**Classify Triangles by Angles** Recall that a triangle is a three-sided polygon. Triangle $ABC$, written $\triangle ABC$, has parts that are named using $A$, $B$, and $C$.

The sides of $\triangle ABC$ are $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$.

The vertices are points $A$, $B$, and $C$.

The angles are $\angle BAC$ or $\angle A$, $\angle ABC$ or $\angle B$, and $\angle BCA$ or $\angle C$.

Triangles can be classified in two ways—by their angles or by their sides. All triangles have at least two acute angles, but the third angle is used to classify the triangle.

### Key Concept: Classifications of Triangles by Angles

- **Acute Triangle**: 3 acute angles
- **Equiangular Triangle**: 3 congruent acute angles
- **Obtuse Triangle**: 1 obtuse angle
- **Right Triangle**: 1 right angle

An equiangular triangle is a special kind of acute triangle.

When classifying triangles, be as specific as possible. While a triangle with three congruent acute angles is an acute triangle, it is more specific to classify it as an equiangular triangle.

### Example 1: Classifying Triangles by Angles

Use the best description to classify each triangle: acute, equiangular, obtuse, or right. Explain.

1. [Image of an acute triangle with angles 70°, 70°, and 40°]
2. [Image of a right triangle with angles 90°, 60°, and 30°]
3. [Image of an obtuse triangle with angles 97°, 49°, and 34°]
4. [Image of an equiangular triangle with angles 60°, 60°, and 60°]
Example 2: Classify Triangles by Angles Within Figures

5. Classify $\triangle PQR$ as acute, equiangular, obtuse, or right. Explain your reasoning.

6. Classify $\triangle PQS$ as acute, equiangular, obtuse, or right. Explain your reasoning.

Example 3: Classify Triangles by Sides

7. Classify the sound box of the Russian lute as equilateral, isosceles, or scalene.
8. Classify the button by its sides.

Example 4: Classify Triangles by Sides Within Figures

9. If point M is the midpoint of $\overline{JL}$, classify $\triangle JKM$ as equilateral, isosceles, or scalene. Explain.

10. Classify $\triangle KML$ as equilateral, isosceles, or scalene. Explain.

Example 5: Finding Missing Values

11. Find the measures of the sides of isosceles triangle ABC.

\[
\begin{align*}
4x + 1 &= 5x - 0.5 \\
4x - 4x &= 5x - 0.5 - 1 \\
-4x &= x - 0.5 \\
-4x + 0.5 &= x \\
8 &= x - 0.5 + 0.5 \\
8 &= x \\
AC &= 4(1.5) + 1 = 7 \\
CB &= 7 \\
AB &= 9(1.5) - 1 = 12.5
\end{align*}
\]

12. Find the measures of the sides of equilateral triangle FGH.

\[
\begin{align*}
2y + 5 &= 3y - 3 \\
2y + 5 &= 3y - 3 \\
\frac{2y + 5}{3} + 3 &= 3y - 3 \\
\frac{8y}{3} &= y \\
2y + 5 &= 3y - 3 \\
2y + 5 &= 3y - 3 \\
5y &= 21 \\
FH &= 21
\end{align*}
\]