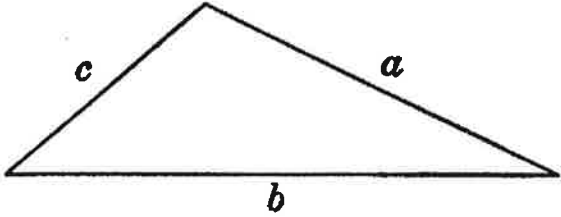


What Is the Triangle Inequality Theorem?
(Topic #4)

Triangle Inequality Theorem	
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.	
$a + b > c$	
$a + c > b$	
$b + c > a$	

EXAMPLE 1: Determining Whether Three Sides Form a Triangle

Determine if the given side lengths form a triangle.

a) 4, 5, 7

b) 4, 5, 9

c) 4, 5, 10

PRACTICE: The Triangle Inequality Theorem states that the sum of the length 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 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. 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 }

3. 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

4. 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. 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

NAME: _____
TRIANGLES

DATE: _____
PERIOD: _____

Homework #4

Determine if the three lengths can be measures of the sides of a triangle. Show your work in the box. Write YES or NO.

1. 3 in, 9 in, and 8 in

2. 37 ft, 13 ft, and 21 ft

3. 16 ft, 6 ft, and 2 ft

4. 7 yd, 5 yd, and 10 yd

5. 25 yd, 17 yd, and 29 yd

6. 32 in, 11 in, and 20 in

7. Alice prepares a cheese sandwich for her lunch. She stuffs an isosceles triangular cheese slice in it. Which of the following is the possible side measures of the cheese slice?
Circle your answer.

A) 3 in, 5 in, 8 in

B) 4 in, 4 in, 6 in

C) 3 in, 3 in, 6 in

What Is the Triangle Inequality Theorem? (Topic #4)

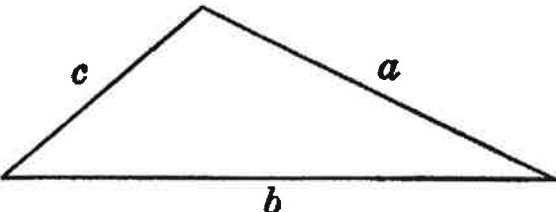
Triangle Inequality Theorem

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.

$$a + b > c$$

$$a + c > b$$

$$b + c > a$$



EXAMPLE 1: Determining Whether Three Sides Form a Triangle

Determine if the given side lengths form a triangle.

a) 4, 5, 7

$4 + 5 > 7$	TRUE	Yes; 4, 5, and 7 do form a Δ .
$4 + 7 > 5$	TRUE	
$7 + 5 > 4$	TRUE	

b) 4, 5, 9

$4 + 5 \not> 9$	FALSE	No; 4, 5, and 9 do not form a Δ .
$4 + 9 > 5$	TRUE	
$9 + 5 > 4$	TRUE	

c) 4, 5, 10

$4 + 5 \not> 10$	FALSE	No; 4, 5, and 10 do not form a Δ .
$4 + 10 > 5$	TRUE	
$10 + 5 > 4$	TRUE	

PRACTICE: The Triangle Inequality Theorem states that the sum of the length 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 the lengths of two sides of a triangle are 5 and 7, the length of the third side may **not** be:

A) 12

$$5 + 7 > 12 \quad F$$

B) 7

$$5 + 7 > 7 \quad T$$

C) 3

$$5 + 7 > 3 \quad T$$

D) 5

$$5 + 7 > 5 \quad T$$

2. 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}

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

A) 6

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D) 16

4. 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. 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



Homework #4

Determine if the three lengths can be measures of the sides of a triangle. Show your work in the box. Write YES or NO.

<p>1. 3 in, 9 in, and 8 in</p> $3 + 9 > 8$ $8 + 3 > 9$ $9 + 8 > 3$ <p style="text-align: right;"><u>YES!</u></p> <p>The sides do form a Δ.</p>	<p>2. 37 ft, 13 ft, and 21 ft</p> $37 + 21 > 13$ $13 + 37 > 21$ $21 + 13 \neq 37$ <p style="text-align: right;"><u>No!</u></p> <p>The sides do <u>not</u> form a Δ.</p>
<p>3. 16 ft, 6 ft, and 2 ft</p> $16 + 6 > 2$ $6 + 2 \neq 16$ $2 + 16 > 6$ <p style="text-align: right;"><u>No!</u></p> <p>The sides do <u>not</u> form a Δ.</p>	<p>4. 7 yd, 5 yd, and 10 yd</p> $7 + 5 > 10$ $5 + 10 > 7$ $10 + 7 > 5$ <p style="text-align: right;"><u>YES!</u></p> <p>The sides do form a Δ.</p>
<p>5. 25 yd, 17 yd, and 29 yd</p> $17 + 25 > 29$ $17 + 29 > 25$ $29 + 25 > 17$ <p style="text-align: right;"><u>YES!</u></p> <p>The sides do form a Δ.</p>	<p>6. 32 in, 11 in, and 20 in</p> $11 + 20 \neq 32$ $32 + 11 > 20$ $20 + 32 > 11$ <p style="text-align: right;"><u>No!</u></p> <p>The sides do <u>not</u> form a Δ.</p>
<p>7. Alice prepares a cheese sandwich for her lunch. She stuffs an isosceles triangular cheese slice in it. Which of the following is the possible side measures of the cheese slice? Circle your answer.</p> <p>A) 3 in, 5 in, 8 in</p> <p><u>B) 4 in, 4 in, 6 in</u></p> <p>C) 3 in, 3 in, 6 in</p> $4 + 4 > 10$ $4 + 10 > 4$ $10 + 4 > 4$	