

Time 1 h 15 min

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MM 40

Prove the following identities

1. $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$
2. $(\sin \theta + \operatorname{cosec} \theta)^2 (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$
3. $\frac{1}{\sec \theta - \cot \theta} - \frac{1}{\sin \theta} = \frac{1}{\sin \theta} - \frac{1}{\operatorname{cosec} \theta + \cot \theta}$
4. $\frac{\cos A}{1 - \sin A} + \frac{\sin A}{1 - \cos A} + 1 = \frac{\sin A \cos A}{(1 - \sin A)(1 - \cos A)}$
5. $\frac{2 \cos^2 \theta - 1}{\sin \theta \sin \theta} = \cot \theta - \tan \theta$
6. Evaluate without using tables $\sec^2 10^\circ + \frac{\sin 15^\circ \cos 75^\circ + \cos 15^\circ \sin 75^\circ}{\cos \theta \sin(90^\circ - \theta) + \sin \theta \cos(90^\circ - \theta)}$
7. Express $\sin 73^\circ + \cos 70^\circ + \tan 68^\circ$ in terms of angles between 0° and 45°
8. Prove $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 87^\circ \tan 88^\circ \tan 89^\circ = 1$
9. Prove $\left[\frac{1 + \sin \theta - \cos \theta}{-1 + \sin \theta + \cos \theta} \right]^2 = \frac{\sec \theta - 1}{\sec \theta + 1}$
10. $\sqrt{\frac{1 + \cos \theta}{1 - \cos \theta}} = \operatorname{cosec} \theta + \cot \theta$

Each 4 marks

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