Classifying Triangles & Triangle Angle Theorems

Geometry Worksheet · Grade 7–9

Name: _____ Date: _____

Learning Objectives

- Classify triangles by their angles (acute, right, obtuse, equiangular) and by their sides (scalene, isosceles, equilateral)
- Identify and apply the Triangle Angle Sum Theorem to find missing angle measures
- Use geometric notation correctly to name sides, angles, and vertices of a triangle

Problems

1. A triangle has three angles each measuring 60°. What type of triangle is this classified as according to its angles?

$$60^\circ + 60^\circ + 60^\circ = 180^\circ$$

2. In triangle PQR, which angle is opposite side PQ?

$$\triangle PQR$$

3. A triangle has one angle measuring 110°. Classify this triangle by its angles.

$$110^\circ > 90^\circ$$

4. In triangle ABC, side AC is included between which two angles?

$$\triangle ABC$$

5. All three angles of a triangle are less than 90°. What type of triangle is it?

$$\angle A < 90^\circ,\ \angle B < 90^\circ,\ \angle C < 90^\circ$$

6. Using the Triangle Angle Sum Theorem, find the missing angle x in a triangle where the other two angles measure 45° and 85°.

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$$45^\circ + 85^\circ + x = 180^\circ$$

7. In triangle EBA, list all three vertices and one possible correct way to name the triangle using those vertices.

$\triangle EBA$

8. A triangle has one angle measuring exactly 90°. Classify this triangle by its angles and find the sum of the remaining two angles.

$$90^\circ + \angle A + \angle B = 180^\circ$$

9. Two angles of a triangle are congruent and each measures 40°. Classify the triangle by its angles and find the third angle.

$$40^\circ + 40^\circ + x = 180^\circ$$

10. In triangle PQR, the measure of angle P is (3x + 5)°, angle Q is (2x – 10)°, and angle R is (x + 15)°. Find the value of x and classify the triangle by its angles.

$$(3x + 5) + (2x - 10) + (x + 15) = 180$$

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Classifying Triangles & Triangle Angle Theorems — Answer Key

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Answer Key

1. Answer: Equiangular triangle

- All three angles are equal (each 60°), so all angles are congruent.
- A triangle with all equal angles is called an equiangular triangle.

2. Answer: Angle R

- Side PQ connects vertices P and Q.
- The angle opposite a side is located at the vertex NOT on that side, which is vertex R.

3. Answer: Obtuse triangle

- An obtuse angle is any angle greater than 90°.
- Since one angle measures 110°, the triangle is classified as an obtuse triangle.

4. Answer: Angle A and Angle C

- An included side is the side that lies between two angles.
- Side AC connects vertex A and vertex C, so it is included between angle A and angle C.

5. Answer: Acute triangle

- An acute angle measures less than 90°.
- Since all three angles are less than 90°, the triangle is an acute triangle.

6. Answer: 50°

- The sum of all angles in a triangle equals 180°.
- x = 180° – 45° – 85° = 50°.

7. Answer: Vertices: E, B, A — e.g., ■ABE or ■BAE

- The vertices are the three non-collinear points that form the triangle: E, B, and A.
- The triangle can be named using any order of those three letters, such as ■ABE or ■BAE, as long as all three vertices are included.

8. Answer: Right triangle; remaining angles sum to 90°

- A triangle with one 90° angle is classified as a right triangle.
- The remaining two angles must sum to 180° – 90° = 90°.

9. Answer: Acute triangle; third angle = 100° — wait, 100° > 90°, so Obtuse triangle; third angle = 100°

- x = 180° – 40° – 40° = 100°.
- Since one angle (100°) is greater than 90°, the triangle is an obtuse triangle.

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10. Answer: x = 28.33°; angles ≈ 90°, 46.67°, 43.33° → Right triangle

- Combine like terms: 6x + 10 = 180, so 6x = 170, giving x = \frac{170}{6} \approx 28.33.
- Angle P = 3(28.33)+5 ≈ 90°, Angle Q = 2(28.33)–10 ≈ 46.67°, Angle R = 28.33+15 ≈ 43.33°; since one angle is approximately 90°, this is a right triangle.

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