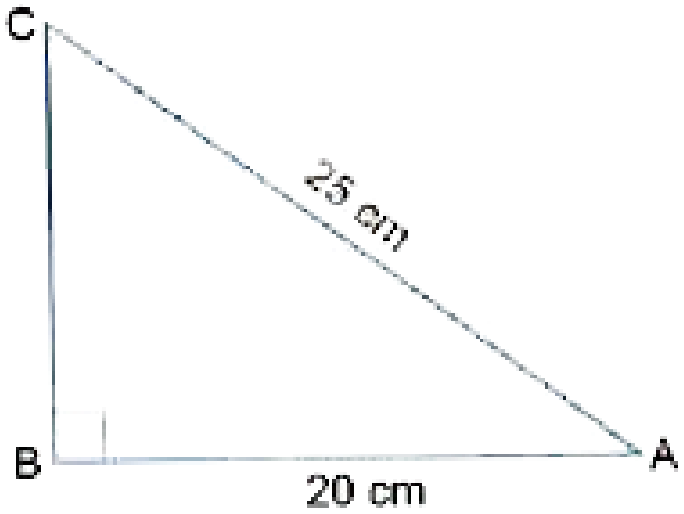
4. In fig. 10.11, find sin A, tan A and cot A.



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5. If $\cot\theta = \frac{1}{\sqrt{3}}$, show that $\frac{1-\cos^2\theta}{2-\sin^2\theta} = \frac{3}{5}$

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6. If $\tan\theta = \frac{1}{3}$, find other five trigonometric ratios.

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7. Write all the other trigonometric ratios of $\angle B$ in terms of tan B.

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8. In $DelatOPQ$, right - angled at P , OP = 7 cm and OQ - PQ =1 cm . Determine the values of sinQ and cos Q .

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9. In ΔABC, right-angled at B, AB = 3 cm and $\angle BAC = 60^\circ$. Determine the lengths of the sides BC and AC.

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10. Evaluate the equation ;-

$\cos 90^\circ \sin 0^\circ - \sin 0^\circ \cos 90^\circ$.

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11. Evaluate the

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

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12. $2\sin^2(30^\circ) - 3\cos^2(45^\circ) + \tan^2(60^\circ)$

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13. Evaluate the

$$\cot^2 30^\circ - 2\cos^2 60^\circ - \frac{3}{4}\sec^2 45^\circ - 4\sec^2 30^\circ$$

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14. Evaluate the

$$\frac{\tan^2 60^\circ + 4\cos^2 45^\circ + 3\sec^2 30^\circ + 5\cos^2 90^\circ}{\text{cosec}30^\circ + \sec 60^\circ - \cot^2 30^\circ}$$

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15. Evaluate the

$$\frac{\tan 45^\circ}{\text{cosec}30^\circ} + \frac{\sec 60^\circ}{\cot 45^\circ} - \frac{3\sin 90^\circ}{2\cos 0^\circ}.$$

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16. Evaluate the equation:-

$$\frac{\sec 70^\circ}{\text{cosec}20^\circ} + \frac{\sin 59^\circ}{\cos 31^\circ}.$$

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17. Show that $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1.$

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18. Prove that :

$(i)\dfrac{\sin 70^\circ}{\cos 20^\circ}+\dfrac{\cos ec20^\circ}{\sec 70^\circ}-2\cos 70^\circ\cos ec20^\circ=0$

$(ii)\dfrac{\cos 80^\circ}{\sin 10^\circ}+\cos 59^\circ\cos ec31^\circ=2$

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

$(iv)\dfrac{\sin 18^\circ}{\cos 72^\circ}+\sqrt{3}(\tan 10^\circ\tan 30^\circ\tan 40^\circ\tan 50^\circ\tan 80^\circ)=2$

$(v)\dfrac{7\cos 55^\circ}{3\sin 35^\circ}-\dfrac{4(\cos 70^\circ\cos ec20^\circ)}{3(\tan 5^\circ\tan 25^\circ\tan 45^\circ\tan 65^\circ\tan 856^\circ)}=1$

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19. Evaluate :

$\cos ec(65^0+\theta)-\sec(25^0-\theta)-\tan(55^0-\theta)+\cot(35^0+\theta)$

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20. Evaluate the

$$\left(\frac{3\cos 43^\circ}{\sin 47^\circ}\right)^2 - \frac{\cos 37^\circ \operatorname{cosec} 53^\circ}{\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ}$$

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21. If $\sec 2A = \operatorname{cosec}(A - 42^\circ)$, where 2A is an acute angle, find the value of A.

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22. If sin (A - B) = 0 , cos (A + B) = 0, $0^\circ < A + B \leq 90^\circ$, find A and B.

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23. If tan (A + B) = $\sqrt{3}$ and tan (A - B) = 0, $0^\circ <$ A + B $\leq 90^\circ$, find sin (A + B) and cos (A - B).

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24. Prove : $\left(1+\tan^2\theta\right)(1+\sin\theta)(1-\sin\theta)=1.$

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25. If $\sin\theta+\cos\theta=\sqrt{3},$ then prove that $\tan\theta+\cot\theta=1$

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26. .If$\alpha+\beta=90^\circ,$ show that $\sqrt{\cos\alpha\cdot\csc\beta-\cos\alpha\cdot\sin\beta}$=$\sin\alpha$

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27. If $\tan\theta=\frac{a}{b}$, prove that $\frac{a\sin\theta-b\cos\theta}{a\sin\theta+b\cos\theta}=\frac{a^2-b^2}{a^2+b^2}$

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28. If $\sec\theta = \frac{5}{4}$, find the value of $\frac{\sin\theta - 2\cos\theta}{\tan\theta - \cot\theta}$

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29. If $\theta = 30o$, verify that: (i) $\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$ (ii) $\sin 2\theta = \frac{2\tan\theta}{1+\tan^2\theta}$

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30. If $\theta = 30o$, verify that: (i) $\cos 2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$ (ii) $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

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31. If A = 30° and $B = 60^\circ$, verify that cos (A + B) = cos A cos B - sin A sin B.

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32. If A = 30° and $B = 60^\circ$, verify that sin (A + B) = sin A cos B + cos A sin B.

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33. $If\ \cot\theta = \frac{15}{8}, the \neq valuate\left((2+2\sin\theta)\frac{1-\sin\theta}{(1+\cos\theta)(2-2\cos\theta)}\right.$

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34. If $\sec\theta = x + \frac{1}{4x}, provethat: \sec\theta + \tan\theta = 2x$ or , $\frac{1}{2x}$

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35. If $\sqrt{3}\tan\theta = 3\sin\theta$ and $\theta \neq 0$ then find the value of $\sin^2\theta - \cos^2\theta$.

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36. If $\cos ec\,\theta = \frac{13}{12}$, find the value of $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$

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37. If $\sin\theta = \frac{a^2 - b^2}{a^2 + b^2}$ then find $1 + \tan\theta \cdot \cos\theta$.

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38. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, then prove that$\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

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39. Find the value of x $\sqrt{3}$ sin x = cos x

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40. If $\tan x = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$ then x is equal to

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41. $\sin^6\theta + \cos^6\theta + 3\sin^2\theta\cos^2\theta = 1$

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42. $\tan\theta + \tan(90^\circ - \theta) = \sec\theta \times \sec(90^\circ - \theta)$

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43. Prove that :

$\tan^4\theta + \tan^2\theta = \sec^4\theta - \sec^2\theta$

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44. Prove that

$$\frac{\tan A}{(1-\cot A)} + \frac{\cot A}{(1-\tan A)} = (1 + \tan A + \cot A).$$

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45. $(1+\cot A-\operatorname{cosec} A)(1+\tan A+\sec A)$ is equal to

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46. Prove that :

$$\tan\theta-\cot\theta=\frac{2\sin^2\theta-1}{\sin\theta\cos\theta}$$

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47. Prove $(\cos ec\theta-\cot\theta)^2=\frac{1-\cos\theta}{1+\cos\theta}$

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48. Prove that: $\left(\sin\theta-2\sin^3\theta\right)=\left(2\cos^3\theta-\cos\theta\right)\tan\theta.$

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Proficiency Exercise Long Answer Questions

1. If $a\sin\theta + b\cos\theta = c$ then prove that $a\cos\theta - b\sin\theta = \sqrt{a^2 + b^2 - c^2}$

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2. If $\sec\theta + \tan\theta = p,$ show that $\frac{p^2 - 1}{p^2 + 1} = \sin\theta$

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3. If $a\cos\theta + b\sin\theta = m$ and $a\sin\theta - b\cos\theta = n$, prove that $a^2 + b^2 = m^2 + n^2$

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4. Prove that

$\sqrt{\sec^2\theta + \text{cosec}^2\theta} = \tan\theta + \cot\theta.$

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5. $\sin A(1 + \tan A) + \cos A(1 + \cot A) = \sec A + \cos ecA$

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6. $\dfrac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = cosecA + \cot A$

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7. $\dfrac{\tan\theta}{1 - \cot\theta} + \dfrac{\cot\theta}{1 - \tan\theta} = 1 + \sec\theta \cdot \cos ec\theta$

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

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9. Prove each of the following identities :

$\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)}=\cot\theta$

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10. Prove that: $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}}+\sqrt{\frac{\sec\theta+1}{\sec\theta-1}}=2\,\text{cosec}\,\theta$

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11. Prove:

$(\sec A-\text{cosec}\,A)(1+\tan A+\cot A)=\tan A\sec A-\cot A\,\text{cosec}\,A\,.$

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12. $\sin A(1+\tan A)+\cos A(1+\cot A)=\sec A+\cos ecA$

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13. $\frac{\sin\theta-2\sin^3\theta}{2\cos^3\theta-\cos\theta}=\tan\theta$

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Self Assessment Test

1. $\frac{2\tan 30^\circ}{1+\tan^2 30^\circ}$ =

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2. If sin B = $\frac{12}{13}$, then find cot B.

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3. Find the value of the expression $\left[\frac{\cot(20^\circ - \theta) + \tan(70^\circ + \theta)}{\sin(70^\circ + \theta)}\right]\sin(20^\circ - \theta)$

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4. If $\text{cosec}^2\theta(1 + \cos\theta)(1 - \cos\theta) = \alpha$ then find the value of α.

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5. In ΔABC, right-angled at A, if cot B = 1, find the value of :

(i) cos B cos C + sin C (ii) sin B cos C - cos B sin C.

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6. Evaluate : $\frac{3\cos 55^\circ}{7\sin 35^\circ} - \frac{4\cos 70^\circ \cos ec20^\circ}{7(\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ)}$.

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7. Prove that :

$$\left(\sin^4\theta - \cos^4\theta + 1\right)\operatorname{cosec}^2\theta = 2$$

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8. If $a\cos\theta - b\sin\theta$= c, prove that $a\sin\theta + b\cos\theta = \pm\sqrt{a^2 + b^2 - c^2}$.

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9. Prove the trigonometric identities:

$$(1 + \cot A + tanA)(s \in A - \cos A) = \frac{secA}{\cos ec^2 A} - \frac{\cos ecA}{\sec^2 A} = \sin A \tan A$$

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