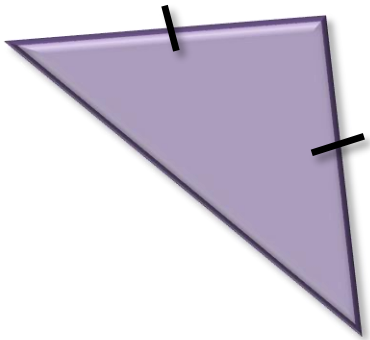
Angles of Triangles

Section 5.1

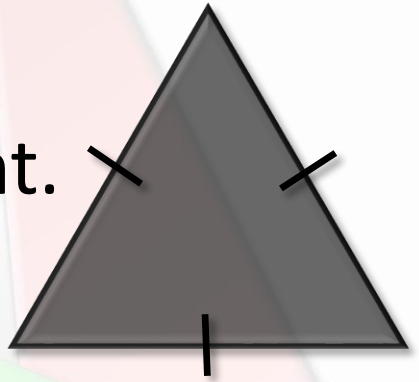
Classifying Triangles by Sides

- **Scalene** triangle – no side congruent.



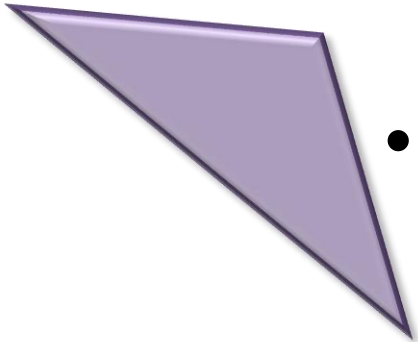
- **Isosceles** triangle – two sides congruent.

- **Equilateral** triangle – all sides congruent.



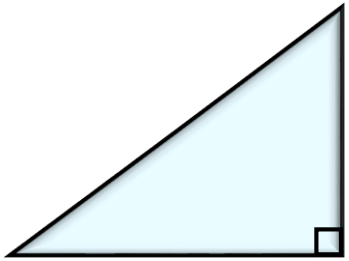
Classifying Triangles by Angles

- **Acute** triangle – 3 acute angles.



- **Obtuse** triangle – 1 obtuse angle.

- **Equiangular** triangle – 3 congruent angles.



- **Right** triangle – 1 right angle.

Classifying Triangles in a Plane

Classify $\triangle ABC$ by its sides. Then determine whether it is a right triangle.

Scalene

$a^2+b^2=c^2$

$(\sqrt{40})^2+(\sqrt{17})^2 \stackrel{?}{=} \sqrt{53}^2$

$40+17 \stackrel{?}{=} 53$

not a right $\triangle$.

$AB = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$\sqrt{(7)^2+(1-3)^2}$

$\sqrt{49+4}$

$BC = \sqrt{(7-1)^2+(1+1)^2}$

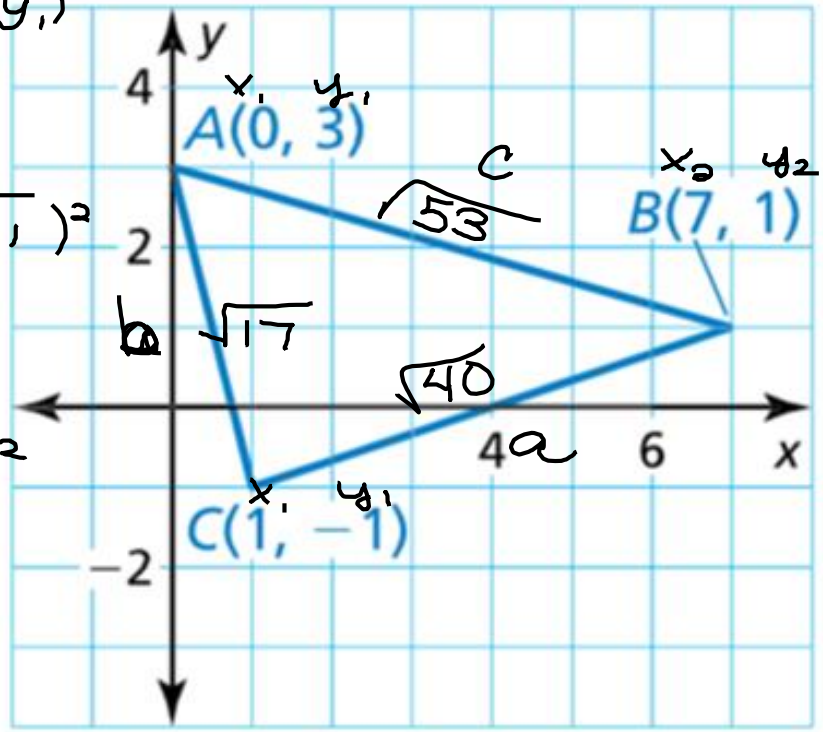
$\sqrt{36+4}$

$\sqrt{40}$

$AC = \sqrt{(1-0)^2+(-1-3)^2}$ $(-4)^2$

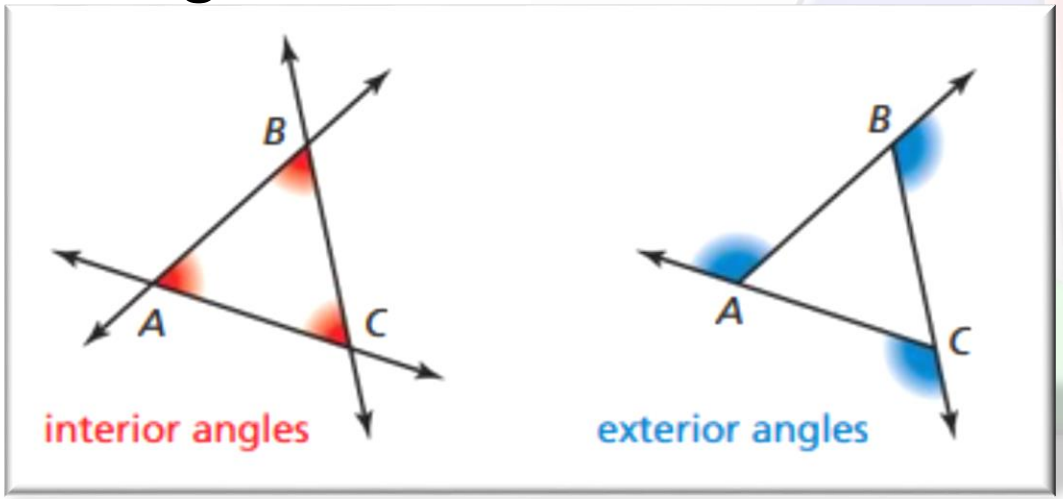
$\sqrt{1+16}$

$\sqrt{17}$



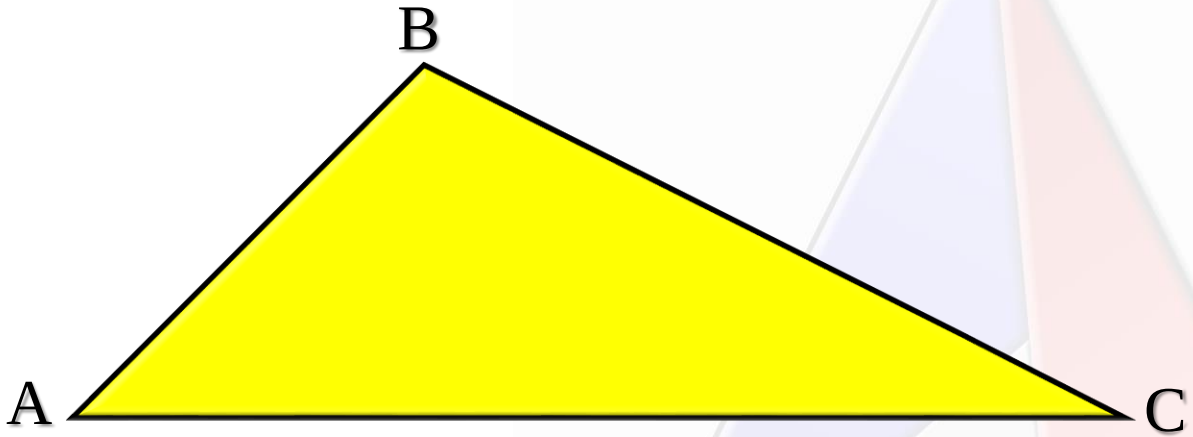
Angles of a Triangle

- When sides of a triangle are extended, other angles are formed.
  - **Interior Angles:** The original angles of the triangle.
  - **Exterior Angles:** The angles that form linear pairs with the interior angles



Triangle Sum Theorem

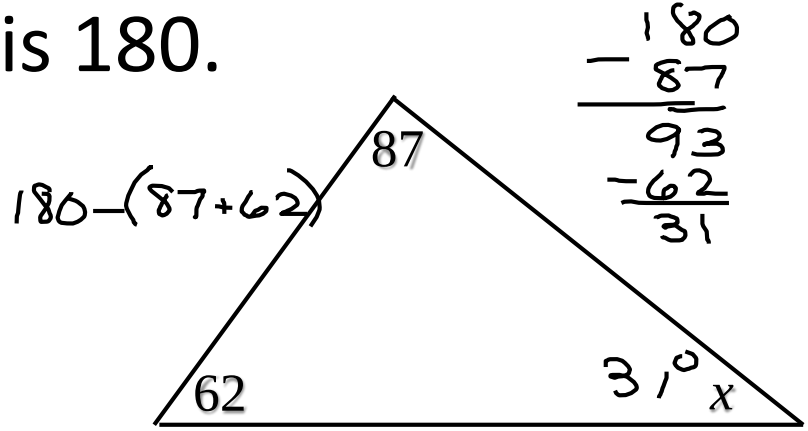
- The sum of the measures of the angles of a triangle is 180°.



$$m\angle A + m\angle B + m\angle C = 180$$

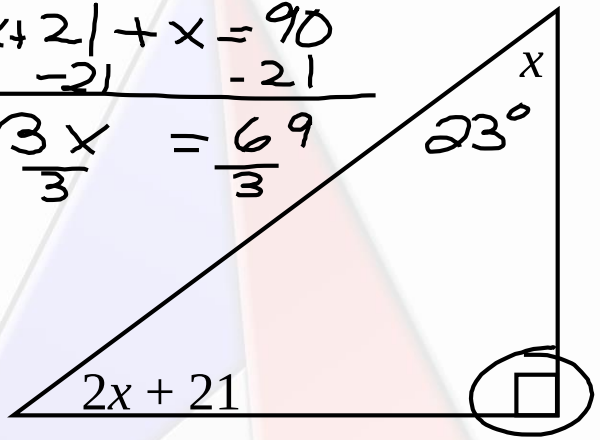
Triangle Sum Theorem

- The sum of the measures of the angles of a triangle is 180.



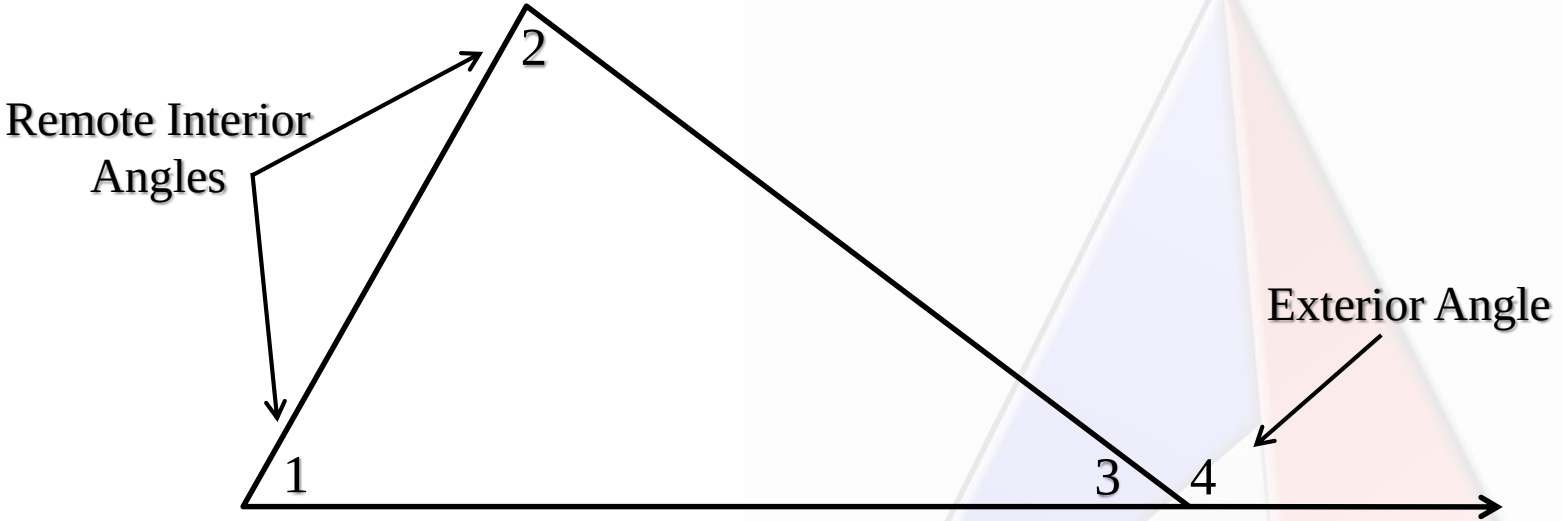
$$\begin{array}{r} 180 \\ -\ 87 \\ \hline 93 \\ -62 \\ \hline 31 \end{array}$$

$$\begin{array}{r} 2x+21+x=90 \\ -21 \quad -21 \\ \hline 3x = 69 \\ \frac{3x}{3} = \frac{69}{3} \end{array}$$

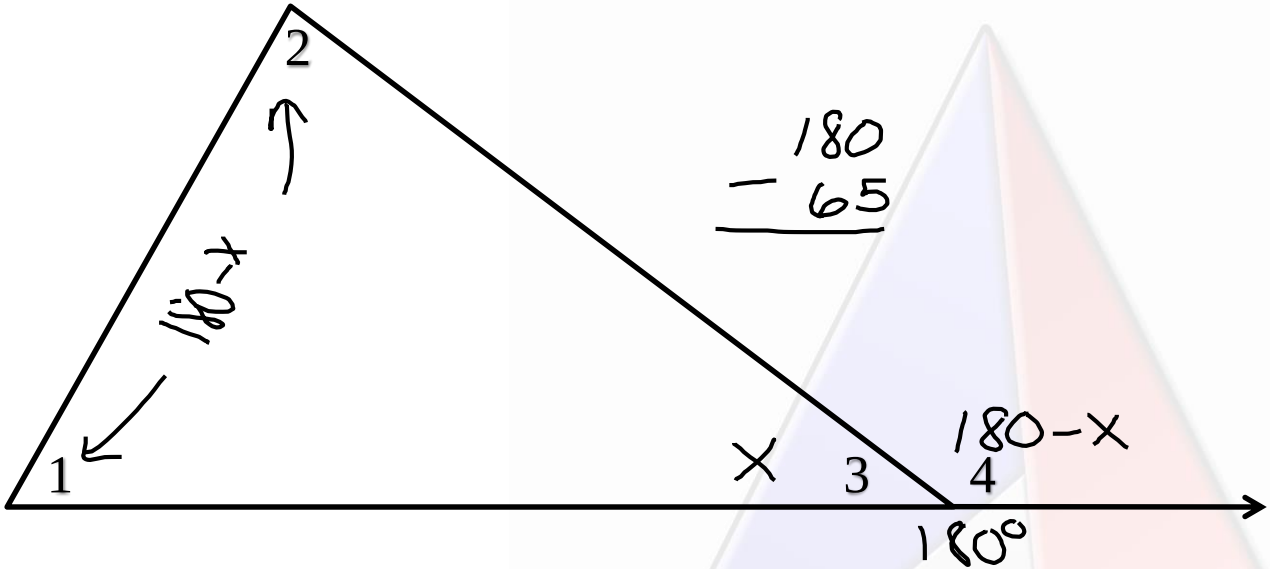


- **Corollary:** The acute angles of a right triangle add up to 90˚.

Exterior & Remote Interior Angles

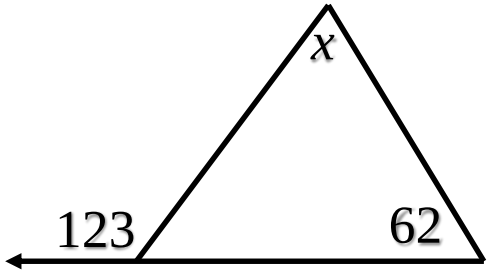


Exterior Angle Theorem

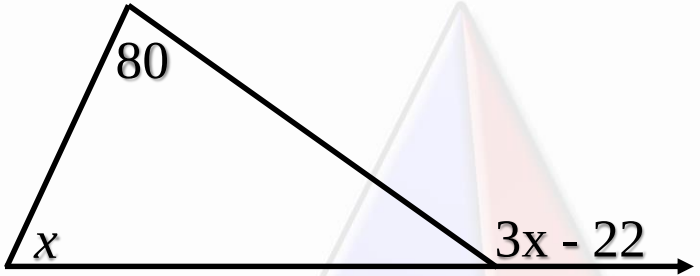


$m\angle 1 + m\angle 2 = m\angle 4$

Exterior Angle Theorem



$$123 = x + 62$$
$$-62 \quad -62$$
$$61^\circ = x$$



$$3x - 22 = 80 + x$$
$$-x \quad +22 \quad +22 - x$$
$$2x = 102$$
$$x = 51^\circ$$

Lesson 5.1 p.236; 3-8, 12-24e, 29-36