SmartKalike

CBSE Class 10 · Maths

Introduction to Trigonometry

10 most probable questions for Boards 2027

Q1. 1 mark · Very short answer

In a right triangle, does the hypotenuse change when the other acute angle is considered instead?

Answer

No. The hypotenuse remains the same longest side; only the opposite and adjacent sides change when the other acute angle is considered.

Q2. 2 marks · Short answer

For an acute angle A in a right triangle, state the definitions of sin A, cos A, and tan A in terms of the opposite, adjacent, and hypotenuse sides.

Answer

For acute angle A, sin A = side opposite to angle A/hypotenuse, cos A = side adjacent to angle A/hypotenuse, and tan A = side opposite to angle A/side adjacent to angle A. The opposite and adjacent sides are named with respect to angle A.

Q3. 3 marks · Medium answer

If sin A = 3/5 and cos A = 4/5, calculate cosec A, sec A, and cot A using the reciprocal relationships.

Answer

Given: sin A = 3/5, cos A = 4/5.
Formula: cosec A = 1/sin A; sec A = 1/cos A; cot A = cos A/sin A.
Substitution: cosec A = 1/(3/5) = 5/3.
Substitution: sec A = 1/(4/5) = 5/4.
Substitution: cot A = (4/5)/(3/5) = 4/3.
Answer: cosec A = 5/3, sec A = 5/4, cot A = 4/3; all are dimensionless ratios, so units do not apply. A ratio has no physical unit.

Q4. 4 marks · Long answer

State the identities involving sec A and tan A, and cosec A and cot A. Give the interval of validity for each and explain why their endpoint restrictions differ.

Answer

The identities follow from the relationship between the sides of a right triangle and apply on intervals where the ratios are defined.
1. $\sec^2 A - \tan^2 A = 1$ for $0° \le A < 90°$. At 90°, cos A = 0, so sec A and tan A are not defined.
2. $\operatorname{cosec}^2 A = 1 + \cot^2 A$ for $0° < A \le 90°$. At 0°, sin A = 0, so cosec A and cot A are not defined.
3. The intervals differ because sec A and tan A have cos A as a denominator, whereas cosec A and

cot A have sin A as a denominator.
The identities hold at the endpoint where their denominators remain nonzero.

Q5. 5 marks · Long answer

(5 marks) (a) Explain what the notation sin A means, and why it is not a product; state how this convention applies to the other trigonometric ratios. (b) Explain how, for an acute angle, knowing one trigonometric ratio can be used with side ratios and the Pythagorean theorem to obtain the other ratios. (c) Explain why the sine and cosine of an acute angle cannot exceed 1.

Answer

Trigonometric ratios relate an acute angle to the side lengths of its right triangle.
1. sin A means the sine of angle A. It is an abbreviation, not the product of sin and A; sin separated from A has no meaning.
2. The same convention applies to cos A, tan A, cosec A, sec A and cot A; each names a ratio, not a product.
3. Knowing one ratio fixes a ratio between two sides. Assign proportional lengths to those sides, use the Pythagorean theorem to find the third side, and substitute all three lengths into the definitions to obtain the other ratios.
4. The hypotenuse is the longest side. Each leg is shorter than it, so the opposite-to-hypotenuse ratio sin A and adjacent-to-hypotenuse ratio cos A are less than 1.
Thus, side ratios determine the other ratios, while sin A and cos A cannot exceed 1.

Q6. 1 mark · Very short answer

What relationship do the trigonometric ratios of an acute angle express in a right triangle?

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/introduction-to-trigonometry

Q7. 2 marks · Short answer

Express tan A in terms of sin A and cos A, and express cot A in terms of cos A and sin A.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/introduction-to-trigonometry

Q8. 3 marks · Medium answer

Two right triangles have the same acute angle A. In the first, the side opposite A is 3 units and the hypotenuse is 5 units; in the second, these lengths are 9 units and 15 units. Calculate sin A from each triangle and compare the results to illustrate why the ratio is unchanged.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/introduction-to-trigonometry

Q9. 5 marks · Long answer

For an acute angle A, express cos A, tan A and sec A in terms of sin A, using the positive square root for cos A. Then use these expressions and a relevant trigonometric identity to prove that sec A(1 − sin A)(sec A + tan A) = 1.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/introduction-to-trigonometry

Q10. 1 mark · Multiple choice

Which option gives the correct values of sin 30°, cos 30°, tan 30°, cosec 30°, sec 30°, and cot 30°, respectively? (A) 1/2, √3/2, 1/√3, 2, 2/√3, √3 (B) √3/2, 1/2, √3, 2/√3, 2, 1/√3 (C) 1/2, √3/2, √3, 2, 2/√3, 1/√3 (D) √3/2, 1/2, 1/√3, 2, √3, 2/√3

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