

All types of triangles in geometry

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The different types of triangles are classified according to the length of their sides and as per the measure of the angles. The triangle is one of the most common shapes and is used in construction for its rigidity and stable shape. Understanding these properties allows us to apply the ideas in many real-world problems. What are the Different Types of Triangles? There are different types of triangles in math that can be distinguished based on their sides and angles. Classifying Triangles The characteristics of a triangle's sides and angles are used to classify them. The different types of triangles are as follows: Types of Triangle Based on Sides Types of Triangles Based on Angles Equilateral Triangle Acute-Angled Triangle (Acute Triangle) Isosceles Triangle Right-Angled Triangle (Right Triangle) Scalene Triangle Obtuse-Angled Triangle (Obtuse Triangle) Types of Triangles Based on Sides On the basis of side lengths, the triangles are classified into the following types: Equilateral Triangle: A triangle is considered to be an equilateral triangle when all three sides have the same length. Isosceles triangle: When two sides of a triangle are equal or congruent, then it is called an isosceles triangle. Scalene triangle: When none of the sides of a triangle are equal, it is called a scalene triangle. Types of Triangles Based on Angles On the basis of angles, triangles are classified into the following types: Acute Triangle: When all the angles of a triangle are acute, that is, they measure less than 90°, it is called an acute-angled triangle or acute triangle. Right Triangle: When one of the angles of a triangle is 90°, it is called a right-angled triangle or right triangle. Obtuse Triangle: When one of the angles of a triangle is an obtuse angle, that is, it measures greater than 90°, it is called an obtuse-angled triangle or obtuse triangle. Types of Triangle Based on Sides and Angles The different types of triangles are also classified according to their sides and angles as follows: Equilateral or Equiangular Triangle: When all sides and angles of a triangle are equal, it is called an equilateral or equiangular triangle. Isosceles Right Triangle: A triangle in which 2 sides are equal and one angle is 90° is called an isosceles right triangle. So, in an isosceles right triangle, two sides and two acute angles are congruent. Obtuse Isosceles Triangle: A triangle in which 2 sides are equal and one angle is an obtuse angle is called an obtuse isosceles triangle. Acute Isosceles Triangle: A triangle in which all 3 angles are acute angles and 2 sides measure the same is called an acute isosceles triangle. Right Scalene Triangle: A triangle in which any one of the angles is a right angle and all the 3 sides are unequal, is called a right scalene triangle. Obtuse Scalene Triangle: A triangle with an obtuse angle with sides of different measures is called an obtuse scalene triangle. Acute Scalene Triangle: A triangle that has 3 unequal sides and 3 acute angles is called an acute scalene triangle. Important Notes: Here is a list of a few points that should be remembered while studying the types of triangles: In an equilateral triangle, each of the three internal angles is 60°. The three internal angles in a triangle always add up to 180°. All triangles have two acute angles. When all the sides and angles of a triangle are equal, it is called an equilateral or equiangular triangle. Related Topics: Example 1: If each vertex angle of a triangle measures 60°, identify the type of triangle based on triangle properties. Solution: It is given that all the interior angles of the given triangle measure 60° each. We know that all the angles in an equilateral triangle measure the same and they sum up to 180°, hence, each angle measures 60°. Therefore, the given triangle is an equilateral triangle. Example 2: The length of the two sides of a triangle is equal. Identify the type of triangle. Solution: In an isosceles triangle, the length of the two sides is equal. Therefore, the given triangle can be identified as an isosceles triangle. Example 3: If all the angles of a triangle are less than 90°, what type of triangle is it called? Solution: If all the angles of a triangle are less than 90°, it is called an acute triangle. Show Answer > go to slidego to slidego to slide Ready to see the world through math's eyes? Math is a life skill. Help your child perfect it through real-world application with Cuemath. Book a Free Trial Class FAQs on Types of Triangles There are six types of triangles in geometry. They can be classified according to 2 groups. Based on their sides, the 3 triangles are classified as equilateral triangles, isosceles triangles, and scalene triangles. Based on their angles, the 3 types of triangles are listed as, acute triangle, obtuse triangle, and right-angled triangle. Thus, there are six types of triangles in geometry. What are the 3 Types of Triangles Based on their Angles? On the basis of angles, triangles are classified into acute triangle, right triangle, and obtuse triangle. Acute triangle: In an acute triangle, all the angles measure less than 90°. Right Triangle: When one angle of a triangle measures 90°, it is called a right-angled triangle. Obtuse Triangle: When one of the angles of a triangle is an obtuse angle, it is called an obtuse-angled triangle. What are the Types of Triangles Based on Sides? On the basis of sides, triangles are classified into 3 types. Equilateral triangle: When all three sides have the same length, the triangle is considered to be an equilateral triangle. Isosceles triangle: If two sides of a triangle are equal, it is called an isosceles triangle. Scalene triangle: If all the sides of a triangle are of different lengths, it is called a scalene triangle. Which Types of Triangles Have 3 Lines of Symmetry? All equilateral triangles have 3 lines of symmetry can pass through the vertex of this triangle. Which Types of Triangles Have Reflection Symmetry? All equilateral and isosceles triangles have reflection symmetry. What are the 6 Types of triangles? The 6 types of triangles can be listed as, acute triangle, obtuse triangle, right triangle, equilateral triangle, isosceles triangle, and scalene triangle. Triangles are such a common shape in our everyday lives, but have you ever noticed how some triangles seem to look more similar than others? Well, ancient mathematicians noticed too, and over the years it has come to be accepted that there are four classifications of triangles. Triangle Classifications define triangles by their geometrical properties. These classifications are equilateral, isosceles, right-angled, and scalene. However, before we start classifying triangles, we must first discuss exactly what these properties are that define the classification of a given triangle. Types of Triangles Properties As discussed previously, triangles are classified by their geometric properties. The two geometric properties by which triangles are classified are the sides' lengths and interior angles. As can be seen in the diagram below, the interior angles of the triangle are the enclosed angles formed by each pair of the triangle's sides. These angles are denoted by α and β (lowercase Greek letters). It is true of all triangles that their interior angles add up to Each side of the triangle has a length, denoted by a , and The individual lengths of these sides do not determine the triangle's classification, in fact, they can have any length at all. It is in fact the length of the sides compared to each other that is important. A triangle highlighting its interior angles and side lengths. StudySmarter Originals With these two geometric properties, it is possible to put any triangle into one of our four classifications, and in many cases, we only need one or the other! Definitions of Types of Triangles As previously stated, the four types of triangles are equilateral, isosceles, scalene and right-angled. Each of these is a triangle you will have come across before, but maybe didn't know it! So let's see just what each of them is. Equilateral Triangles The most simple classification of a triangle is the equilateral triangle. The name here hints at how this type of triangle is defined. Equi is a common prefix arising from the adjective equal, and so words beginning with this prefix often describe things that are equal. For instance, if two shops are equidistant from where you are, it means they are each the same distance away. Equilateral triangles are no different! An equilateral triangle is a triangle with three sides of equal length. Consequently, the interior angles of an equilateral triangle are also equal to one another. The triangle below is an equilateral triangle, immediately we can tell this by the single dashes on each side which signify that the sides are of equal length, i.e., $a = b = c$. The interior angles of the triangle can also be seen to be equal, with each being, but is this always the case? An equilateral triangle, characterised by its three equal sides and three equal interior angles. StudySmarter Originals As we know, a triangle's interior angles will always all add up to Let's say that each angle in the equilateral triangle is x . Dividing both sides by three we can find the value of x . So there we have it, the interior angles of an equilateral triangle are always each 60° . Isosceles Triangles The next type of triangle we will look at is the isosceles triangle. Similar to equilateral triangles, we can spot an isosceles triangle by the length of its sides or by the size of its interior angles. An isosceles triangle is a triangle with two sides of equal length, and a third of a different length. Consequently, only two of the interior angles of an isosceles triangle are equal. The triangle below is an isosceles triangle. In this case, the dashes indicate that only the sides a and b are equal. The interior angles and can be seen to be equal, but not the angle α . An isosceles triangle, characterised by its two equal sides and two equal angles. StudySmarter Originals So, we've seen equilateral triangles, which have three equal sides, and isosceles triangles which have two equal sides, so what will be the case for scalene triangles? You guessed it, they have no equal sides! A scalene triangle is a triangle with no sides of equal length. Consequently, none of the interior angles are equal. The triangle below is a scalene triangle. As such, it has no dashes indicating equal sides. A scalene triangle, characterised by its lack of equal sides or interior angles. StudySmarter Originals Right-Angled Triangles The final type of triangle is a right-angled triangle. Unlike the previous types of triangles discussed, right-angled triangles are not defined by the number of equal sides or the number of equal angles. In fact, the only thing that a triangle needs to possess to be right-angled, is one interior angle equalling 90° . In other words, it must possess a right angle. This means that a right-angled triangle will also be either an isosceles triangle or a scalene triangle. A right-angled triangle is a triangle possessing one interior angle of 90° . Its other two interior angles may be equal or not equal, and it may have two or zero equal sides. The triangle below is a right-angled triangle. This can be instantly recognised by the box in place of the usual angle segment, denoting a right angle. A right-angled triangle, characterised by its single right interior angle. StudySmarter Originals Right-angled triangles are extremely important in maths, why not head over to our explanations on Pythagoras' Theorem and Trigonometry to really learn about what makes them special! Types of Triangles Examples Now, let's see if we can use what we've learnt to try and classify some triangles. What triangle classification does each of the triangles below belong to? a) Triangle for question a) with three labelled angles, StudySmarter Originals Solution: This triangle is an isosceles triangle, as it has two angles that are equal, and a third that is not. b) Triangle for question b) with three labelled sides, StudySmarter Originals Solution: This triangle is an equilateral triangle, as it has three sides of equal length. c) Triangle for question c), with two labelled angles, StudySmarter Originals Solution: We are only given two angles for this triangle; however, knowing that the interior angles of a triangle always add up to we can determine the third angle. Firstly, we equate the sum of the three angles to 180° . Then, we substitute the angles we know and rearrange the equation to find α . As the third angle, is a right angle, the triangle is a right-angled triangle. As all three interior angles are different, it is also a scalene triangle. d) Triangle for question d), with three labelled angles, StudySmarter Solution: This triangle is a scalene triangle as none of its interior angles are equal. e) Triangle for question e) with no labelled angles or sides. StudySmarter Originals Solution: The triangle is an isosceles triangle, as it has two sides of the same length, indicated by the two dashes. f) Triangle for question f), with two labelled angles, StudySmarter Solution: In this question, we are given two interior angles which are equal. By remembering that all interior angles in a triangle add up to we can use these two interior angles to find the third angle. First, we equate the three interior angles to 180° . Then, we substitute the angles we know and rearrange the equation to find α . As the triangle has one right interior angle, and two equal interior angles, it must be both an isosceles, and a right-angled triangle. Types of Triangles - Key takeaways Triangles can be classified by comparing the length of their sides, and by comparing the size of their interior angles. There are four types of triangles: equilateral, isosceles, scalene, and right-angled. Equilateral triangles have three equal sides and three equal interior angles. Isosceles triangles have two equal sides and two equal interior angles. Scalene triangles have no equal sides and no equal interior angles. Right-angled triangles have one interior angle of 90° .

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