

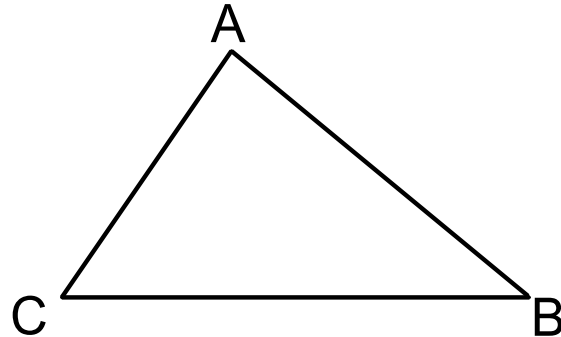
**Triangle Inequality Theorem:**

- \* The sum of the lengths of any 2 sides of a triangle is greater than the length of the third side.

$$AB + BC > AC$$

$$BC + AC > AB$$

$$AC + AB > BC$$



- \* Will help us decide if the given lengths can be sides of a triangle.

1. Determine whether the given measures can be the lengths of the sides of a triangle.

a. 6.5, 6.5, and 14.5

$$6.5 + 6.5 = 13 < 14.5$$

$$6.5 + 14.5 = 21 > 6.5 \text{ YES}$$

no, its not a triangle.

b. 6.8, 7.2, and 5.1

$$6.8 + 5.1 = 11.9 > 7.2 \text{ YES}$$

$$6.8 + 7.2 = 14.0 > 5.1 \text{ YES}$$

$$7.2 + 5.1 = 12.3 > 6.8 \text{ YES}$$

Its a triangle

**To find a third side you will need to test all three combinations.**

Example: Two sides of a triangle are 8 and 14, what is the range for the third side.

$$\begin{array}{lll} 8 + 14 > x & 8 + x > 14 & 14 + x > 8 \\ 22 > x & x > 6 & x > -6 \end{array}$$

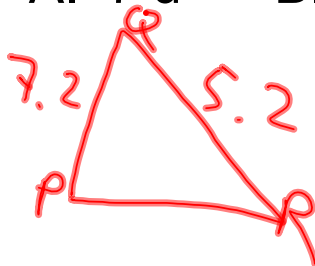
The third side has to be greater than 6, but less than 22.

*14 - 8*  
*14 + 8*

$$6 < x < 22$$

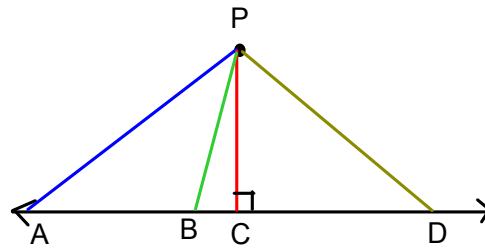
2. In  $\triangle PQR$ ,  $PQ = 7.2$  and  $QR = 5.2$ . Which measure cannot be  $PR$ ?

- A. 7 u      B. 9 u      C. 11 u      **D. 13 u**



$$\begin{aligned} 7.2 - 5.2 < PR < 7.2 + 5.2 \\ 2 < PR < 12.4 \end{aligned}$$

The  $\perp$  segment from a point to a line is the shortest segment from the point to the line.



The  $\perp$  segment from a point to a plane is the shortest segment from the point to the plane.