RS Aggarwal Solutions for Class 10 Maths Chapter 6 : Exercise 6 in RS Aggarwal's Class 10 Maths book focuses on practicing and mastering the trigonometric ratios of specific angles such as 0°, 30°, 45°, 60°, and 90°.

This exercise is designed to help students consolidate their understanding of sine, cosine, tangent, and their reciprocals (cosecant, secant, cotangent) for these fundamental angles.

The solutions provided in RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6 provide step-by-step explanations and calculations, ensuring clarity and aiding students in building a strong foundation in trigonometry.

By working through this exercise, students can improve their problem-solving skills and gain confidence in handling trigonometric concepts effectively.

RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6 Overview

The solutions for Chapter 6, Exercise 6 of RS Aggarwal's Class 10 Maths have been created by experts from Physics Wallah. These solutions are designed to help students understand and solve problems related to trigonometric ratios of angles like 0°, 30°, 45°, 60°, and 90°. Physics Wallah's team ensures that each solution is clear and correct, following the latest curriculum guidelines.

By using these solutions, students can improve their skills in trigonometry, solve equations, verify mathematical identities, and apply these concepts to real-world situations. Physics Wallah's experts make these solutions a valuable resource for Class 10 students who want to score good marks in mathematics.

RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6 PDF

You can find the PDF link below for RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6. This resource provide detailed solutions prepared by subject experts to help students practice and understand trigonometric ratios of specific angles like 0°, 30°, 45°, 60°, and 90°.

These solutions are created to help students in solving equations, verifying identities, and applying trigonometric concepts effectively.

RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6 PDF

RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6

Here we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6 for the ease of students so that they can prepare better for their exams.

Q. $\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ$

Solution:
On substituting the value of various T-ratios, we get
sin60° cos30° + cos60° sin30°

(√3/2 × √3/2 + 1/2 × 1/2) = (3/4+1/4)=4/4=1

Q. $\cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ$

Solution:
On substituting the value of various T-ratios, we get
cos60° cos30° – sin60° sin30°

$= \frac{1}{2} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \times \frac{1}{2}$

$= \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4}$

$= 0$

Q. $\cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ$

Solution:
On substituting the value of various Tratios, we get
cos45° cos30° + sin45° sin30°

$= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2} = \frac{\sqrt{3}}{2\sqrt{2}} + \frac{1}{2\sqrt{2}} = \frac{\sqrt{3}+1}{2\sqrt{2}}$

Q. $\frac{\sin 30^\circ}{\cos 45^\circ} + \frac{\cot 45^\circ}{\sec 60^\circ} - \frac{\sin 60^\circ}{\tan 45^\circ} + \frac{\cos 30^\circ}{\sin 90^\circ}$

Solution:

On substituting the value of various Tratios, we get

$$\frac{\sin 30^\circ}{\cos 45^\circ}+\frac{\cot 45^\circ}{\sec 60^\circ}-\frac{\sin 60^\circ}{\tan 45^\circ}-\frac{\cos 30^\circ}{\sin 90^\circ}$$

$$=\frac{\left(\frac{1}{2}\right)}{\left(\frac{1}{\sqrt{2}}\right)}+\frac{1}{\left(\frac{2}{1}\right)}-\frac{\left(\frac{\sqrt{3}}{2}\right)}{1}-\frac{\left(\frac{\sqrt{3}}{2}\right)}{1}$$

$$=\frac{\sqrt{2}}{2}+\frac{1}{2}-\frac{\sqrt{3}}{2}-\frac{\sqrt{3}}{2}=\frac{\sqrt{2}+1-\sqrt{3}-\sqrt{3}}{2}$$

$$=\left(\frac{\sqrt{2}+1-2\sqrt{3}}{2}\right)$$

Q. $\frac{5\cos^2 60^\circ+4\sec^2 30^\circ-\tan^2 45^\circ}{\sin^2 30^\circ+\cos^2 30^\circ}$

Solution:

$$\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

$$= \frac{5\left(\frac{1}{2}\right)^2 + 4\left(\frac{2}{\sqrt{3}}\right)^2 - (1)^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2}$$

$$= \frac{5 \times \frac{1}{4} + 4 \times \frac{4}{3} - 1}{\frac{1}{4} + \frac{3}{4}}$$

$$= \frac{\frac{5}{4} + \frac{16}{3} - 1}{\frac{1+3}{4}}$$

$$= \frac{\frac{15+64-12}{12}}{\frac{4}{4}}$$

$$= \frac{\frac{67}{12}}{1}$$

$$= \frac{67}{12}$$

Q. $2\cos^2 60^\circ + 3\sin^2 45^\circ - 3\sin^2 30^\circ + 2\cos^2 90^\circ$

Solution:

On substituting the value of various Tratios, we get

$$2\cos^2 60^\circ + 3\sin^2 45^\circ - 3\sin^2 30^\circ + 2\cos^2 90^\circ$$

$$= 2 \times \left(\frac{1}{2}\right)^2 + 3 \times \left(\frac{1}{\sqrt{2}}\right)^2 - 3 \times \left(\frac{1}{2}\right)^2 + 2(0)^2$$

$$= \frac{1}{2} + \frac{3}{2} - \frac{3}{4} \Rightarrow \frac{2+6-3}{4} = \frac{5}{4}$$

Q. $\cot^2 30^\circ - 2\cos^2 30^\circ - \frac{3}{4}\sec^2 45^\circ + \frac{1}{4}\text{cosec}^2 30^\circ$

Solution:

On substituting the value of various Tratios, we get

$$\cot^2 30^\circ - 2\cos^2 30^\circ - \frac{3}{4}\sec^2 45^\circ + \frac{1}{4}\operatorname{cosec}^2 30^\circ$$

$$= \left(\sqrt{3}\right)^2 - 2\times\left(\frac{\sqrt{3}}{2}\right)^2 - \frac{3}{4}\times\left(\frac{\sqrt{2}}{1}\right)^2 + \frac{1}{4}\times(2)^2$$

$$= 3 - 2\times\frac{3}{4} - \frac{3}{4}\times 2 + \frac{1}{4}\times 4$$

$$= 3 - \frac{3}{2} - \frac{3}{2} + 1$$

$$= \frac{6-3-3+2}{2}$$

$$= \frac{2}{2} = 1$$

Q. $(\sin^2 30^\circ + 4\cot^2 45^\circ - \sec^2 60^\circ)(\operatorname{cosec}^2 45^\circ \sec^2 30^\circ)$

Solution:

On substituting the value of various Tratios, we get

$$\left(\sin^2 30^\circ + 4\cot^2 45^\circ - \sec^2 60^\circ\right)\left(\operatorname{cosec}^2 45^\circ \sec^2 30\right)$$

$$= \left[\left(\frac{1}{2}\right)^2 + 4\times(1)^2 - (2)^2\right]\left[\left(\sqrt{2}\right)^2 \times \left(\frac{2}{\sqrt{3}}\right)^2\right]$$

$$= \left(\frac{1}{4} + 4 - 4\right)\left(2\times\frac{4}{3}\right)$$

$$= \frac{1}{4}\times\frac{8}{3} = \frac{2}{3}$$

Q. $\frac{4}{\cot^2 30^\circ} + \frac{1}{\sin^2 30^\circ} - 2\cos^2 45^\circ - \sin^2 0^\circ$

Solution:

On substituting the value of various Tratios, we get

$$\frac{4}{\cot^2 30^\circ}+\frac{1}{\sin^2 30^\circ}-2\cos^2 45^\circ-\sin^2 0^\circ$$

$$=\frac{4}{\left(\sqrt{3}\right)^2}+\frac{1}{\left(\frac{1}{2}\right)^2}-2\times\left(\frac{1}{\sqrt{2}}\right)^2-0$$

$$=\frac{4}{3}+\frac{4}{1}-\frac{2}{2}-0$$

$$=\frac{8+24-6-0}{6}$$

$$=\frac{26}{6}=\frac{13}{3}$$

Q. Show that:

(i) $\dfrac{1-\sin\ 60^\circ}{\cos\ 60^\circ}=\dfrac{\tan\ 60^\circ-1}{\tan\ 60^\circ+1}$

(ii) $\dfrac{\cos\ 30^\circ+\sin\ 60^\circ}{1+\sin\ 30^\circ+\cos\ 60^\circ}=\cos\ 30^\circ$

Solution:

(i)

$$\text{L.H.S.}=\frac{1-\sin 60^\circ}{\cos 60^\circ}=\frac{1-\frac{\sqrt{3}}{2}}{\frac{1}{2}}=\frac{2-\sqrt{3}}{1}$$

$$\text{R.H.S.}=\frac{\tan 60^\circ-1}{\tan 60^\circ+1}=\frac{\sqrt{3}-1}{\sqrt{3}+1}\times\frac{\sqrt{3}-1}{\sqrt{3}-1}$$

$$=\frac{\left(\sqrt{3}-1\right)^2}{\left(\sqrt{3}\right)^2-(1)^2}$$

$$=\frac{3+1-2\sqrt{3}}{3-1}$$

$$=\frac{4-2\sqrt{3}}{2}$$

$$=\frac{2\left(2-\sqrt{3}\right)}{2}$$

$$=\left(2-\sqrt{3}\right)$$

L.H.S. = R.H.S.

Hence, $\dfrac{1-\sin 60^\circ}{\cos 60^\circ}=\dfrac{\tan 60^\circ-1}{\tan 60^\circ+1}$

(ii)

$$\text{L.H.S.} = \frac{\cos 30^\circ + \sin 60^\circ}{1 + \sin 30^\circ + \cos 60^\circ} = \frac{\frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2}}{1 + \frac{1}{2} + \frac{1}{2}} = \frac{\sqrt{3}}{2}$$

$$\text{R.H.S.} = \cos 30^\circ = \frac{\sqrt{3}}{2}$$

L.H.S = R.H.S.

$$\text{hence, } \frac{\cos 30^\circ + \sin 60^\circ}{1 + \sin 30^\circ + \cos 60^\circ} = \cos 30^\circ$$

Q. Verify each of the following:

(i) $\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ = \sin 30^\circ$

(ii) $\cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ = \cos 30^\circ$

(iii) $2 \sin 30^\circ \cos 30^\circ = \sin 60^\circ$

(iv) $2 \sin 45^\circ \cos 45^\circ = \sin 90^\circ$

Solution:

(i)

$$\text{L.H.S.} = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

$$= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} - \frac{1}{2} \times \frac{1}{2} \Rightarrow \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

$$\text{R.H.S.} = \sin 30^\circ = \frac{1}{2}$$

R.H.S. = L.H.S.

Hence, $\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ = \sin 30^\circ$

(ii)

L.H.S. = $\cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ$

$$= \frac{1}{2} \times \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} \times \frac{1}{2} = \frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$$

$$\text{R.H.S.} = \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$\therefore$ L.H.S = R.H.S

Hence, $\cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ = \cos 30^\circ$ >

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(A+B) = \frac{\left(\frac{1}{3} + \frac{1}{2}\right)}{1 - \frac{1}{3} \times \frac{1}{2}} \left[\because \tan A = \frac{1}{3}, \tan B = \frac{1}{2}\right]$$

$$= \frac{\left(\frac{5}{6}\right)}{\left(\frac{5}{6}\right)} = \frac{5}{6} \times \frac{6}{5} = 1$$

$$\tan(A+B) = 1 \Rightarrow \tan(A+B) = \tan 45^\circ$$

(iii)

$$\text{LHS} = 2 \sin 30^\circ \cos 30^\circ \Rightarrow 2 \times \frac{1}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$$

$$\text{RHS} = \sin 60^\circ = \frac{\sqrt{3}}{2}$$

R.H.S. = L.H.S.

Hence, $2\sin 30^\circ \cos 30^\circ = \sin 60^\circ$

(iv)

$$\text{LHS} = 2 \sin 45^\circ \cos 45^\circ = 2 \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = 1$$

R.H.S. = $\sin 90^\circ = 1$

R.H.S. = L.H.S.

Hence, $2 \sin 45^\circ \cos 45^\circ = \sin 90^\circ$

Q. If $A = 45^\circ$, verify that:

(i) $\sin 2A = 2\sin A \cos A$ (ii) $\cos 2A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$

Solution:

A = 45° 2 A = 90°

(i)Sin 2A = sin90° = 1

$\therefore\ 2\sin A\cos A = 2\sin 45^\circ\cos 45^\circ = 2\times\frac{1}{\sqrt{2}}\times\frac{1}{\sqrt{2}} = 1$

$\therefore\ \sin 2A = 2\sin A\cos A$

(ii) cos2A = cos90° = 0

$$2\cos^2 A - 1 = 2\cos^2 45^\circ - 1$$

$$= 2\left(\frac{1}{\sqrt{2}}\right)^2 - 1 = 1 - 1 = 0$$

$$1 - 2\sin^2 A = 1 - 2\sin^2 45^\circ = 1 - 2\times\left(\frac{1}{\sqrt{2}}\right)^2 = 1 - 1 = 0$$

$$\therefore \cos 2A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$$

Q. If A = 30°, verify that:

(i) sin 2A = $\frac{2\tan A}{1+\tan^2 A}$ (ii) cos 2A = $\frac{1-\tan^2 A}{1+\tan^2 A}$ (iii) tan 2A = $\frac{2\tan A}{1-\tan^2 A}$

(i)

$$\sin 2A = \sin 60^\circ = \frac{\sqrt{3}}{2}$$

Also $\frac{2\tan A}{1+\tan^2 A} = \frac{2\tan 30^\circ}{1+\tan^2 30} = \frac{2\times\frac{1}{\sqrt{3}}}{1+\left(\frac{1}{\sqrt{3}}\right)^2} = \frac{\frac{2}{\sqrt{3}}}{1+\frac{1}{3}}$

$$= \frac{\frac{2}{\sqrt{3}}}{\frac{4}{3}} = \frac{2}{\sqrt{3}}\times\frac{3}{4} = \frac{\sqrt{3}}{2}$$

Hence, $\sin 2A = \frac{2\tan A}{1+\tan^2 A}$

(ii)

$$\cos 2A = \cos 60^\circ = \frac{1}{2}$$

Also, $$\frac{1-\tan^2 A}{1+\tan^2 A} = \frac{1-\tan^2 30^\circ}{1+\tan^2 30^\circ} = \frac{1-\left(\frac{1}{\sqrt{3}}\right)^2}{1+\left(\frac{1}{\sqrt{3}}\right)^2}$$

$$= \frac{\left(1-\frac{1}{3}\right)}{\left(1+\frac{1}{3}\right)} = \frac{\left(\frac{2}{3}\right)}{\left(\frac{4}{3}\right)} = \left(\frac{2}{3}\times\frac{3}{4}\right) = \frac{1}{2}$$

Hence, $\cos 2A = \frac{1-\tan^2 A}{1+\tan^2 A}$

(iii)

$$\tan 2A = \tan 60^\circ = \sqrt{3}$$

Also, $$\frac{2\tan A}{1-\tan^2 A} = \frac{2\tan 30^\circ}{1-\tan^2 30^\circ} = \frac{2\times\frac{1}{\sqrt{3}}}{1-\left(\frac{1}{\sqrt{3}}\right)^2} = \frac{2\times\frac{1}{\sqrt{3}}}{1-\frac{1}{3}}$$

$$= \frac{\left(\frac{2}{\sqrt{3}}\right)}{\left(\frac{2}{3}\right)} = \left(\frac{2}{\sqrt{3}}\times\frac{3}{2}\right) = \sqrt{3}$$

Hence, $\tan 2A = \frac{2\tan A}{1-\tan^2 A}$

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 6 Exercise 6

- **Comprehensive Understanding**: The solutions provide detailed explanations for each problem, helping students grasp the concepts of trigonometric ratios of specific angles like 0°, 30°, 45°, 60°, and 90° thoroughly.

- **Step-by-Step Solutions**: Each solution is broken down into clear, step-by-step processes, making it easier for students to follow and understand the methods used to solve the problems.
- **Practice and Mastery**: By working through the solutions, students can practice and master the application of trigonometric ratios, which is crucial for higher-level math topics.
- **Exam Preparation**: The solutions align with the exam format, providing students with a solid foundation and boosting their confidence for exams. Practicing these solutions can help improve problem-solving speed and accuracy.
- **Error Clarification**: Students can identify and understand their mistakes by comparing their solutions with the provided ones, leading to better learning and retention of concepts.
- **Support from Experts**: The solutions are prepared by subject experts, ensuring accuracy and adherence to the latest curriculum standards. This expert guidance helps students learn effectively and efficiently.
- **Time Management**: By familiarizing themselves with different types of problems and their solutions, students can improve their time management skills during exams.
- **Building a Strong Foundation**: Mastering the concepts in Chapter 6 through these solutions helps build a strong mathematical foundation, which is essential for advanced studies in mathematics.
- **Enhanced Problem-Solving Skills**: Regular practice with these solutions enhances students problem-solving skills, making them more adept at tackling various mathematical challenges.