

Trigonometric Identities

Exercise 10.1 for Class XI

Question # 1 Without using the tables, find the value of :

- (i) $\sin(-780^\circ)$
- (ii) $\cot(-855^\circ)$
- (iii) $\csc(2040^\circ)$
- (iv) $\sec(-960^\circ)$
- (v) $\tan(1110^\circ)$
- (vi) $\sin(-300^\circ)$

Question # 2 Express each of the following as a trigonometric function of an angle of positive degree measure of less than 45° .

- (i) $\sin 196^\circ$
- (ii) $\cos 147^\circ$
- (iii) $\sin 319^\circ$
- (iv) $\cos 254^\circ$
- (v) $\tan 294^\circ$
- (vi) $\cos 728^\circ$
- (vii) $\sin(-625^\circ)$
- (viii) $\cos(-435^\circ)$

Question # 3 Prove the following:

- (i) $\sin(180 + \alpha) \sin(90 - \alpha) = -\sin \alpha \cos \alpha$
- (ii) $\sin 780^\circ \sin 480^\circ + \cos 120^\circ \sin 30^\circ = \frac{1}{2}$
- (iii) $\sin 306^\circ + \cos 234^\circ + \cos 162^\circ + \cos 18^\circ = 0$
- (iv) $\cos 330^\circ \sin 600^\circ + \cos 120^\circ \sin 150^\circ = -1$

Question # 4 Prove that

- (i)
$$\frac{\sin^2(\pi + \theta) \tan\left(\frac{3\pi}{2} + \theta\right)}{\cot^2\left(\frac{3\pi}{2} - \theta\right) \cos^2(\pi - \theta) \operatorname{cosec}(2\pi - \theta)} = \cos \theta$$
- (ii)
$$\frac{\cos(90^\circ + \theta) \sec(-\theta) \tan(180^\circ - \theta)}{\sec(360^\circ - \theta) \sin(180^\circ + \theta) \cot(90^\circ - \theta)} = -1$$

Question # 5 If α, β, γ are the angles of a triangle ABC , then prove that

- (i) $\sin(\alpha + \beta) = \sin \gamma$
- (ii) $\cos\left(\frac{\alpha + \beta}{2}\right) = \sin \frac{\gamma}{2}$
- (iii) $\cos(\alpha + \beta) = \cos \gamma$
- (iv) $\tan(\alpha + \beta) + \tan \gamma = 0$