

Trigonometrical Identities and Ratios
ICSE-Class IX-X

Full Marks: 43

Time: 1 hrs 30 mins

1. Find the simplest value of $(\cos \theta + \sin \theta)^2 + (\cos \theta - \sin \theta)^2$ [3]
2. Show that $(\tan \theta + \sec \theta)^2 = \frac{1 + \sin \theta}{1 - \sin \theta}$ [4]
3. Show that $\sin^6 \theta + \cos^6 \theta = 1 - 3 \sin^2 \theta \cos^2 \theta$ [4]
4. Show that $\sqrt{\frac{1 + \cos \theta}{1 - \cos \theta}} + \sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} = 2 \operatorname{cosec} \theta$ [5]
5. Show that $\frac{\tan \theta}{\sec \theta - 1} + \frac{\tan \theta}{\sec \theta + 1} = 2 \operatorname{cosec} \theta$ [4]
6. Show that $\frac{1}{\operatorname{cosec} \theta - \cot \theta} - \frac{1}{\sin \theta} = \frac{1}{\sin \theta} - \frac{1}{\operatorname{cosec} \theta + \cot \theta}$ [5]
7. Find the value of $\frac{4}{3} \cot^2 30^\circ + 3 \sin^2 60^\circ - 2 \operatorname{cosec}^2 60^\circ - \frac{3}{4} \tan^2 30^\circ$ [5]
8. Find x , if $x \cdot \sin 45^\circ \cdot \cos 45^\circ \cdot \tan 60^\circ = \tan^2 45^\circ - \cos^2 60^\circ$ [5]
9. Simplify $\tan 1^\circ \tan 2^\circ \tan 3^\circ \tan 87^\circ \tan 88^\circ \tan 89^\circ$ [4]
10. Simplify $\frac{\sin 35^\circ}{\cos 55^\circ} + \tan^2 \theta \tan^2 (90 - \theta) + \sec^2 45^\circ$ [4]

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Best of luck!

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