

5 - 4

The Triangle Inequality

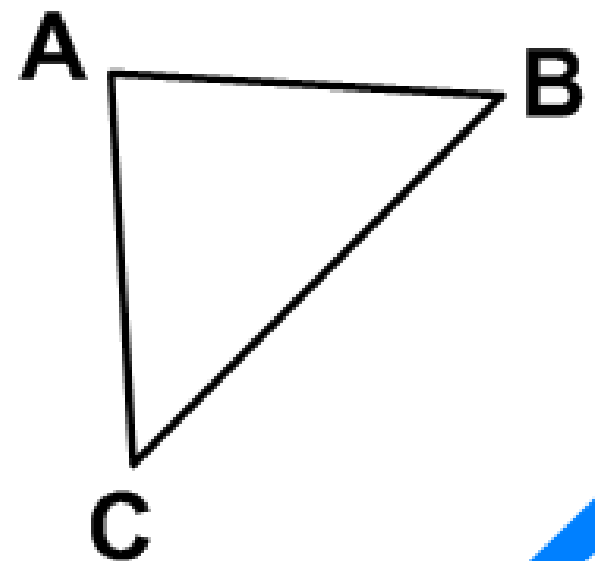
The shortest distance between 2 points

is a straight line .

$$A \rightarrow C \quad AC < AB + BC$$

$$B \rightarrow C \quad BC < BA + AC$$

$$A \rightarrow B \quad AB < AC + CB$$



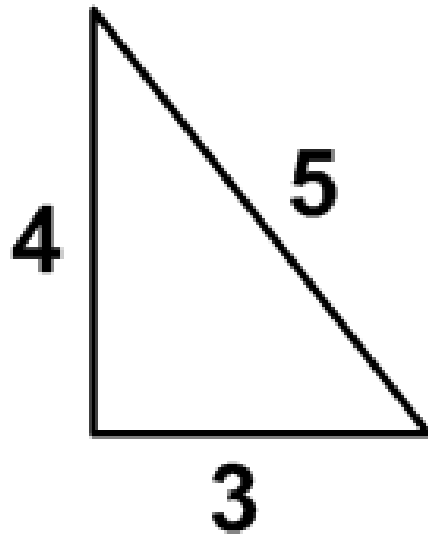
Theorem 5.11:

(Triangle Inequality Theorem)

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



The following is a common right triangle:



$$5 + 4 > 3$$

$$5 + 3 > 4$$

$$3 + 4 > 5$$



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

Ex: 3, 5, 6 *yes*

Ex: 6, 8, 14 *no*

$$6 + 8 = 14$$

not > 14



Given two sides, find the possible lengths of the third side.

Ex: 8 ft, 14 ft, n ft

$$8 + 14 > n$$

$$22 > n$$

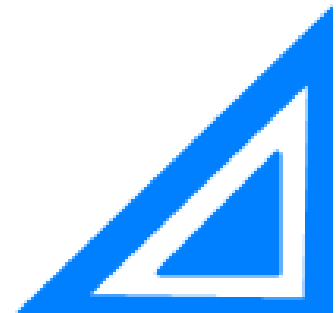
$$n < 22$$

$$\begin{array}{r} \cancel{8} + n > 14 \\ -8 \quad -8 \end{array}$$

$$n > 6$$

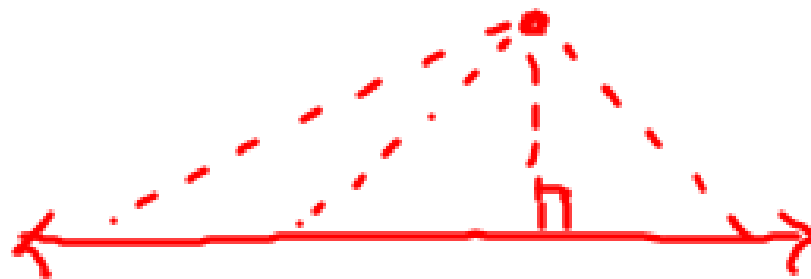
$$\begin{array}{r} n + \cancel{14} > 8 \\ -14 \quad -14 \end{array}$$

$$n < \cancel{-6}$$



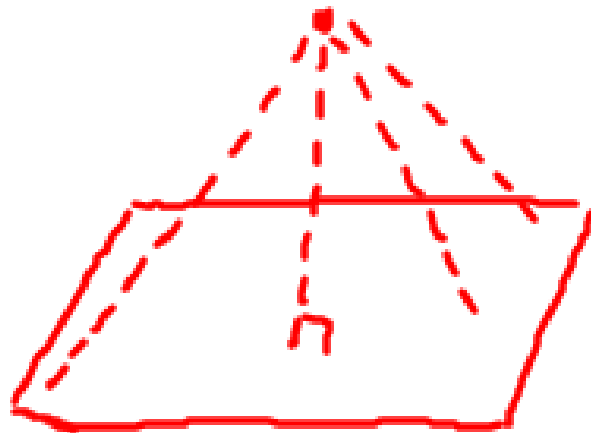
Theorem 5.12:

The perpendicular segment from a point to a line is the shortest segment from the point to the line.



Corollary 5.1:

The perpendicular segment from a point to a plane is the shortest segment from the point to the plane.



Homework:

5 - 4 WS

