NCERT Solutions Class 10 Maths
Chapter 8: Introduction to Trigonometry
Exercise 8.2

Quick Summary: In NCERT Solutions Class 10 Maths Chapter 8 Exercise 8.2, students learn to calculate trigonometric ratios of specific angles (0°, 30°, 45°, 60°, 90°) and apply fundamental trigonometric identities. This exercise covers evaluation of trigonometric expressions using standard values and solving problems involving angle relationships, which are essential for CBSE Class 10 board exams and form the foundation for advanced trigonometry concepts.

Key Takeaways:

- Standard trigonometric values: $\sin 30° = \frac{1}{2}$, $\cos 45° = \frac{1}{\sqrt{2}}$, $\tan 60° = \sqrt{3}$
- Fundamental identity: $\sin^2\theta + \cos^2\theta = 1$ and its variations
- Complementary angle relationships: $\sin(90° - \theta) = \cos\theta$ and $\tan(90° - \theta) = \cot\theta$
- Problem-solving techniques for evaluating complex trigonometric expressions using standard angle values

Complete Solutions

Question 1

Evaluate the following:

1. $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$
2. $2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$
3. $(\cos 45^\circ)/(\sec 30^\circ + \text{cosec } 30^\circ)$
4. $\sin 30^\circ + \tan 45^\circ - \text{cosec } 60^\circ \sec 30^\circ + \cos 60^\circ + \cot 45^\circ$
5. $(5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ)/(\sin^2 30^\circ + \cos^2 30^\circ)$

SOLUTION

To evaluate such expressions quickly, it helps to keep the standard trigonometric values in a table.

Standard Trigonometric Values Table (0°, 30°, 45°, 60°, 90°)

Trigonometric Function			
	0		1
	1		0
	0	1	Not defined
	Not defined	2	1
	1		2	Not defined
	Not defined	1	0

Note: , , . Values become "Not defined" when the denominator is 0.

(i)

Using the table:

Answer:

(ii)

From the table: , , .

So, , , .

Answer:

(iii)

From the table: , , .

Step 1: Simplify denominator:

So,

Step 2: Rationalize:

Answer:

(iv)

From the table: , , , , , .

Numerator

Denominator

So,

Step 1: Multiply numerator and denominator by :

Step 2: Multiply by conjugate :

Denominator:

Numerator:

Answer:

(v)

Step 1: Numerator

From the table:

So

So

Numerator

LCM :

Step 2: Denominator

Step 3: Final value

Answer:

Student Tip: If you memorize the table and also remember , most evaluation questions become very fast.

ANSWER

(i) 1

(ii) 2

(iii) $3\sqrt{2} - \sqrt{68}$

(iv) $43 - 24\sqrt{3}11$

(v) $(67)/(12)$

Question 2

Choose the correct option and justify your choice:

1. $(2 \tan 30^\circ)/(1 + \tan^2 30^\circ) =$
   (A) $\sin 60^\circ$ (B) $\cos 60^\circ$ (C) $\tan 60^\circ$ (D) $\sin 30^\circ$
2. $(1 - \tan^2 45^\circ)/(1 + \tan^2 45^\circ) =$
   (A) $\tan 90^\circ$ (B) 1 (C) $\sin 45^\circ$ (D) 0
3. $\sin 2A = 2 \sin A$ is true when $A =$
   (A) 0° (B) 30° (C) 45° (D) 60°
4. $(2 \tan 30^\circ)/(1 - \tan^2 30^\circ) =$
   (A) $\cos 60^\circ$ (B) $\sin 60^\circ$ (C) $\tan 60^\circ$ (D) $\sin 30^\circ$

SOLUTION

We solve each part using standard trigonometric identities and exact values of special angles.

(i)

Identity used: .

Here . So,

.

Correct option: (A) .

Student Note: Whenever you see , it directly matches .

(ii)

We know , so .

Substitute:

Numerator:

Denominator:

Therefore, .

Correct option: (D) 0.

(iii) "" is true when

Identity used: .

Given equation:

Bring to one side:

So, either:

(1) or (2) .

For the given options, makes and , so the equation is true.

Correct option: (A) .

(iv)

Identity used: .

Here . So,

.

Correct option: (C) .

Quick Check: , so the expression should come out greater than 1, which matches .

Question 3

If \tan (A + B) = √3 and \tan (A - B) = (1)/(√3); 0^\circ < A + B ≤ 90^\circ, A > B, find A and B.

SOLUTION

Given: and , with and .

To find: and .

Step 1: Convert each tangent value to its standard angle

We use the standard values:

and .

So we can write:

Step 2: Use the given range to fix the exact angles

Since , the angle must be an acute angle.

In the acute range, has only one standard match, so:

.

Also, since , we have . The standard acute angle for is , so:

.

Student Note: Without the range information, could repeat every . The conditions given in the question help us choose the correct (acute) angles.

Step 3: Solve the two equations

We now have a pair of simple linear equations:

(1)

(2)

Add (1) and (2):

Now substitute in (1):

.

Final Answer: and .

Quick Check:

✓

✓

Question 4

State whether the following are true or false. Justify your answer.

1. $\sin (A + B) = \sin A + \sin B$.
2. The value of $\sin \theta$ increases as θ increases.
3. The value of $\cos \theta$ increases as θ increases.
4. $\sin \theta = \cos \theta$ for all values of θ.
5. $\cot A$ is not defined for $A = 0^\circ$.

SOLUTION

We check each statement using trigonometric identities and basic behaviour of and .

(i)

False. The correct identity is:

.

Justification by example: Take , .

LHS: .

RHS: .

Since , the statement is false.

(ii) "The value of increases as increases."

True (for).

In the first quadrant, as increases, the opposite side (compared to hypotenuse) effectively increases, so increases.

Quick table check: , , , , . These values clearly increase.

Student Note: This "increasing" behaviour is commonly discussed for to . Outside this range, does not keep increasing forever.

(iii) "The value of increases as increases."

False (for).

In the first quadrant, actually **decreases** as increases.

Quick table check: , , , , , . These values go down.

(iv) for all values of

False. equals only for some specific angles, not for all.

Justification by example: At , (so it is true here).

But at : and , which are not equal. Hence it is not true for all .

(v) " is not defined for "

True. We know:

.

At , and .

So, , which is not defined.

Final Answers: (i) False, (ii) True, (iii) False, (iv) False, (v) True.

ANSWER

(i) False

(ii) True

(iii) False

(iv) False

(v) True

📚 Relevant Resources

Explore more NCERT solutions (click links to visit):

Resource	Visit Link
NCERT Class 10 Maths All Chapters	View Solutions →
NCERT Class 10 Science Solutions	View Solutions →
NCERT Class 10 Social Science	View Solutions →
NCERT Class 10 English Solutions	View Solutions →

📝 Key Formulas

Important Formulas for Exercise 8.2

This exercise focuses on the values of trigonometric ratios for specific angles: 0°, 30°, 45°, 60°, and 90°.

1. TRIGONOMETRIC RATIOS OF A RIGHT-ANGLED TRIANGLE

Formula / Concept	Description
$\sin(\theta) = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$	The ratio of the length of the side opposite to the angle to the length of the hypotenuse.
$\cos(\theta) = \frac{\text{Base}}{\text{Hypotenuse}}$	The ratio of the length of the adjacent side to the length of the hypotenuse.
$\tan(\theta) = \frac{\text{Perpendicular}}{\text{Base}}$	The ratio of the length of the side opposite to the angle to the length of the adjacent side.
$\csc(\theta) = \frac{\text{Hypotenuse}}{\text{Perpendicular}} = \frac{1}{\sin(\theta)}$	The reciprocal of sine.
$\sec(\theta) = \frac{\text{Hypotenuse}}{\text{Base}} = \frac{1}{\cos(\theta)}$	The reciprocal of cosine.
$\cot(\theta) = \frac{\text{Base}}{\text{Perpendicular}} = \frac{1}{\tan(\theta)}$	The reciprocal of tangent.

2. TRIGONOMETRIC IDENTITIES

Formula / Concept	Description
$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$	Quotient Identities, expressing tan and cot in terms of sin and cos.
$\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$	
$\sin^2(\theta) + \cos^2(\theta) = 1$	
$1 + \tan^2(\theta) = \sec^2(\theta)$	Pythagorean Identities, derived from the Pythagorean theorem.
$1 + \cot^2(\theta) = \csc^2(\theta)$	

3. TRIGONOMETRIC RATIOS OF SPECIFIC ANGLES

The core of Exercise 8.2 is using the values from this table to solve problems.

Angle $\rightarrow$	0°	30°	45°	60°	90°
$\sin(\theta)$	0	$\frac{1}{2}$	$\frac{1}{\sqrt2}$	$\frac{\sqrt3}{2}$	1
$\cos(\theta)$	1	$\frac{\sqrt3}{2}$	$\frac{1}{\sqrt2}$	$\frac{1}{2}$	0
$\tan(\theta)$	0	$\frac{1}{\sqrt3}$	1	$\sqrt3$	Not Defined
$\csc(\theta)$	Not Defined	2	$\sqrt2$	$\frac{2}{\sqrt3}$	1

Angle $\rightarrow$	0°	30°	45°	60°	90°
$\sec(\theta)$	1	$(2)/(\sqrt{3})$	$\sqrt{2}$	2	Not Defined
$\cot(\theta)$	Not Defined	$\sqrt{3}$	1	$(1)/(\sqrt{3})$	0

⁊ Top FAQs

Q1. How many questions are in NCERT Solutions Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.2 for CBSE 2025-26?

Exercise 8.2 of NCERT Solutions Class 10 Maths Chapter 8 Introduction to Trigonometry contains exactly 4 questions. These questions focus on Trigonometric Ratios of Specific Angles like 0°, 30°, 45°, 60°, and 90°, which are crucial for CBSE board exam 2025-26 preparation.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.2 with step by step solutions?

You can download the free PDF of NCERT Solutions for Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.2 from the official NCERT website or various educational portals offering step by step solutions. These PDFs are updated as per the CBSE syllabus 2025-26 and include detailed explanations for all 4 questions covering Trigonometric Ratios of Specific Angles.

Q3. How many marks does Introduction to Trigonometry Chapter 8 Exercise 8.2 carry in CBSE Class 10 Maths board exam 2025-26?

Introduction to Trigonometry (Chapter 8) carries approximately 8 marks in CBSE Class 10 Maths board exam 2025-26 under Unit IV - Trigonometry. Exercise 8.2 specifically covers Trigonometric Ratios of Specific Angles, which forms an essential part of questions asked in the board examination and is shared with other trigonometry concepts.

Q4. Which is the most difficult question in NCERT Solutions Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.2 for CBSE 2025-26?

Question 4 of Exercise 8.2 in NCERT Solutions Class 10 Maths Chapter 8 Introduction to Trigonometry is generally considered the most challenging as it involves complex Trigonometric Identities and Trigonometric Ratios of Specific Angles. Students are advised to practice step by step solutions and understand the application of trigonometric values at 0°, 30°, 45°, 60°, and 90° to solve this question effectively for CBSE board exam 2025-26.

Q5. What is Trigonometric Ratios of Specific Angles covered in NCERT Class 10 Maths Chapter 8 Introduction to Trigonometry Exercise 8.2?

Trigonometric Ratios of Specific Angles in NCERT Class 10 Maths Chapter 8 Exercise 8.2 refer to the exact values of sin, cos, tan, cosec, sec, and cot at standard angles: 0°, 30°, 45°, 60°, and 90°. These fundamental ratios form the basis for solving trigonometric problems in CBSE board exam 2025-26 and are essential for understanding advanced trigonometry concepts.

🏠 More Exercises

Visit all exercises from Chapter 8:

Exercise 8.1 →

Exercise 8.2 ✓ →

Exercise 8.3 →

🌐 **Complete Chapter: Class 10 Maths Ch 8: Introduction to Trigonometry →**