

Triangle Inequality Theorem Worksheet

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Part 1: Building a Foundation

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

Hint: Think about the relationship between the sides of a triangle.

- A) The sum of the lengths of any two sides of a triangle is equal to the length of the third side.
- B) The sum of the lengths of any two sides of a triangle is less than the length of the third side.
- C) The sum of the lengths of any two sides of a triangle is greater than the length of the third side.
- D) The difference of the lengths of any two sides of a triangle is greater than the length of the third side.

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

Hint: Consider the definitions of the theorem.

- A) The sum of the lengths of any two sides of a triangle is equal to the length of the third side.
- B) The sum of the lengths of any two sides of a triangle is less than the length of the third side.
- C) The sum of the lengths of any two sides of a triangle is greater than the length of the third side.
- D) The difference 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 ?

Hint: Consider the relationships between all three sides.

- A) $a + b > c$
- B) $a + c > b$
- C) $b + c > a$
- D) $a + b = c$

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- C) $b + c > a$
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Explain in your own words why the Triangle Inequality Theorem is important in determining whether three lengths can form a triangle.

Hint: Think about the implications of the theorem in geometry.

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

Hint: Consider the implications of the theorem in geometry.

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

Hint: Consider the relationships between each pair of sides.

1. First inequality

2. Second inequality

3. Third inequality

Part 2: Comprehension and Application

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

Hint: Evaluate each inequality carefully.

- A) $3 + 4 > 8$
- B) $3 + 8 > 4$
- C) $4 + 8 > 3$
- D) A triangle cannot be formed with these side lengths.

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

Hint: Apply the Triangle Inequality Theorem to these lengths.

- A) $3 + 4 > 8$
- B) $3 + 8 > 4$
- C) $4 + 8 > 3$
- 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.

Hint: Use the Triangle Inequality Theorem to establish the inequalities.

Part 3: Analysis, Evaluation, and Creation

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

Hint: Consider the implications of the Triangle Inequality Theorem.

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

- B) They cannot form a triangle because one inequality is not satisfied.
- C) They can form a triangle because they satisfy the Pythagorean theorem.
- D) They cannot form a triangle because they are not integers.

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

Hint: Evaluate the inequalities for these lengths.

- A) They can form a triangle because all inequalities are satisfied.
- B) They cannot form a triangle because one inequality is not satisfied.
- C) They can form a triangle because they satisfy the Pythagorean theorem.
- D) They cannot form a triangle because they are not integers.

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

Hint: Think about the Triangle Inequality Theorem.

- A) 3, 4, 5
- B) 1, 2, 3
- C) 6, 8, 10
- D) 5, 9, 14

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.

Hint: Think about practical applications of the theorem.

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

Hint: Evaluate each set against the Triangle Inequality Theorem.

- A) 3, 4, 5
- B) 1, 2, 3
- C) 6, 8, 10

D) 5, 9, 14

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.

Hint: Think about scenarios in construction or design.

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

Hint: Consider its applications in various geometric contexts.

1. First reason

2. Second reason