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Guess Paper – UNIT: 3 (TRIGONOMETRY)

1. Find the value of $9 \tan^2 A - 9 \sec^2 A$
2. Express $\sin 81^\circ + \cos 81^\circ$ in terms of trigonometric ratios of angles lying between 0° and 45° .
3. Evaluate: $(\cos 0^\circ + \sin 45^\circ + \sin 30^\circ)(\sin 90^\circ - \cos 45^\circ + \cos 60^\circ)$
4. The string of a kite is 150 m long and it makes an angle of 60° with the horizontal. Find the height of the kite from the ground.
5. If $\tan A = \frac{3}{4}$, find all other trigonometric ratios.
6. If $x = a \cos A - b \sin A$ and $y = a \sin A + b \cos A$, then prove that $a^2 + b^2 = x^2 + y^2$.
7. Evaluate: $(\cos^2 25^\circ + \cos^2 65^\circ) + \operatorname{cosec} \theta \sec (90^\circ - \theta) - \cot \theta \tan (90^\circ - \theta)$
8. Prove that $(1 + \cot \theta - \operatorname{cosec} \theta)(1 + \tan \theta + \sec \theta) = 2$

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9. If A, B and C are the interior angles of a triangle ABC,
show $\sec \frac{A+C}{2} = \operatorname{cosec} \frac{B}{2}$
10. A tree is broken by the wind. The top struck the ground at an angle of 30° at a distance of 30 m from the root. Find the whole height of the tree.
11. If $\sec \theta = x + \frac{1}{4x}$, then prove that $\sec \theta + \tan \theta = 2x$ or $\frac{1}{2x}$
12. If $7 \sin^2 \theta + 3 \cos^2 \theta = 4$, show that $\tan \theta = \frac{1}{\sqrt{3}}$.
13. Prove that $\frac{1}{\sec x - \tan x} - \frac{1}{\cos x} = \frac{1}{\cos x} - \frac{1}{\sec x + \tan x}$

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14. The angle of elevation of a cloud from a point h metres above a lake is β and the angle of depression of its reflection in the lake is α . Prove that the height of the cloud above the lake is $\frac{h(\tan \alpha + \tan \beta)}{\tan \alpha - \tan \beta}$

15. If $\tan (x + y) = \sqrt{3}$ and $\tan (x - y) = \frac{1}{\sqrt{3}}$, find x and y .