Year 7 · Geometry: Sorting Triangles

Name: _____ Date: _____

Kia ora! This sheet helps you name triangles two ways, by their angles and by their sides. Grab a pencil and let's classify some shapes!

Warm-up

1. Name the type of triangle that has one right angle (a 90° corner).

2. How many sides of an equilateral triangle are equal in length?

3. A triangle has one angle that is bigger than 90°. What is this type called?

4. An isosceles triangle has how many equal sides?

Practice

5. A triangle has angles of 60°, 60° and 60°. Classify it by BOTH its angles and its sides.

6. A triangle has angles of 90°, 45° and 45°. Classify it by BOTH its angles and its sides.

7. A triangle has side lengths 5 cm, 7 cm and 9 cm, all different, and its largest angle is 100°. Classify it by BOTH its angles and its sides.

8. Aria is cutting a triangular flag for her waka ama club. Two of its angles are 70° and 70°. What is the third angle, and is the flag isosceles?

9. Tane draws a triangle with angles 35°, 55° and 90°. Is this an acute, right or obtuse triangle? Explain.

10. A garden bed at Avondale Primary is shaped like a triangle. All three sides measure 4 m, and one angle is 60°. Classify the triangle by BOTH its sides and its angles, and find the other two angles.

Challenge

11. An isosceles triangle has one angle of 40°. There are TWO different triangles this could be. Find both sets of three angles.

12. Can a triangle be both right (one 90° angle) and equilateral at the same time? Explain your reasoning using angle facts.

Answer key (for parents and tutors)

1. Name the type of triangle that has one right angle (a 90° corner).
   A right triangle. It has exactly one angle measuring 90°.
2. How many sides of an equilateral triangle are equal in length?
   All three sides are equal in length. (Its three angles are also all 60°.)
3. A triangle has one angle that is bigger than 90°. What is this type called?
   An obtuse triangle. It has one angle greater than 90° (an obtuse angle).
4. An isosceles triangle has how many equal sides?
   At least two equal sides. The two angles opposite those equal sides (the base angles) are also equal.
5. A triangle has angles of 60°, 60° and 60°. Classify it by BOTH its angles and its sides.
   By angles: all three are less than 90°, so it is acute. By sides: three equal 60° angles mean three equal sides, so it is equilateral. Answer: an acute, equilateral triangle.
6. A triangle has angles of 90°, 45° and 45°. Classify it by BOTH its angles and its sides.
   By angles: it has one 90° angle, so it is a right triangle. By sides: the two 45° angles are equal, so the two sides opposite them are equal, it is isosceles. Answer: a right, isosceles triangle.
7. A triangle has side lengths 5 cm, 7 cm and 9 cm, all different, and its largest angle is 100°. Classify it by BOTH its angles and its sides.
   By sides: all three sides are different, so it is scalene. By angles: one angle is 100°, which is greater than 90°, so it is obtuse. Answer: an obtuse, scalene triangle.
8. Aria is cutting a triangular flag for her waka ama club. Two of its angles are 70° and 70°. What is the third angle, and is the flag isosceles?
   Angles in a triangle add to 180°. Third angle = 180° − 70° − 70° = 40°. Two angles are equal (70° and 70°), so the sides opposite them are equal, yes, the flag is isosceles.
9. Tane draws a triangle with angles 35°, 55° and 90°. Is this an acute, right or obtuse triangle? Explain.
   It has one angle of exactly 90°, so it is a right triangle. The other angles (35° and 55°) are acute, but a single 90° angle makes it a right triangle.
10. A garden bed at Avondale Primary is shaped like a triangle. All three sides measure 4 m, and one angle is 60°. Classify the triangle by BOTH its sides and its angles, and find the other two angles.
    All three sides are equal, so it is equilateral. Every equilateral triangle has three 60° angles, so the other two angles are also 60° each. Since all angles are less than 90°, it is also acute. Answer: an acute, equilateral triangle with angles 60°, 60°, 60°.
11. An isosceles triangle has one angle of 40°. There are TWO different triangles this could be. Find both sets of three angles.
    Case 1: the 40° angle is the odd angle (the apex), so the two equal base angles share the rest: 180° − 40° = 140°, and 140° ÷ 2 = 70°. Angles: 40°, 70°, 70°. Case 2: the 40° angle is one of the equal base angles, so there are two 40° angles: 40° + 40° = 80°, and the third angle = 180° − 80° = 100°. Angles: 40°, 40°, 100°. Both are valid isosceles triangles.
12. Can a triangle be both right (one 90° angle) and equilateral at the same time? Explain your reasoning using angle facts.
    No. An equilateral triangle must have three equal angles, and since they add to 180°, each is 180° ÷ 3 = 60°. A right triangle needs a 90° angle. Because an equilateral triangle's angles are all 60°, it can never contain a 90° angle. So a triangle cannot be both right and equilateral.