

Special Right Triangle Worksheet Answer Key PDF

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Part 1: Building a Foundation

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

undefined. A) All sides are equal

undefined. B) The hypotenuse is $\sqrt{2}$ times the length of a leg

undefined. C) The side opposite the 30-degree angle is the shortest ✓

undefined. 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)

undefined. A) Both legs are of equal length ✓

undefined. B) The hypotenuse is twice the length of a leg

undefined. C) The angles are 45 degrees, 45 degrees, and 90 degrees ✓

undefined. 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.

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.

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?

undefined. A) 5 units

undefined. B) 10 units ✓

undefined. C) $5\sqrt{3}$ units

undefined. 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)

undefined. A) The other leg measures 7 units ✓

undefined. B) The hypotenuse measures $7\sqrt{2}$ units ✓

undefined. C) The hypotenuse measures 14 units

undefined. 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.

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?

undefined. A) 5 feet

undefined. B) 10 feet

undefined. C) $5\sqrt{3}$ feet ✓

undefined. 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?

undefined. **A) It is derived from the Pythagorean theorem ✓**

undefined. B) It is a property of all right triangles

undefined. C) It is based on the definition of sine and cosine

undefined. 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)

undefined. **A) A square cut diagonally ✓**

undefined. B) A right triangle with angles 30, 60, and 90 degrees

undefined. **C) An isosceles right triangle ✓**

undefined. 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.

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?

undefined. A) 10 units

undefined. **B) $10\sqrt{2}$ units ✓**

undefined. C) 20 units

undefined. 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.

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.

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.