Special Triangles Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the measure of each angle in an equilateral triangle?

Hint: Consider the properties of equilateral triangles.

- ◯ A) 45 degrees
- ◯ **B) 60 degrees ✓**
- ◯ C) 90 degrees
- ◯ D) 120 degrees

> Each angle in an equilateral triangle measures 60 degrees.

Which of the following are properties of an isosceles triangle?

Hint: Think about the characteristics that define isosceles triangles.

- ☐ **A) Two sides are equal ✓**
- ☐ B) All angles are equal
- ☐ **C) Base angles are equal ✓**
- ☐ D) It has a right angle

> An isosceles triangle has two equal sides and base angles that are equal.

Explain the Pythagorean theorem and its significance in right triangles.

Hint: Consider how the theorem relates the sides of a right triangle.

> **The Pythagorean theorem states that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.**

List the side ratios for a 45-45-90 triangle and a 30-60-90 triangle.

Hint: Recall the special triangles and their properties.

1. 45-45-90 triangle side ratios

> 1:1:√2

2. 30-60-90 triangle side ratios

> 1:√3:2

> The side ratios for a 45-45-90 triangle are 1:1: √2, and for a 30-60-90 triangle, they are 1:√3:2.

Part 2: comprehension and Application

If a triangle has angles measuring 30 degrees, 60 degrees, and 90 degrees, what type of triangle is it?

Hint: Identify the triangle based on its angle measures.

- ◯ A) Equilateral
- ◯ B) Isosceles
- ◯ **C) Right ✓**
- ◯ D) Scalene

> This triangle is a right triangle.

Which statements are true about a 30-60-90 triangle?

Hint: Consider the relationships between the sides and angles.

- [x] **A) The hypotenuse is twice the length of the shorter leg ✓**
- [ ] B) The longer leg is the same length as the hypotenuse
- [x] **C) The longer leg is √3 times the shorter leg ✓**
- [ ] D) All angles are equal

> The hypotenuse is twice the length of the shorter leg, and the longer leg is √3 times the shorter leg.

Describe how the properties of an equilateral triangle can be used to find its area.

Hint: Think about the formula for the area of a triangle.

> **The area of an equilateral triangle can be found using the formula $A = (\sqrt{3}/4) * s^2$, where s is the length of a side.**

Given a right triangle with legs measuring 3 cm and 4 cm, what is the length of the hypotenuse?

Hint: Use the Pythagorean theorem to find the hypotenuse.

- ◯ **A) 5 cm ✓**
- ◯ B) 6 cm
- ◯ C) 7 cm
- ◯ D) 8 cm

> The length of the hypotenuse is 5 cm.

Which of the following can be used to calculate the area of an isosceles triangle?

Hint: Consider the different methods for calculating area.

- [x] **A) Base and height ✓**
- [x] **B) Two equal sides and the angle between them ✓**
- [ ] C) All three sides
- [ ] D) Perimeter

> The area of an isosceles triangle can be calculated using the base and height or two equal sides and the angle between them.

Calculate the height of an equilateral triangle with a side length of 10 cm.

Hint: Use the properties of equilateral triangles to find the height.

> **The height of an equilateral triangle with a side length of 10 cm is approximately 8.66 cm.**

Part 3: Analysis, Evaluation, and Creation

Which triangle has the property that the square of the hypotenuse is equal to the sum of the squares of the other two sides?

Hint: Identify the triangle based on its properties.

- ○ A) Equilateral
- ○ B) Isosceles
- ○ **C) Right ✓**
- ○ D) Scalene

> This property is characteristic of right triangles.

Identify the correct relationships in a 45-45-90 triangle.

Hint: Consider the properties of this special triangle.

- [x] **A) The legs are equal ✓**

- [ ] **B) The hypotenuse is √2 times the length of a leg ✓**
- [ ] **C) All angles are 45 degrees ✓**
- [ ] D) The hypotenuse is equal to one of the legs

> In a 45-45-90 triangle, the legs are equal, and the hypotenuse is √2 times the length of a leg.

Analyze how changing the length of one side of an isosceles triangle affects its angles.

Hint: Consider the properties of isosceles triangles.

> **Changing the length of one side of an isosceles triangle affects the angles opposite to the sides, maintaining the property that the two base angles remain equal.**

Which triangle type is most efficient for maximizing area given a fixed perimeter?

Hint: Consider the properties of triangles and their areas.

- ◯ **A) Equilateral ✓**
- ◯ B) Isosceles
- ◯ C) Right
- ◯ D) Scalene

> The equilateral triangle is the most efficient for maximizing area given a fixed perimeter.

Which of the following scenarios demonstrate the use of special triangles in real-world applications?

Hint: Think about practical applications of triangle properties.

- [ ] **A) Designing a triangular park ✓**
- [ ] **B) Calculating the height of a building using its shadow ✓**
- [ ] **C) ConstructING a roof with equal slopes ✓**
- [ ] **D) Estimating the distance across a river ✓**

All listed scenarios demonstrate the use of special triangles in real-world applications.

Design a real-world problem that involves a 30-60-90 triangle and explain how you would solve it.

Hint: Think about practical applications of the triangle's properties.

A real-world problem could involve determining the height of a tree using the shadow it casts, applying the properties of a 30-60-90 triangle.