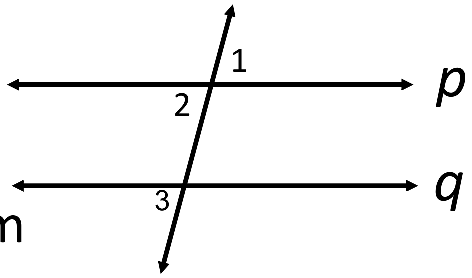
Given: $p // q$

Prove the Alternate Exterior Angles Theorem



Statements	Reasons
1. $p // q$	1. Given
2. $\angle 2 \cong \angle 3$	2. Parallel lines Post.
3. $\angle 2 \cong \angle 1$	3. Vert. $\angle$'s theo.
4. $\angle 1 \cong \angle 3$	4. Transitive Prop. of $\cong$.

<u>Classification of Triangles</u>

By Sides:

Scalene - No sides congruent

Isosceles - At least two sides are congruent

Equilateral - All 3 sides are congruent

By Angles:

Acute - All three angles are acute

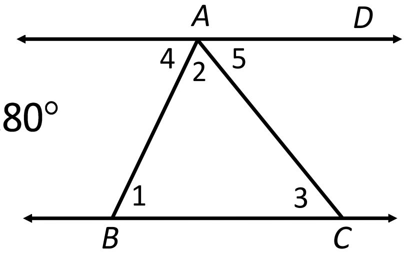
Right - One of the angles is a right angle

Obtuse - One of the angles is an obtuse angle

Equiangular - All 3 angles are congruent

Given: $\overleftrightarrow{AD} \,//\, \overleftrightarrow{BC}$

Prove: $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$



Statements	Reasons
1. $\overleftrightarrow{AD} \,//\, \overleftrightarrow{BC}$	1. Given
2. $\angle 1 \cong \angle 4$	2. Alt. int. ∠'s Theo.
3. $\angle 3 \cong \angle 5$	3. Alt. int. ∠s theo.
4. $m\angle 4 + m\angle 2 + m\angle 5 = 180^\circ$	4. Assume from diagram.
5. $m\angle 1 = m\angle 4$, $m\angle 3 = m\angle 5$	5. Definition of ≅.
6. $m\angle 1 + m\angle 2 + m\angle 3 = 180$.	6. Substitution Prop.

Triangle Sum Theorem

In any triangle, the sum of the measures of the interior angles will always equal 180°

$80+55+y=180^\circ$

$\boxed{y=45^\circ}$

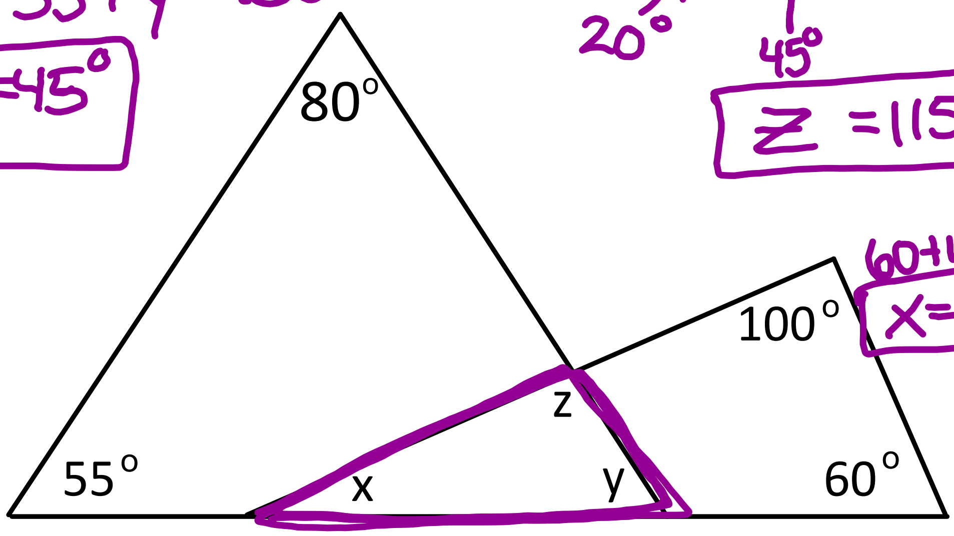
$x+y+z=180^\circ$

20° 45°

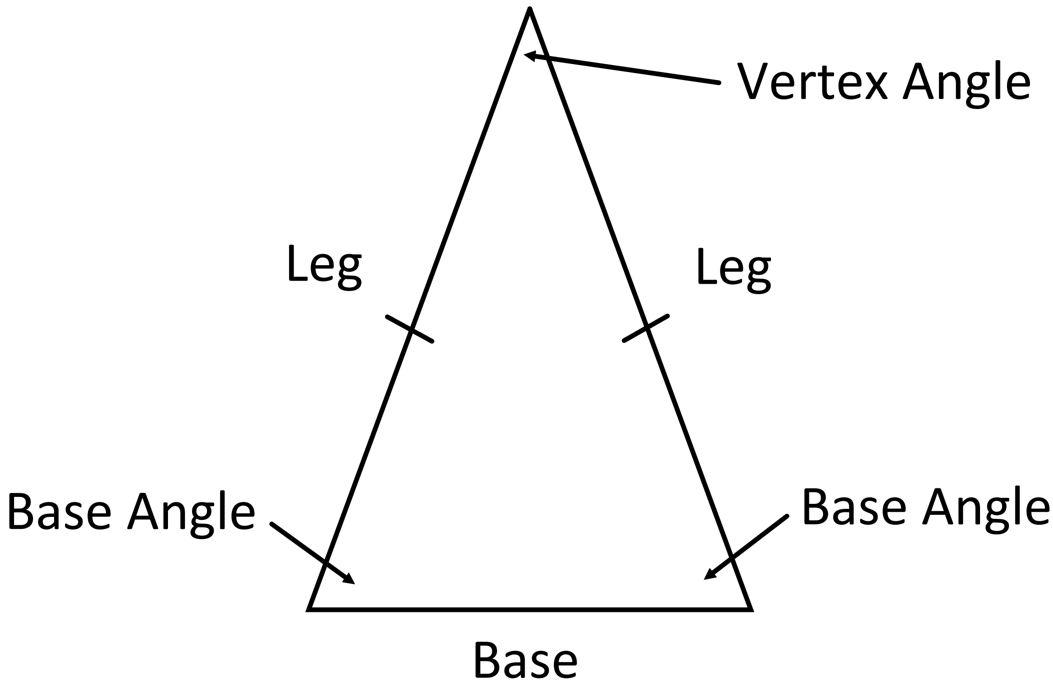
$\boxed{z=115^\circ}$

$60+100+x=180$

$\boxed{x=20^\circ}$

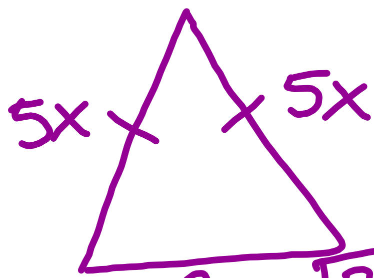


Parts of an Isosceles Triangle



The lengths of the base and a leg of an isosceles triangle are in the ratio of 2:5. If the perimeter of the triangle is 132 cm, find the length of the base of the triangle.

$2:5$
$4:10$
$20:50$
$2x:5x$

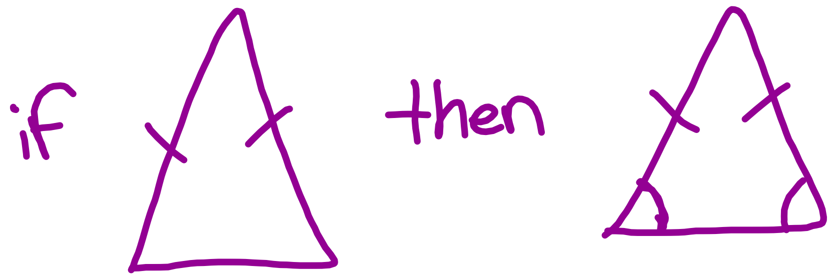


$2x = \boxed{22cm}$

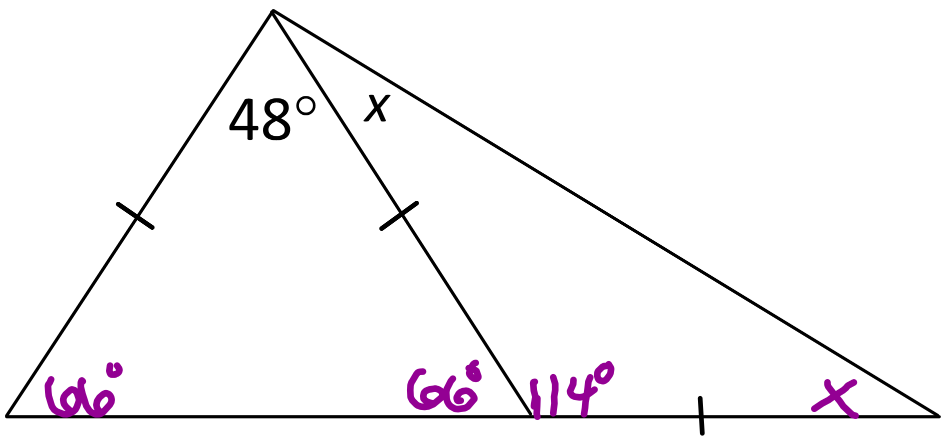
$2x + 5x + 5x = 132$
$12x = 132$
$x = 11$

<u>Base Angles Theorem</u>

In any isosceles triangle, the base angles are congruent



Find x



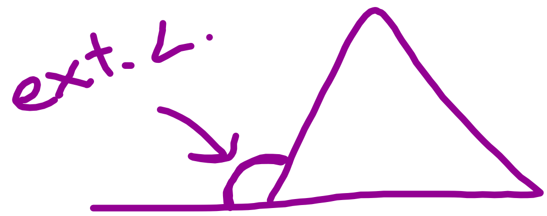
$$\frac{132^\circ}{2} = 66^\circ$$

$$\frac{66^\circ}{2} = x$$

$$\boxed{x = 33}$$

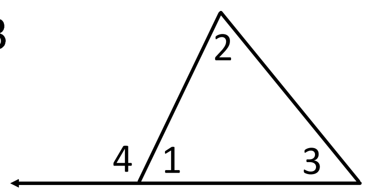
Exterior Angle of a Triangle

An angle formed outside of a triangle, adjacent to one of the sides, when one of the sides of the triangle is extended



Given: $\angle 4$ is an exterior angle of the triangle

Prove: $m\angle 4 = m\angle 2 + m\angle 3$

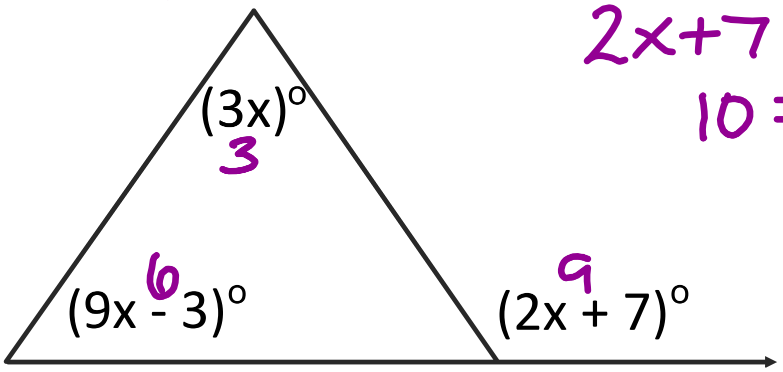


Statements	Reasons
1. $\angle 4$ is an ext. $\angle$ of $\triangle$	1. Given
2. $m\angle 4 + m\angle 1 = 180°$	2. Linear Pair Post.
3. $m\angle 1 + m\angle 2 + m\angle 3 = 180°$	3. $\triangle$ sum theo.
4. $m\angle 4 + m\angle 1 = m\angle 1 + m\angle 2 + m\angle 3$	4. Transitive Prop. of =.
5. $m\angle 4 = m\angle 2 + m\angle 3$	5. Subtraction Prop of =.

Exterior Angle Equality Theorem

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles

non-adjacent



$2x+7=3x+(9x-3)$

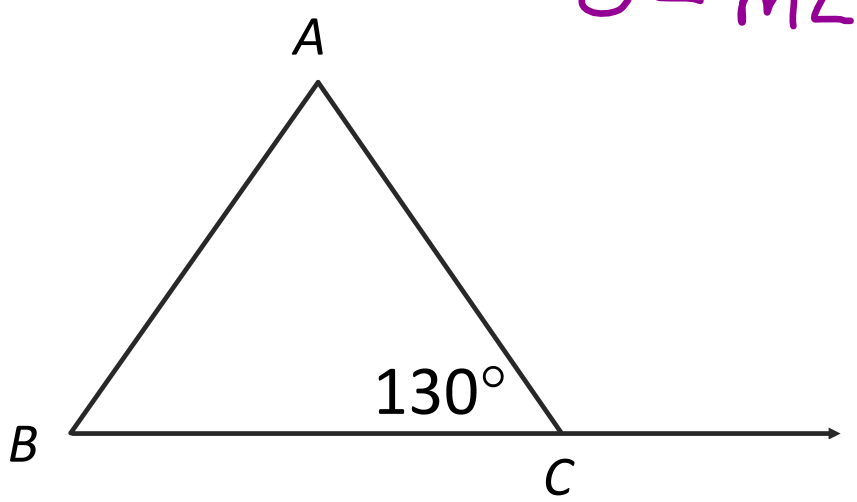
$2x+7=12x-3$

$10=10x$

$\boxed{x=1}$

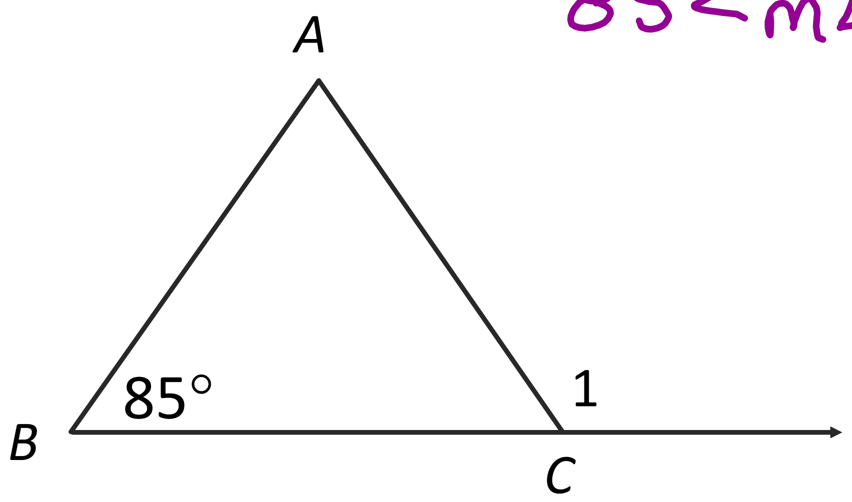
Find the restrictions on $m\angle A$

$0 < m\angle A < 50°$



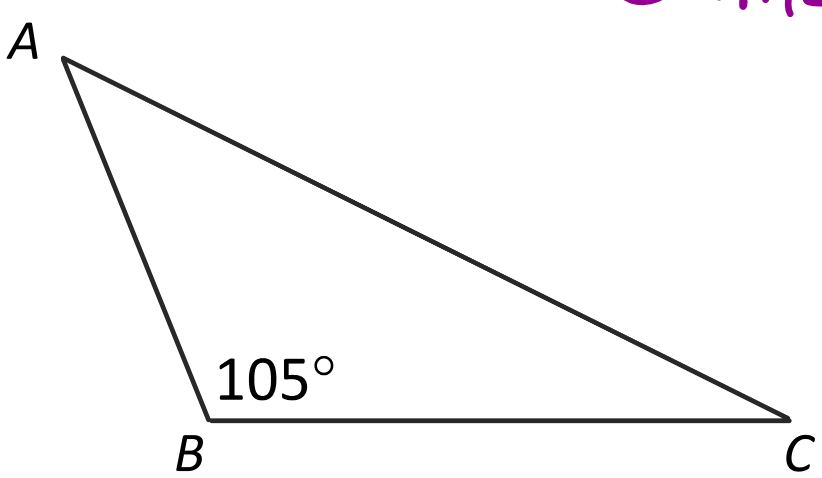
Find the restrictions on $m\angle 1$

$85^\circ < m\angle 1 < 180^\circ$

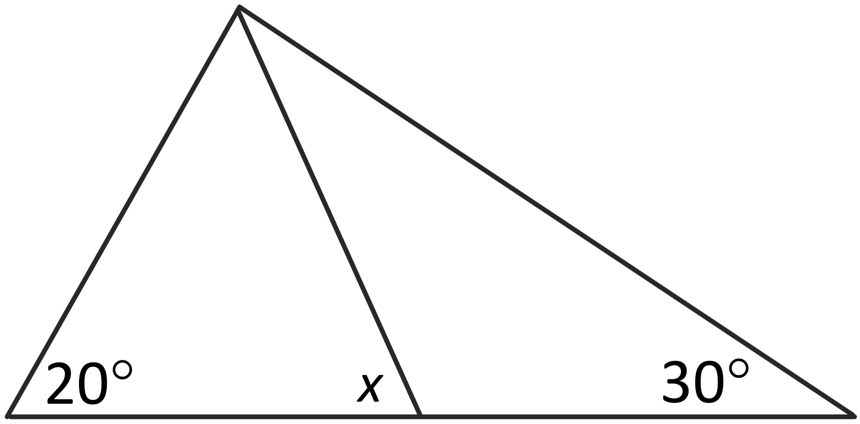


Find the restrictions on $m\angle A$

$0^\circ < m\angle A < 75^\circ$



Find the restrictions on *x*



to meet this criteria $< 160°$

to meet this Δ criteria, must be $> 30°$

$$30° < x < 160°$$