Section 6.1 – Inequalities in One Triangle
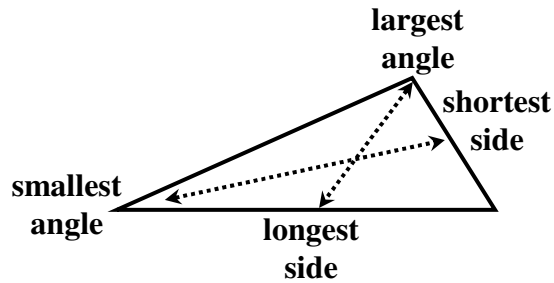
The side opposite of the largest angle

is the _____ side.

The side opposite of the smallest angle

is the _____ side.

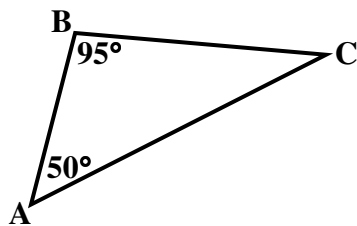**largest angle**

shortest side

smallest angle

longest side

The angle opposite of the longest side

is the _____ angle.

The angle opposite of the shortest side

is the _____ angle.

Ex 1:

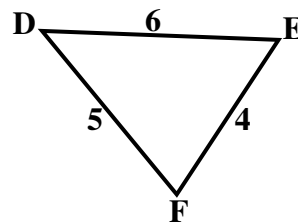**a)** List the sides in order from <u>shortest</u> to <u>longest</u>.

B
95°
C
50°
A

b) List the angles in order from <u>smallest</u> to <u>largest</u>.
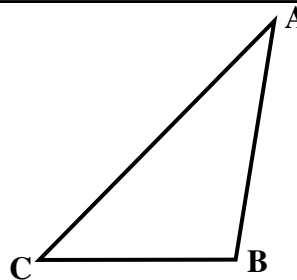
D 6 E
5 4
F

Triangle Inequality Theorem

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

$$AB + BC > AC$$
$$AC + BC > AB$$
$$AB + AC > BC$$

A

C   B

Ex 2:

Is it possible to construct a triangle with the given side lengths?

Important Note: You only have to use part of the Triangle Inequality Theorem to solve
this type of problem. If the sum of the two shortest sides lengths is greater
than the third, then a triangle can be constructed.

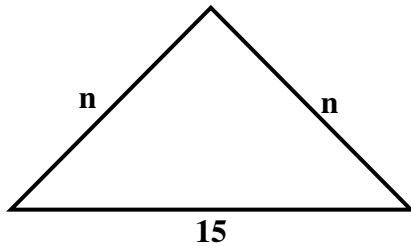**a)** 8 in., 3 in., 3 in.   **b)** 6 in., 6 in., 12 in.   **c)** 9 in., 5 in., 11 in.
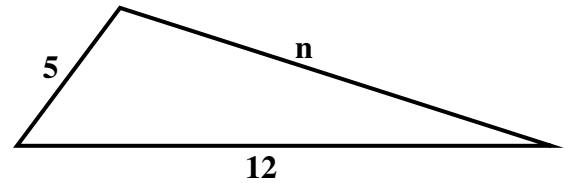
Ex 3:
A triangle has one side of 3 centimeters and another of 14 centimeters. Describe the possible lengths of the third side.

Ex 4:
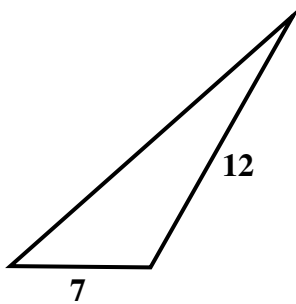**a)** In the figure below, n is a whole number. What is the smallest possible value for n?

15

b) In the figure below, n is a whole number. What is the largest possible value for n?

12

Ex 5:
a) The lengths of two sides of the triangle are known.

12

7

Which of the following could be the perimeter of the triangle?

A   19

B   24

C   31

D   38

b) Two sides of a triangle measure 14 and 9. Which of the following cannot be the perimeter of the triangle.

A   28

B   37

C   41

D   46