RS Aggarwal Solutions for Class 10 Maths Chapter 7 Exercise 7.1: The Physics Wallah academic team has produced a comprehensive solution for Chapter 7's Trigonometric Identities in the RS Aggarwal class 10 textbook. Use the NCERT solutions to assist you tackle questions from the NCERT to get good grades in class 10.

Maths class 10 NCERT solutions were uploaded by a Physics Wallah specialist. The RS Aggarwal class 10 solution for Chapter 7 Trigonometric Identities Exercise 7A is uploaded for reference only; do not copy the solutions. Before going through the solution of Chapter 7 Trigonometric Identities Exercise-7A, one must have a clear understanding of Chapter 7 Trigonometric Identities. Read the theory of Chapter 7 Trigonometric Identities and then try to solve all numerical of exercise-7A.

RS Aggarwal Solutions for Class 10 Maths Chapter 7 Exercise 7.1 Overview

In Chapter 7 of RS Aggarwal's Class 10 Maths, Exercise 7.1 focuses on Trigonometric Identities, which are essential tools in simplifying and solving trigonometric equations. These identities, such as reciprocal identities are universally valid across all values of the angles they involve. Mastery of these identities allows students to simplify complex trigonometric expressions and equations effectively.

Exercise 7.1 typically includes problems aimed at reinforcing these concepts, helping students develop confidence in applying trigonometric identities to solve various mathematical problems. Understanding these identities lays a strong foundation for further exploration of trigonometry and its applications in higher studies and practical scenarios.

RS Aggarwal Solutions for Class 10 Maths Chapter 7 Exercise 7.1

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 7 Exercise 7.1 for the ease of the students –

Question 1 A .

Solution:

Consider the left – hand side:

L.H.S. = $(1 - \cos^2\theta) \times \text{cosec}^2\theta$

= $(\sin^2\theta) \times \text{cosec}^2\theta$ ($\because \sin^2\theta + \cos^2\theta = 1$)

= 1

= R.H.S.

Hence, proved.

Question 1 B. Prove each of the following identities:

$(1 + \cot^2\theta) \sin^2\theta = 1$

Solution: Consider the left – hand side:

L.H.S. = $(1 + \cot^2\theta) \times \sin^2\theta$

= $(\text{cosec}^2\theta) \times \sin^2\theta$ ($\because 1 + \cot^2\theta = \text{cosec}^2\theta$)

= 1

= R.H.S.

Hence, proved.

Question 2 A.

Solution:

Consider the left – hand side:

L.H.S. = $(\sec^2\theta - 1) \times \cot^2\theta$

= $(\tan^2\theta) \times \cot^2\theta$ ($\because 1 + \tan^2 \theta = \sec^2 \theta$)

= 1

= R.H.S.

Hence, proved.

Question 2 B.

Solution:

Consider the left – hand side:

L.H.S. = $(\sec^2 \theta - 1)(\text{cosec}^2 \theta - 1)$

= $(\tan^2\theta) \times \cot^2\theta$ ($\because 1 + \tan^2 \theta = \sec^2 \theta$ and $1 + \cot^2 \theta = \text{cosec}^2 \theta$)

= 1

= R.H.S.

Hence, proved.

Question 2 C .

Solution:

Consider the left – hand side:

L.H.S. = $(1 - \cos^2 \theta) \sec^2 \theta$

= $(\sin^2\theta) \times (1/\cos^2\theta)$ ($\because \sin^2 \theta + \cos^2 \theta = 1$)

= $(\sin^2\theta) \times (\cos^2\theta)$

= $\tan^2 \theta$

= R.H.S.

Hence, proved.

Question 3 A.

Solution:

Consider the left – hand side:

L.H.S. = $\sin^2\theta + \frac{1}{1+\tan^2\theta}$

= ($\sin^2\theta$) + ($1/\sec^2\theta$) ($\because 1 + \tan^2\theta = \sec^2\theta$)

= ($\sin^2\theta$) + ($\cos^2\theta$) ($\because \sin^2\theta + \cos^2\theta = 1$)

= 1

= R.H.S.

Hence, proved.

Question 3 B .

Solution:

Consider the left – hand side:

L.H.S. = $\frac{1}{1+\tan^2\theta} + \frac{1}{1+\cot^2\theta}$

= ($1/\sec^2\theta$) + ($1/\text{cosec}^2\theta$) ($\because 1 + \tan^2\theta = \sec^2\theta$ and $1 + \tan^2\theta$ = $\sec^2\theta$)

= ($\cos^2\theta$) + ($\sin^2\theta$) ($\because \sin^2\theta + \cos^2\theta = 1$)

$= 1$

= R.H.S.

Hence, proved.

Question 4 A.

Solution:

Consider the left – hand side:

L.H.S. $= (1 + \cos\theta)(1 - \cos\theta)(1 + \cot^2\theta)$

$= (1 - \cos^2\theta) \times \text{cosec}^2\theta$ ($\because 1 + \cot^2\theta = \text{cosec}^2\theta$)

$= (\sin^2\theta) \times \text{cosec}^2\theta$ ($\because \sin^2\theta + \cos^2\theta = 1$)

$= 1$

= R.H.S.

Hence, proved.

Question 4 B.

Solution:

Consider the left – hand side:

L.H.S. $= (\text{cosec}\,\theta)(1 + \cos\theta)(\text{cosec}\,\theta - \cot\theta)$

$= (1 - \cos^2\theta) \times \text{cosec}^2\theta$

($\because 1 + \cot^2\theta = \text{cosec}^2\theta$)

$= (\sin^2\theta) \times \text{cosec}^2\theta$

($\because \sin^2\theta + \cos^2\theta = 1$)

= 1

= R.H.S.

Hence, proved.

Question 5 A .

Solution:

Consider the left – hand side:

L.H.S. = $\cot^2 \theta - \frac{1}{\sin^2 \theta}$

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

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

$= (-\sin^2 \theta) \times \sin^2 \theta$ ($\because \sin^2\theta + \cos^2 \theta = 1$)

= – 1

= R.H.S.

Hence, proved.

Question 5 B .

Solution:

Consider the left – hand side:

L.H.S. = $\tan^2 \theta - \frac{1}{\cos^2 \theta}$

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

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

$= (-\cos^2\theta) \times \cos^2\theta$ ($\because \sin^2\theta + \cos^2\theta = 1$)

$= -1$

= R.H.S.

Hence, proved.

Question 5 C .

Solution:

Consider the left – hand side:

L.H.S. $= \cos^2\theta + \frac{1}{1 + \cot^2\theta}$

$= \cos^2\theta + \frac{1}{\csc^2\theta}$ ($\because 1 + \cot^2\theta = \csc^2\theta$)

$= \cos^2\theta + \sin^2\theta$

$= (-\cos^2\theta) \times \cos^2\theta$ ($\because \sin^2\theta + \cos^2\theta = 1$)

$= -1$

= R.H.S.

Hence, proved.

Question 6 .

Solution:

Consider the left – hand side:

L.H.S. = $\frac{1}{1+\sin\theta}+\frac{1}{1-\sin\theta}$

$= \frac{1-\sin\theta+1+\sin\theta}{1-\sin^2\theta}$

$= \frac{2}{\cos^2\theta}$

$= 2\sec^2\theta$

= R.H.S.

Hence, proved.

Question 7 A.

Solution:

Consider the left – hand side:

L.H.S. = $\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta)$

$= \left(\frac{1}{\cos\theta}\right)\times(1-\sin\theta)\times\left(\frac{1}{\cos\theta}+\frac{\sin\theta}{\cos\theta}\right)$

$= \left(\frac{1}{\cos\theta}\right)\times(1-\sin\theta)\times\left(\frac{1+\sin\theta}{\cos\theta}\right)$

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

$= \frac{\cos^2\theta}{\cos^2\theta}$

= 1

= R.H.S.

Question 7 B.

Solution:

Consider the left – hand side:

L.H.S. = $\sin\theta\ (1 + \tan\theta) + \cos\theta\ (1 + \cot\theta)$

$= \sin\theta\ (1 + \frac{\sin\theta}{\cos\theta}) + \cos\theta\ (1 + \frac{\cos\theta}{\sin\theta})$

$= \sin\theta\left(\frac{\cos\theta + \sin\theta}{\cos\theta}\right) \times (\cos\theta) \times \left(\frac{\sin\theta + \cos\theta}{\sin\theta}\right)$

$= (\cos\theta + \sin\theta)\left(\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}\right)$

$= (\cos\theta + \sin\theta)\left(\frac{(\cos^2\theta + \sin^2\theta)}{\cos\theta\sin\theta}\right)$

$= \left(\frac{\cos\theta + \sin\theta}{\cos\theta\sin\theta}\right)$

$= \left(\frac{1}{\sin\theta} + \frac{1}{\cos\theta}\right)$

$= \operatorname{cosec}\theta + \sec\theta$

= R.H.S.

Hence, proved.

Question 8 A .

Solution:

Consider the left – hand side:

L.H.S. $= 1 + \frac{\cot^2\theta}{1 + \operatorname{cosec}\theta}$

$= 1 + \frac{\frac{\cos^2\theta}{\sin^2\theta}}{1+\frac{1}{\sin\theta}}$

$= 1 + \frac{\cos^2\theta}{1+\sin\theta} \times \frac{\sin\theta}{\sin^2\theta}$

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

$= \frac{\sin\theta + \sin^2\theta + \cos^2\theta}{\sin\theta + \sin^2\theta}$

$= \frac{\sin\theta + 1}{\sin\theta(1+\sin\theta)}$

= 1/sin θ

= cosec θ

= R.H.S.

Hence, proved.

Question 8 B .

Solution:

Consider the left – hand side:

L.H.S. $= 1 + \frac{\tan^2\theta}{1+\sec\theta}$

$= 1 + \frac{\frac{\sin^2\theta}{\cos^2\theta}}{1+\frac{1}{\cos\theta}}$

$= 1 + \frac{\sin^2\theta}{1+\cos\theta} \times \frac{\cos\theta}{\cos^2\theta}$

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

$= \frac{\cos\theta + \cos^2\theta + \sin^2\theta}{\cos\theta + \cos^2\theta}$

$= \frac{\cos\theta + 1}{\cos\theta(1+\cos\theta)}$

= 1/cos θ

= sec θ

= R.H.S.

Hence, proved.

Question 9.

Solution:

Consider the left – hand side:

L.H.S. $= \frac{(1+\tan^2\theta)\cot\theta}{\text{cosec}^2\theta}$

$= \frac{\left(1+\frac{\sin^2\theta}{\cos^2\theta}\right)\times\frac{\cos\theta}{\sin\theta}}{\frac{1}{\sin^2\theta}}$

$= \frac{\cos^2\theta+\sin^2\theta}{\cos^2\theta}\times\frac{\cos\theta}{\sin\theta}\times\sin^2\theta$

$= 1\times\frac{\sin\theta}{\cos\theta}$

= tan θ

= R.H.S.

Hence, proved.

Question 10.

Solution:

Consider the left – hand side:

L.H.S. $= \frac{\tan^2\theta}{1+\tan^2\theta} + \frac{\cot^2\theta}{1+\cot^2\theta}$

$= \frac{\frac{\sin^2\theta}{\cos^2\theta}}{1+\frac{\sin^2\theta}{\cos^2\theta}} + \frac{\frac{\cos^2\theta}{\sin^2\theta}}{1+\frac{\cos^2\theta}{\sin^2\theta}}$

$= \frac{\sin^2\theta}{1+\sin^2\theta} + \frac{\cos^2\theta}{1+\cos^2\theta}$

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

$= \frac{\sin^2\theta + \sin^2\theta\cos^2\theta + \cos^2\theta + \cos^2\theta\sin^2\theta}{\sin^2\theta + \sin^2\theta\cos^2\theta + \cos^2\theta + \cos^2\theta\sin^2\theta}$

$= 1$

= R.H.S.

Hence, proved.

Question 11 .

Solution:

Consider the left – hand side:

L.H.S. $= \frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta}$

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

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

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

$= 2/\sin\theta$

$= 2\text{cosec}\,\theta$

= R.H.S.

Hence, proved.

Question 12 .

Solution:

Consider L.H.S. $= \frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta}$

$= \frac{\frac{\sin\theta}{\cos\theta}}{1-\frac{\cos\theta}{\sin\theta}} + \frac{\frac{\cos\theta}{\sin\theta}}{1-\frac{\sin\theta}{\cos\theta}}$

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

$= \frac{\sin^3\theta-\cos^3\theta}{(\sin\theta-\cos\theta)\sin\theta\cos\theta}$

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

$= \frac{1+\sin\theta\cos\theta}{\sin\theta\cos\theta}$

$= \sec\theta\ \text{cosec}\,\theta + 1$

= R.H.S.

Hence, proved.

Question 13 .

Solution:

Consider the left – hand side:

L.H.S. = $\frac{\cos^2\theta}{1-\tan\theta}+\frac{\sin^3\theta}{\sin\theta-\cos\theta}$

$= \frac{\cos^2\theta}{1-\frac{\sin\theta}{\cos\theta}}+\frac{\sin^3\theta}{\sin\theta-\cos\theta}$

$= \frac{\cos^3\theta}{\cos\theta-\sin\theta}-\frac{\sin^3\theta}{\cos\theta-\sin\theta}$

$= \frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}$

$= \frac{(\cos\theta-\sin\theta)\left(\cos^2\theta+\sin^2\theta+\sin\theta\cos\theta\right)}{\cos\theta-\sin\theta}$

$= \cos^2\theta + \sin^2\theta + \sin\theta\cos\theta$

$= 1 + \cos\theta\sin\theta$

= R.H.S.

Hence, proved.

Question 14 .

Solution:

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

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

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

$=\frac{(\cos\theta-\sin\theta)(\cos\theta+\sin\theta)}{(\cos\theta-\sin\theta)}$

$= \cos\theta + \sin\theta$

= R.H.S.

Hence, proved.

Question 15 .

Solution:

Consider L.H.S. = $(1 + \tan^2\theta)(1 + \cot^2\theta)$

$= (\sec^2\theta)(\text{cosec}^2\theta)$

$=\frac{1}{\cos^2\theta}\times\frac{1}{\sin^2\theta}$

$=\frac{1}{1-\sin^2\theta}\times\frac{1}{\sin^2\theta}$

$=\frac{1}{\sin^2\theta-\sin^4\theta}$

= R.H.S.

Hence, proved.

Question 16 .

Solution:

Consider L.H.S. = $\frac{\tan\theta}{(1+\tan^2\theta)^2} + \frac{\cot\theta}{(1+\cot^2\theta)^2}$

$= \frac{\frac{\sin\theta}{\cos\theta}}{\left(1+\frac{\sin^2\theta}{\cos^2\theta}\right)^2} + \frac{\frac{\cos\theta}{\sin\theta}}{\left(1+\frac{\cos^2\theta}{\sin^2\theta}\right)^2}$

$= \frac{\frac{\sin\theta}{\cos\theta}}{\left(\frac{\cos^2\theta+\sin^2\theta}{\cos^2\theta}\right)^2} + \frac{\frac{\cos\theta}{\sin\theta}}{\left(\frac{\sin^2\theta+\cos^2\theta}{\sin^2\theta}\right)^2}$

$= \frac{\frac{\sin\theta}{\cos\theta}}{\left(\frac{1}{\cos^2\theta}\right)^2} + \frac{\frac{\cos\theta}{\sin\theta}}{\left(\frac{1}{\sin^2\theta}\right)^2}$

$= \left(\frac{\sin\theta}{\cos\theta} \times \cos^4\theta\right) + \left(\frac{\cos\theta}{\sin\theta} \times \sin^4\theta\right)$

$= \sin\theta\,(\cos^3\theta) + \cos\theta\,(\sin^3\theta)$

$= \sin\theta\cos\theta\,(\cos^2\theta + \sin^2\theta)$

$= \sin\theta\cos\theta$

= R.H.S.

Hence, proved.

Question 17 A.

Solution:

Consider L.H.S. = $\sin^6\theta + \cos^6\theta$

$= (\sin^2\theta)^3 + (\cos^2\theta)^3$

$= (\sin^2 \theta + \cos^2 \theta)(\sin^4 \theta + \cos^4 \theta - \sin^2 \theta \cos^2 \theta)$

[Using $a^3 + b^3 = (a + b)(a^2 + b^2 - ab)$]

$= (\sin^4 \theta + \cos^4 \theta - \sin^2 \theta \cos^2 \theta)$

$(\because \sin^2 \theta + \cos^2 \theta = 1)$

$= [\{(\sin^2 \theta + \cos^2 \theta)^2 - 2 \sin^2 \theta \cos^2 \theta) - \sin^2 \theta \cos^2 \theta]$

$(\because (a^2 + b^2) = (a + b)^2 - 2ab)$

$= [1 - 2 \sin^2 \theta \cos^2 \theta - \sin^2 \theta \cos^2 \theta]$

$= 1 - 3 \sin^2 \theta \cos^2 \theta$

= R.H.S.

Hence, proved.

Question 17 B.

Solution:

Consider L.H.S. $= \sin^2 \theta + \cos^4 \theta$

$= (\sin^2 \theta) + (\cos^2 \theta)^2$

$= (\sin^2 \theta) + (1 - \sin^2 \theta)^2$

$= (\sin^2 \theta) + 1 + \sin^4 \theta - 2\sin^2 \theta$

$= 1 - \sin^2 \theta + \sin^4 \theta$

$= \cos^2 \theta + \sin^4 \theta$

= R.H.S.

Hence, proved.

Question 17 C .

Solution:

Consider L.H.S. = $\text{cosec}^4 \theta - \text{cosec}^2 \theta$

$= (\text{cosec}^2 \theta)^2 - (\text{cosec}^2 \theta)$

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

$= 1 + \cot^4 \theta + 2\cot^2 \theta - (\text{cosec}^2 \theta)$

$= 1 + \cot^4 \theta + \cot^2 \theta - (\text{cosec}^2 \theta - \cot^2 \theta)$

$= 1 + \cot^4 \theta + \cot^2 \theta - 1$

$= \cot^4 \theta + \cot^2 \theta$

= R.H.S.

Hence, proved.

Question 18 A .

Solution:

Consider L.H.S. = $\frac{1-\tan^2\theta}{1+\tan^2\theta}$

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

$= \frac{\frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta}}{\frac{\cos^2\theta + \sin^2\theta}{\cos^2\theta}}$

$= \frac{\cos^2\theta - \sin^2\theta}{\sin^2\theta + \cos^2\theta}$

$= \cos^2\theta - \sin^2\theta$

= R.H.S.

Hence, proved.

Question 18 B.

Solution:

Consider L.H.S. $= \frac{1-\tan^2\theta}{\cot^2\theta - 1}$

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

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

$= \frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta - \sin^2\theta} \times \frac{\sin^2\theta}{\cos^2\theta}$

$= \sin^2\theta / \cos^2\theta$

$= \tan^2\theta$

= R.H.S.

Hence, proved.

Question 19 A .

Solution:

Consider L.H.S. = $\frac{\tan\theta}{\sec\theta - 1} + \frac{\tan\theta}{\sec\theta + 1}$

$= \frac{\tan\theta(\sec\theta+1)+\tan\theta(\sec\theta-1)}{(\sec\theta - 1)(\sec\theta+1)}$

$= \frac{\tan\theta\sec\theta+\tan\theta+\tan\theta\sec\theta-\tan\theta}{\sec^2\theta-1}$

$= \frac{2\tan\theta\sec\theta}{\tan^2\theta}$

$= \frac{2\sec\theta}{\tan\theta}$

= [2 (1/cos θ)]/[sin θ /cos θ]

= [2/sin θ]

= 2 cosec θ

= R.H.S.

Hence, proved.

Question 19 B .

Solution:

Consider L.H.S. = $\frac{\cot\theta}{\operatorname{cosec}\theta+1} + \frac{\operatorname{cosec}\theta+1}{\cot\theta}$

$= \frac{\cot^2\theta + (\operatorname{cosec}\theta+1)^2}{(\operatorname{cosec}\theta + 1)(\cot\theta)}$

$= \frac{\cot^2\theta+\operatorname{cosec}^2\theta+1+2\operatorname{cosec}\theta}{(\operatorname{cosec}\theta + 1)(\cot\theta)}$

$= \frac{\operatorname{cosec}^2\theta+\operatorname{cosec}^2\theta+2\operatorname{cosec}\theta}{(\operatorname{cosec}\theta + 1)(\cot\theta)}$

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

$= \frac{2\,\text{cosec}\,\theta(\text{cosec}\,\theta + 1)}{(\text{cosec}\,\theta + 1)}$

= 2 cosec θ/cot θ

= 2 (1/sin θ)/(cos θ/sin θ)

= 2/ cos θ

= 2 sec θ

= R.H.S.

Hence, proved.

Question 20 A.

Solution:

Consider L.H.S. = $\frac{\sec\theta - 1}{\sec\theta + 1}$

Multiply and divide by (sec θ + 1):

$= \frac{\sec\theta - 1}{\sec\theta + 1} \times \frac{\sec\theta + 1}{\sec\theta + 1}$

$= \frac{\sec^2\theta - 1}{(\sec\theta + 1)^2}$

$= \frac{\tan^2\theta}{(1 + \sec\theta)^2}$

$= \frac{\frac{\sin^2\theta}{\cos^2\theta}}{\left(\frac{1 + \cos\theta}{\cos\theta}\right)^2}$

$= \dfrac{\dfrac{\sin^2\theta}{\cos^2\theta}}{\dfrac{(1+\cos\theta)^2}{\cos^2\theta}}$

$= \dfrac{\sin^2\theta}{(1+\cos\theta)^2}$

= R.H.S.

Hence, proved.

Question 20 B.

Solution:

Consider L.H.S. = $\dfrac{\sec\theta-\tan\theta}{\sec\theta+\tan\theta}$

Multiply and divide by ($\sec\theta + \tan\theta$):

$= \dfrac{\sec\theta-\tan\theta}{\sec\theta+\tan\theta} \times \dfrac{\sec\theta+\tan\theta}{\sec\theta+\tan\theta}$

$= \dfrac{\sec^2\theta-\tan^2\theta}{(\sec\theta+\tan\theta)^2}$

$= \dfrac{1}{\left(\dfrac{1}{\cos\theta}+\dfrac{\sin\theta}{\cos\theta}\right)^2}$

$= \dfrac{1}{\dfrac{(1+\sin\theta)^2}{\cos^2\theta}}$

$= \dfrac{\cos^2\theta}{(1+\sin\theta)^2}$

= R.H.S.

Hence, proved.

Question 21 A .

Solution:

Consider L.H.S. = $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}}$

Multiply and divide by (1 + sin θ):

$= \sqrt{\frac{1+\sin\theta}{1-\sin\theta} \times \frac{1+\sin\theta}{1+\sin\theta}}$

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

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

= (1 + sin θ)/cos θ

= (1/cos θ) + (sin θ/cos θ)

= sec θ + tan θ

= R.H.S.

Hence, proved.

Question 21 B .

Solution:

Consider L.H.S. = $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}}$

Multiply and divide by (1 – cos θ):

$= \sqrt{\frac{1-\cos\theta}{1+\cos\theta} \times \frac{1-\cos\theta}{1-\cos\theta}}$

$= \sqrt{\frac{(1-\cos\theta)^2}{1-\cos^2\theta}}$

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

= (1 – cos θ)/sin θ

= (1/sin θ) – (cos θ/sin θ)

= cosec θ – cot θ

= R.H.S.

Hence, proved.

Question 21 C.

Solution:

Consider L.H.S. = $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} + \sqrt{\frac{1-\cos\theta}{1+\cos\theta}}$

Multiply and divide by (1 + cos θ) in first part and (1 – cos θ) in the second part:

$= \sqrt{\frac{1+\cos\theta}{1-\cos\theta} \times \frac{1+\cos\theta}{1+\cos\theta}} + \sqrt{\frac{1-\cos\theta}{1+\cos\theta} \times \frac{1-\cos\theta}{1-\cos\theta}}$

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

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

= [(1 + cos θ)/sin θ] + [(1 − cos θ)/sin θ]

= [(1/sin θ) + (cos θ/sin θ)] + [(1/sin θ) − (cos θ/sin θ)]

= [cosec θ + cot θ] + [cosec θ − cot θ]

= 2 cosec θ

= R.H.S.

Hence, proved.

Question 22

Solution:

Consider L.H.S. = $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta} + \frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}$

Using identities $(a^3 + b^3) = (a + b)(a^2 + b^2 - ab)$ and $(a^3 - b^3) = (a - b)(a^2 + b^2 + ab)$

∴ L.H.S. = $\frac{(\cos\theta+\sin\theta)(\cos^2\theta+\sin^2\theta-\cos\theta\sin\theta)}{(\cos\theta+\sin\theta)} + \frac{(\cos\theta-\sin\theta)(\cos^2\theta+\sin^2\theta+\cos\theta\sin\theta)}{(\cos\theta-\sin\theta)}$

= $(\cos^2\theta + \sin^2\theta - \cos\theta\sin\theta) + (\cos^2\theta + \sin^2\theta + \cos\theta\sin\theta)$

= (1 − cos θ sin θ) + (1 + cos θ sin θ)

= 2

= R.H.S.

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 7 Exercise 7.1

RS Aggarwal Solutions for Class 10 Maths Chapter 7 Exercise 7.1 on Trigonometric Identities offers several benefits to students for their better preparation in the exams.

Clear Conceptual Understanding: The solutions provide clear explanations and step-by-step methods for solving problems related to trigonometric identities. This helps students grasp the fundamental concepts and their application in various contexts.

Structured Approach: The solutions follow a structured approach to solving problems, which helps students learn systematic problem-solving techniques. This is crucial for building confidence in handling trigonometric identities effectively.

Practice and Application: Exercise 7.1 includes a variety of problems that encourage the practice and application of trigonometric identities. By solving these problems, students gain proficiency in using identities to simplify expressions and solve equations.

Preparation for Exams: The exercises and solutions are designed to align with the curriculum and exam patterns. This prepares students well for their Class 10 exams, ensuring they are proficient in trigonometric identities, which are often a significant part of the syllabus.

Self-assessment and Improvement: By using the solutions, students can self-assess their understanding and identify areas where they need more practice. This allows for targeted improvement and reinforcement of concepts.

Enhanced Problem-solving Skills: Working through the exercises enhances students' problem-solving skills, critical thinking, and analytical abilities. These skills are not only beneficial for mathematics but also for other subjects and real-life situations.