

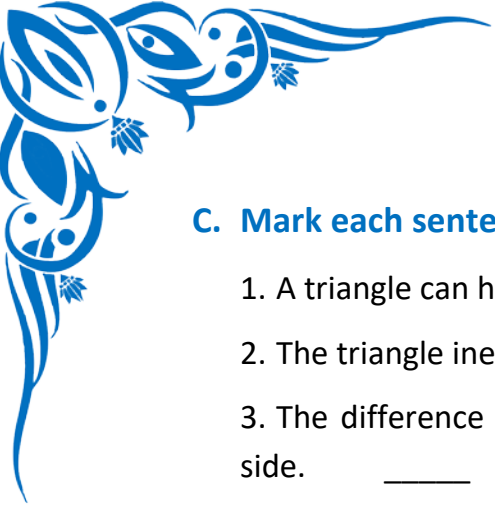
Triangle inequality property

A. Choose the correct answer:

1. According to the triangle inequality property, the sum of the lengths of any two sides of a triangle must be
 - a) less than the third side
 - b) equal to the third side
 - c) greater than the third side
 - d) less than or equal to the third side
2. Which of the following can be the sides of a triangle?
 - a) 3 cm, 4 cm, 8 cm
 - b) 2 cm, 5 cm, 7 cm
 - c) 5 cm, 6 cm, 12 cm
 - d) 7 cm, 8 cm, 15 cm
3. If two sides of a triangle are 5 cm and 7 cm, the third side must be
 - a) more than 12 cm
 - b) less than 2 cm
 - c) less than 12 cm and more than 2 cm
 - d) equal to 12 cm
4. Which of the following cannot form a triangle?
 - a) 6 cm, 8 cm, 13 cm
 - b) 2 cm, 2 cm, 5 cm
 - c) 4 cm, 4 cm, 5 cm
 - d) 5 cm, 6 cm, 10 cm
5. In a triangle, the difference of the lengths of any two sides is always
 - a) less than the third side
 - b) more than the third side
 - c) equal to the third side
 - d) greater than the sum of the third side

B. Write the Missing Terms to Complete the Sentences:

1. The sum of any two sides of a triangle must be _____ than the third side.
2. A triangle cannot be formed if the sum of two sides is _____ than or equal to the third side.
3. The sides 3 cm, 4 cm, and 5 cm can form a _____.
4. If two sides of a triangle are 6 cm and 9 cm, the third side must be less than _____.
5. According to the triangle inequality property, the third side must lie between the _____ and the _____ of the other two sides.



C. Mark each sentence with a True (✓) or False (X):

1. A triangle can have sides 2 cm, 3 cm, and 6 cm. _____
2. The triangle inequality applies to all triangles. _____
3. The difference of any two sides of a triangle is always greater than the third side. _____
4. The sides 4 cm, 4 cm, and 9 cm cannot form a triangle. _____
5. A triangle with sides 5 cm, 5 cm, and 10 cm satisfies the triangle inequality property. _____

D. Figure out the answers to these questions:

1. Can a triangle be formed with sides 5 cm, 10 cm, and 15 cm? Check using the triangle inequality property.
2. If two sides of a triangle are 7 cm and 11 cm, find the range of the possible lengths of the third side.
3. A triangle has one side 8 cm and another side 3 cm. What is the maximum and minimum value the third side can take.
4. Use the triangle inequality property to check whether 6 cm, 7 cm, and 14 cm can form a triangle.
5. If two sides of a triangle are equal to a and b, write the condition for the third side using triangle inequality.

E. Challenge yourself with these questions:

1. Can a triangle be formed with sides $\frac{7}{2}$ cm, $\frac{3}{2}$ cm, and 5 cm.
2. Find three different sets of side lengths that satisfy the triangle inequality property.
3. Explain why a triangle cannot have sides 2 cm, 2 cm, and 5 cm.
4. Test whether a triangle with sides 4.5 cm, 5.5 cm, and 10 cm is possible.
5. If a triangle has sides a, b, and c, write all three triangle inequality conditions using a, b, and c.

F. In the given figure P and Q are the points on the side BC of $\triangle ABC$. Find $AP = AQ$. Prove that $AC + AB + BC > 2AP + PQ$.

