

Special Right Triangle Worksheet Questions and Answers PDF

Special Right Triangle Worksheet Questions And Answers PDF

Disclaimer: The special right triangle worksheet questions and answers pdf was generated with the help of StudyBlaze AI. Please be aware that AI can make mistakes. Please consult your teacher if you're unsure about your solution or think there might have been a mistake. Or reach out directly to the StudyBlaze team at max@studyblaze.io.

Part 1: Building a Foundation

Which of the following is a characteristic of a 30-60-90 triangle?

Hint: Think about the relationships between the sides and angles.

- A) All sides are equal
- B) The hypotenuse is $\sqrt{2}$ times the length of a leg
- C) The side opposite the 30-degree angle is the shortest ✓
- D) The side opposite the 60-degree angle is the shortest

■ The side opposite the 30-degree angle is the shortest.

Which of the following statements are true about 45-45-90 triangles? (Select all that apply)

Hint: Consider the properties of isosceles right triangles.

- A) Both legs are of equal length ✓
- B) The hypotenuse is twice the length of a leg
- C) The angles are 45 degrees, 45 degrees, and 90 degrees ✓
- D) The side ratios are $1:1:\sqrt{2}$ ✓

■ Both legs are equal, and the angles are 45 degrees, 45 degrees, and 90 degrees.

Explain the significance of the side ratios in a 30-60-90 triangle and how they are derived.

Hint: Consider how the angles relate to the lengths of the sides.

The side ratios are derived from the properties of the triangle and help in solving real-world problems.

List the angle measures and corresponding side ratios for both 30-60-90 and 45-45-90 triangles.

Hint: Think about the angles and how they relate to the sides.

1. 30-60-90 triangle angles and ratios

Angles: 30° , 60° , 90° ; Ratios: $1:\sqrt{3}:2$

2. 45-45-90 triangle angles and ratios

Angles: 45° , 45° , 90° ; Ratios: $1:1:\sqrt{2}$

30-60-90: angles are 30° , 60° , 90° with side ratios $1:\sqrt{3}:2$; 45-45-90: angles are 45° , 45° , 90° with side ratios $1:1:\sqrt{2}$.

Part 2: Comprehension and Application

If the shortest side of a 30-60-90 triangle is 5 units, what is the length of the hypotenuse?

Hint: Use the side ratios of a 30-60-90 triangle.

- A) 5 units
- B) 10 units ✓
- C) $5\sqrt{3}$ units
- D) 15 units

The hypotenuse is 10 units, as it is twice the shortest side.

In a 45-45-90 triangle, if one leg measures 7 units, which of the following are true? (Select all that apply)

Hint: Consider the properties of isosceles right triangles.

- A) The other leg measures 7 units ✓
- B) The hypotenuse measures $7\sqrt{2}$ units ✓
- C) The hypotenuse measures 14 units
- D) The angles are 30 degrees, 60 degrees, and 90 degrees

The other leg also measures 7 units, and the hypotenuse measures $7\sqrt{2}$ units.

Describe how the Pythagorean theorem is used to verify the side lengths of a 45-45-90 triangle.

Hint: Think about the relationship between the sides and the theorem.

The Pythagorean theorem confirms that the sum of the squares of the legs equals the square of the hypotenuse.

A ladder leans against a wall forming a 30-degree angle with the ground. If the ladder is 10 feet long, how far is the base of the ladder from the wall?

Hint: Use the properties of a 30-60-90 triangle.

- A) 5 feet
- B) 10 feet
- C) $5\sqrt{3}$ feet ✓
- D) $10\sqrt{3}$ feet

The base of the ladder is $5\sqrt{3}$ feet from the wall.

Part 3: Analysis, Evaluation, and Creation

Which of the following best explains why the side opposite the 60-degree angle in a 30-60-90 triangle is $\sqrt{3}$ times the shortest side?

Hint: Consider the properties of the triangle and trigonometric functions.

- A) It is derived from the Pythagorean theorem ✓
- B) It is a property of all right triangles
- C) It is based on the definition of sine and cosine
- D) It is a result of the triangle's symmetry

It is derived from the Pythagorean theorem and the properties of the triangle.

Analyze the following scenarios and identify which involve a 45-45-90 triangle. (Select all that apply)

Hint: Think about the properties of isosceles right triangles.

- A) A square cut diagonally ✓
- B) A right triangle with angles 30, 60, and 90 degrees
- C) An isosceles right triangle ✓
- D) A triangle with sides 3, 4, and 5

A square cut diagonally and an isosceles right triangle involve 45-45-90 triangles.

Compare and contrast the properties of 30-60-90 and 45-45-90 triangles, focusing on their side ratios and angle measures.

Hint: Consider how the angles affect the side lengths.

30-60-90 triangles have side ratios of $1:\sqrt{3}:2$, while 45-45-90 triangles have ratios of $1:1:\sqrt{2}$.

If you need to create a right triangle with a hypotenuse of 20 units and one angle of 45 degrees, what will be the length of each leg?

Hint: Use the properties of a 45-45-90 triangle.

- A) 10 units
- B) $10\sqrt{2}$ units ✓
- C) 20 units
- D) $20\sqrt{2}$ units

Each leg will measure $10\sqrt{2}$ units.

Design a real-world problem involving a 30-60-90 triangle, and explain how you would solve it using the properties of the triangle.

Hint: Think about practical applications of these triangles.

A real-world problem could involve calculating heights or distances using the properties of a 30-60-90 triangle.

Propose two different scenarios where using a 45-45-90 triangle would be beneficial, and explain why.

Hint: Consider situations that require equal leg lengths.

1. Scenario 1

Design a roof with equal slopes.

2. Scenario 2

Create a square garden bed.

Scenarios could include designing a roof or creating a square garden bed, where equal leg lengths simplify calculations.