

Name: _____

Date _____

Section 9.4 A – Triangle Inequality Theorem

Triangle Inequality Theorem

The sum of the lengths of any two sides of a triangle is Greater / Longer / Larger than the length of the third side.

Example: Determine if the given side lengths form a triangle.

a) 4, 5, 10

$$4 + 5 = 9 < 10$$

b) 4, 5, 9

$$4 + 5 = 9 < 9$$

c) 4, 5, 7

$$\begin{aligned} 4 + 5 &= 9 > 7 \quad \checkmark \\ 5 + 7 &= 12 > 4 \quad \checkmark \\ 4 + 7 &= 11 > 5 \quad \checkmark \end{aligned}$$

Practice:

The triangle Inequality Theorem states that the sum of the lengths of any two sides of a triangle is greater than the length of the third side. Using this theorem, answer the following questions.

1) If two sides of a triangle are 1 and 3, the third side may be:

(a) 5

(b) 2

(c) 3

(d) 4

$$2 < \cancel{3} < 4$$

difference sum

2) If the lengths of two sides of a triangle are 5 and 7, the length of the third side may not be:

(a) 12

(b) 7

(c) 3

(d) 5

$$2 < \cancel{7} < 12$$

difference sum

Name: _____

Date _____

3) Which set of numbers may represent the lengths of the sides of a triangle?

(a) {2,5,9}

(b) {6,6,7}

(c) {6,4,2}

(d) {7,8,1}

$$\begin{aligned}6 + 6 &= 12 > 7 \\6 + 7 &= 13 > 6\end{aligned}$$

4) If the lengths of two sides of a triangle are 4 and 10, which could be the length of the third side?

(a) 6

(b) 8

(c) 14

(d) 16

$$6 < X < 14$$

5) If the lengths of two sides of a triangle measure 7 and 12, the length of the third side could measure:

(a) 16

(b) 19

(c) 3

(d) 5

$$5 < X < 19$$

6) Two sides of an isosceles triangle have lengths 2 and 12, respectively. Find the length of the third side.

12

7) If the lengths of two sides of a triangle are 10 and 14, the length of the third side may be:

(a) 22

(b) 2

(c) 24

(d) 4

$$4 < X < 24$$