Triangle Inequality Theorem Worksheet Answer Key PDF

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Part 1: Building a Foundation

Which of the following is a correct statement of the Triangle Inequality Theorem?

undefined. A) The sum of the lengths of any two sides of a triangle is equal to the length of the third side.

undefined. B) The sum of the lengths of any two sides of a triangle is less than the length of the third side.

undefined. C) The sum of the lengths of any two sides of a triangle is greater than the length of the third side. ✓

undefined. D) The difference of the lengths of any two sides of a triangle is greater than the length of the third side.

The correct statement is that the sum of the lengths of any two sides of a triangle is greater than the length of the third side.

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undefined. A) The sum of the lengths of any two sides of a triangle is equal to the length of the third side.

undefined. B) The sum of the lengths of any two sides of a triangle is less than the length of the third side.

undefined. C) The sum of the lengths of any two sides of a triangle is greater than the length of the third side. ✓

undefined. D) The difference of the lengths of any two sides of a triangle is greater than the length of the third side.

The correct statement is C) The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

Which of the following inequalities must be true for a triangle with sides a, b, and c?

undefined. A) a + b > c ✓

undefined. B) a + c > b ✓

undefined. C) b + c > a ✓

undefined. D) a + b = c

All three inequalities must be true for the sides to form a triangle.

Which of the following inequalities must be true for a triangle with sides a, b, and c?

undefined. A) a + b > c ✓

undefined. B) a + c > b ✓

undefined. C) b + c > a ✓

undefined. D) a + b = c

All of the inequalities A), B), and C) must be true.

Explain in your own words why the Triangle Inequality Theorem is important in determining whether three lengths can form a triangle.

The theorem is crucial because it establishes the necessary conditions for three lengths to create a closed shape, ensuring that the lengths can connect to form a triangle.

Explain in your own words why the Triangle Inequality Theorem is important in determining whether three lengths can form a triangle.

The Triangle Inequality Theorem is crucial because it provides a necessary condition for the existence of a triangle.

List the three inequalities that must be satisfied for a triangle with sides x, y, and z.

1. First inequality

x + y > z

2. Second inequality

x + z > y

3. Third inequality

y + z > x

The inequalities are: x + y > z, x + z > y, and y + z > x.

Part 2: Comprehension and Application

Given the side lengths 3, 4, and 8, which statements are true regarding the possibility of forming a triangle?

undefined. A) 3 + 4 > 8

undefined. B) 3 + 8 > 4 ✓

undefined. C) 4 + 8 > 3 ✓

undefined. D) A triangle cannot be formed with these side lengths. ✓

The correct statement is D) A triangle cannot be formed with these side lengths because one inequality is not satisfied.

Given the side lengths 3, 4, and 8, which statements are true regarding the possibility of forming a triangle?

undefined. A) 3 + 4 > 8

undefined. B) 3 + 8 > 4 ✓

undefined. C) 4 + 8 > 3 ✓

undefined. D) A triangle cannot be formed with these side lengths. ✓

The correct statement is D) A triangle cannot be formed with these side lengths.

Given the side lengths 9, 12, and x, find the range of possible values for x that would allow these lengths to form a triangle.

The range for x is 3 < x < 21, derived from the inequalities 9 + 12 > x, 9 + x > 12, and 12 + x > 9.

Part 3: Analysis, Evaluation, and Creation

Analyze the following set of side lengths: 10, 24, and 15. Which statement is true?

undefined. A) They can form a triangle because all inequalities are satisfied. ✓

undefined. B) They cannot form a triangle because one inequality is not satisfied.

undefined. C) They can form a triangle because they satisfy the Pythagorean theorem.

undefined. D) They cannot form a triangle because they are not integers.

The correct answer is A) They can form a triangle because all inequalities are satisfied.

Analyze the following set of side lengths: 10, 24, and 15. Which statement is true?

undefined. A) They can form a triangle because all inequalities are satisfied.

undefined. B) They cannot form a triangle because one inequality is not satisfied. ✓

undefined. C) They can form a triangle because they satisfy the Pythagorean theorem.

undefined. D) They cannot form a triangle because they are not integers.

The correct answer is B) They cannot form a triangle because one inequality is not satisfied.

Create a set of three side lengths that cannot form a triangle. Which of the following sets meets this criterion?

undefined. A) 3, 4, 5

undefined. B) 1, 2, 3 ✓

undefined. C) 6, 8, 10

undefined. D) 5, 9, 14

The correct answer is B) 1, 2, 3, as they do not satisfy the triangle inequality.

Propose a real-world problem that involves using the Triangle Inequality Theorem to solve. Describe the problem and explain how the theorem would be applied.

A real-world problem could involve determining if a triangular piece of land can be formed with given side lengths.

Create a set of three side lengths that cannot form a triangle. Which of the following sets meets this criterion?

undefined. A) 3, 4, 5

undefined. B) 1, 2, 3 ✓

undefined. C) 6, 8, 10

undefined. D) 5, 9, 14

The correct answer is B) 1, 2, 3, as they do not satisfy the Triangle Inequality Theorem.

Propose a real-world problem that involves using the Triangle Inequality Theorem to solve. Describe the problem and explain how the theorem would be applied.

An example could be determining if three lengths of wood can form a triangular support for a structure, applying the theorem to ensure stability.

Reflect on the importance of the Triangle Inequality Theorem in geometry. Provide two reasons why understanding this theorem is crucial for solving geometric problems.

1. First reason

It ensures that three lengths can form a triangle.

2. Second reason

It helps in solving problems related to triangle construction.

Understanding the theorem is crucial for ensuring that shapes can be formed and for solving problems related to triangle construction.