Properties and Constructions of Triangles

Review: Triangles

All Triangles have 3 sides.



For \triangle ABC below, the three sides are:



All Triangles have 3 interior angles.



Review: Triangles

All Triangles have 3 vertices. Forr AABC :



The angles in the Triangle can be named as follows:



Review: Triangles

Also, notice that:

 $\mathbf{A} = \mathbf{B} \mathbf{C}$ $\mathbf{B} \mathbf{C}$ $\mathbf{B} \mathbf{C}$ $\mathbf{B} \mathbf{C}$ \mathbf{C}



Review: Angles in Triangles

For all triangles, the sum of the interior angles is 180°. So, for $\triangle ABC$,



Review: Angles in Triangles (Example)

Given $\triangle ABC$ below, determine the measure of $\angle C$



Review: Side Lengths in Triangles

For all triangles, the sum of the two side lengths must always be greater than the third side.

Review: Side Lengths in Triangles (Example)

KS.



 $m\overline{AB} + m\overline{BC} > m\overline{AC}$ 6cm + 8cm > 10cm14cm > 10cm

14cm is bigger than 10cm

Constructing a Triangle

You can construct a Triangle if you are given the following:

Scenario 1: All three sides of the triangle

Scenario 2: Two side lengths and the angle between those sides

Scenario 3: Two angles and the side length between those angles

Example 1: Scenario 1

Construct $\triangle ABC$ according to the following information.

$$m\overline{AB} = 3.5cm$$
$$m\overline{BC} = 4.5cm$$
$$m\overline{AC} = 5cm$$

First, we will use $m\overline{AC} = 5$ cm to be the base of $\triangle ABC$

Example 1 - Continued

Since *mAB* = **3.5cm**, make an arc from point A with your compass that has a radius of **3.5cm**



Next, since *mBC* = **4.5cm**, make an arc from point C with your compass that has a radius of **4.5cm**



Example 1 – continued

Place point B where the two arcs meet.



Finally connect point A to point B and point B to point C.



Scenario 2: Example 2

Construct $\triangle ABC$ according to the following information.

$$m\overline{BC} = 4.4cm$$
$$m\overline{AC} = 3.7cm$$
$$\angle C = 35^{\circ}$$

First, we will use $\overline{mBC} = 4.4$ cm to be the **base** of $\triangle ABC$

-		-
в	4.4cm	С

Example 2: Continued

Next, use a **protractor** to construct $\angle C = 35^{\circ}$

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Next, place **point A 3.7cm** from **point C** on the new line that we drew.



Example 2: Continued

Finally, connect point A to point B.



This is $\triangle ABC$.

Scenario 3: Example 3

Construct triangle ABC according to the following information:

mAB = 4.8cm $\angle A = 20^{\circ}$

∠B = 30°

Can we find the measurement of $\angle C$? How?

Example 3: Continued



Place **point C** where the two lines meet.



Example 3: Continued

