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Quadrilateral just means "four sides"(quad means four, lateral means side). A quadrilateral has four-sides, it is 2-dimensional (a flat shape), closed (the lines join up), and has straight sides. Drag the points: geometry/images/geom-quad.js?mode=choose (Also see this on Interactive Quadrilaterals) Properties A quadrilateral has: four sides (edges) four vertices (corners) interior angles that add to 360 degrees: Try drawing a quadrilateral, and measure the angles. They should add to 360 Types of Quadrilaterals There are special types of quadrilateral: Some types are also included in the definition of other types! For example a square, rhombus and rectangle are also parallelograms. See below for more details. Let us look at each type in turn: The Rectangle the little squares in each corner mean "right angle" A rectangle is a four-sided shape where every angle is a right angle (90). Also opposite sides are parallel and of equal length. The Square the little squares in each corner mean "right angle" A square has equal sides (marked "s") and every angle is a right angle (90) Also opposite sides are parallel. A square also fits the definition of a rectangle (all angles are 90), and a rhombus (all sides are equal length). The Rhombus A rhombus is a four-sided shape where all sides have equal length (marked "s"). Also opposite sides are parallel and opposite angles are equal. Another interesting thing is that the diagonals (dashed lines) meet in the middle at a right angle. In other words they "bisect" (cut in half) each other at right angles. A rhombus is sometimes called a rhomb or a diamond. The Parallelogram A parallelogram has opposite sides parallel and equal in length. Also opposite angles are equal (angles "A" are the same, and angles "B" are the same). NOTE: Squares, Rectangles and Rhombuses are all Parallelograms! A parallelogram with: all sides equal and angles "A" and "B" as right angles is a square! Trapezoid Isosceles Trapezoid A trapezoid (called a trapezium in the UK) has a pair of opposite sides parallel. And a trapezium (called a trapezoid in the UK) is a quadrilateral with NO parallel sides: Trapezoid Trapezium In the US: a pair of parallel sides NO parallel sides In the UK: NO parallel sides a pair of parallel sides (the US and UK definitions are swapped over!) An Isosceles trapezoid, as shown above, has left and right sides of equal length that join to the base at equal angles. The Kite Hey, it looks like a kite (usually). It has two pairs of sides: Each pair is made of two equal-length sides that join up. Also: the angles where the two pairs meet are equal the diagonals, shown as dashed lines above, meet at a right angle one of the diagonals bisects (cuts equally in half) the other ... and that's it for the special quadrilaterals. The only regular (all sides equal and all angles equal) quadrilateral is a square. So all other quadrilaterals are irregular. Quadrilateral definitions are inclusive. So we include a square in the definition of a rectangle. (We don't say "Having all 90 angles makes it a rectangle except when all sides are equal then it is a square.") This may seem odd, as in daily life we think of a square as not being a rectangle ... but in mathematics it is. Using the chart below we can answer such questions as: Is a Square a type of Rectangle? (Yes) Is a Rectangle a type of Kite? (No) Complex Quadrilaterals Oh Yes! when two sides cross over, we call it a "Complex" or "Self-Intersecting" quadrilateral, like these: They still have 4 sides, but two sides cross over. Polygon A quadrilateral is a polygon. In fact it is a 4-sided polygon, just like a triangle is a 3-sided polygon, a pentagon is a 5-sided polygon, and so on. Play with Them Now that you know the different types, you can play with the Interactive Quadrilaterals. Other Names A quadrilateral can sometimes be called: a Quadrangle ("four angles"), so it sounds like "triangle" a Tetragon ("four polygon"), so it sounds like "pentagon", "hexagon", and so on 621,622,623,624,763,764, 2128, 2129, 3230, 3231 Copyright 2025 Rod Pierce Quadrilateral just means "four sides"(quad means four, lateral means side). A quadrilateral has four-sides, it is 2-dimensional (a flat shape), closed (the lines join up), and has straight sides. Drag the points: geometry/images/geom-quad.js?mode=choose (Also see this on Interactive Quadrilaterals) Properties A quadrilateral has: four sides (edges) four vertices (corners) interior angles that add to 360 degrees: Try drawing a quadrilateral, and measure the angles. They should add to 360 Types of Quadrilaterals There are special types of quadrilateral: Some types are also included in the definition of other types! For example a square, rhombus and rectangle are also parallelograms. See below for more details. Let us look at each type in turn: The Rectangle the little squares in each corner mean "right angle" A rectangle is a four-sided shape where every angle is a right angle (90). Also opposite sides are parallel and of equal length. The Square the little squares in each corner mean "right angle" A square has equal sides (marked "s") and every angle is a right angle (90) Also opposite sides are parallel. A square also fits the definition of a rectangle (all angles are 90), and a rhombus (all sides are equal length). The Rhombus A rhombus is a four-sided shape where all sides have equal length (marked "s"). Also opposite sides are parallel and opposite angles are equal. Another interesting thing is that the diagonals (dashed lines) meet in the middle at a right angle. In other words they "bisect" (cut in half) each other at right angles. A rhombus is sometimes called a rhomb or a diamond. The Parallelogram A parallelogram has opposite sides parallel and equal in length. Also opposite angles are equal (angles "A" are the same, and angles "B" are the same). NOTE: Squares, Rectangles and Rhombuses are all Parallelograms! A parallelogram with: all sides equal and angles "A" and "B" as right angles is a square! Trapezoid Isosceles Trapezoid A trapezoid (called a trapezium in the UK) has a pair of opposite sides parallel. And a trapezium (called a trapezoid in the UK) is a quadrilateral with NO parallel sides: Trapezoid Trapezium In the US: a pair of parallel sides NO parallel sides In the UK: NO parallel sides a pair of parallel sides (the US and UK definitions are swapped over!) An Isosceles trapezoid, as shown above, has left and right sides of equal length that join to the base at equal angles. The Kite Hey, it looks like a kite (usually). It has two pairs of sides: Each pair is made of two equal-length sides that join up. 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Polygon A quadrilateral is a polygon. In fact it is a 4-sided polygon, just like a triangle is a 3-sided polygon, a pentagon is a 5-sided polygon, and so on. Play with Them Now that you know the different types, you can play with the Interactive Quadrilaterals. Other Names A quadrilateral can sometimes be called: a Quadrangle ("four angles"), so it sounds like "triangle" a Tetragon ("four polygon"), so it sounds like "pentagon", "hexagon", and so on 621,622,623,624,763,764, 2128, 2129, 3230, 3231 Copyright 2025 Rod PierceTwo-dimensional (2D) shapes are completely flat.2D shapes can be found printed in a book or on a website.2D shapes have sides and corners.A rectangle has 4 straight sides and 4 corners.A square is a special type of rectangle, where all 4 sides are the same length.Back to topWhy not see how much you know about this topic already? Then, complete the guide and see if you can beat your score.Back to topHere are three lines. They make three sides of a shape.Do you know what shape it will be if you draw another line?Look, if you draw a line straight down and close the shape it makes a rectangle.A rectangle has 4 sides. It has two short sides and 2 long sides.A rectangle also has 4 corners. These are where the lines join together.A corner is also known as a vertex.Rectangles don't all look the same.Here are some more examples. Some have been turned, some are long and thin, others are shorter and wider.Back to topA square is a type of rectangle. It also has 4 sides and 4 corners.The difference is that all of the sides of a square are the same length.Can you count the 4 sides and 4 corners on these squares?Back to topShapes with four sides are known as quadrilaterals.Here are the different types of shapes with 4 sides.They might all look slightly different, but can you see that all these shapes have 4 sides and 4 corners?Back to topWhich of these shapes is the odd one out? Count the number of sides and corners on each of the shapes.Shape A, B and D all have 4 sides and 4 corner.Shape C is a triangle. It has 3 sides and 3 corners, so it is the odd one out.Back to topNow look at these shapes.Which shape is the odd one out? If you count the number of sides and corners on each shape you can work out the answer again.Shape A, B and C all have 4 sides and 4 corners, but can you see that Shape D has 5 sides and 5 corners. This is the odd one out.A shape with 5 sides and 5 corners is called a pentagon.Back to topBack to topLanguage:EnglishCymraegGaeilgeGidhlig Written By Rachana Last Modified 22-06-2023 Suppose any three parts are known out of its six parts, a unique triangle. Some of the measurements of a quadrilateral must be known for the construction of quadrilaterals. As the quadrilateral hasfour sides,four anglesandtwo diagonals Four measurements are not sufficient to draw a unique quadrilateral. To draw a unique quadrilateral, we need \(5\) measures of the quadrilateral. Therefore, a quadrilateral can be drawn if five measurements of the quadrilateral are known. This article shall discuss how to draw a quadrilateral with examples. Since three measurements are enough to draw a triangle, a natural question arises whether four measures would be sufficient to draw a unique four-sided closed figure, a quadrilateral. The answer is no; a quadrilateral has ten parts: four sides, four angles and two diagonals. Therefore, to construct a quadrilateral, we will need data of a minimum of five elements. A unique quadrilateral can be drawn if five measurements of a quadrilateral are given. In a quadrilateral, there are \(4\) sides, \(4\) angles and \(2\) diagonals. A unique quadrilateral cannot be drawn when any four parts of a quadrilateral are known. But, if five parts of a quadrilateral are known, then a unique quadrilateral can be drawn.First, we draw a rough sketch of the quadrilateral and write the measurements of the five parts of the quadrilateral in the rough figure. Then, we draw the quadrilateral analysing the given data (measurements).We divide the necessary quadrilateral into two triangles which can be easily constructed. These two triangles together will form a quadrilateral. A quadrilateral can be constructed uniquely if the lengths of its four sides and diagonal are given.A quadrilateral can be constructed uniquely if its two diagonals and three sides are given.A quadrilateral can be constructed in a unique way if its two adjacent sides and three angles are given.A quadrilateral can be constructed in a unique way if its three sides and two included angles are given.A quadrilateral can be constructed when four sides and one angle are given. A quadrilateral can be constructed using a ruler and compass. In the construction of quadrilaterals, we use a compass to construct angles and to mark arcs to draw line segments. Example: Construct a quadrilateral \(PQRS\) in which \(P Q=3 \mathrm{~cm}, Q R=5 \mathrm{~cm}, Q S=5 \mathrm{~cm}, P S=4 \mathrm{~cm}\) and \(R S=4 \mathrm{~cm}\). Ans: Thus, quadrilateral \(PQRS\) will be formed. Draw a line segment \(P Q=3 \mathrm{~cm}\).Taking \(P\) as the centre, draw an arc of radius \(P S=4 \mathrm{~cm}\).Taking \(Q\) as a centre, draw an arc of radius \(Q S=5 \mathrm{~cm}\), which cuts the arc of step \(2\) at \(S\).Taking \(S\) as a centre, draw an arc of radius \(R S=4 \mathrm{~cm}\).Taking \(Q\) as a centre, draw an arc of radius \(Q R=5 \mathrm{~cm}\), which cuts the arc drawn in step-\(4\) at \(R\).Join \(P S, Q S, Q R\) and \(R S\). Thus \(P Q R S\) is the required quadrilateral formed. Example: Construct a quadrilateral \(PQRS\) in which \(Q R=7.5 \mathrm{~cm}, P R=P S=6 \mathrm{~cm}, R S=5 \mathrm{~cm}\) and \(Q S=10 \mathrm{~cm}\). Ans: Thus quadrilateral \(PQRS\) will be formed. Draw a line segment \(Q R=7.5 \mathrm{~cm}\).Taking \(Q\) as a centre and draw an arc of radius \(Q S=10 \mathrm{~cm}\).Taking \(R\) as a centre, draw an arc of radius \(R S=5 \mathrm{~cm}\), which cuts the arc drawn in step \(-2\) at \(S\).Taking \(S\) as the centre, draw an arc of radius \(S P=6 \mathrm{~cm}\).Taking \(R\) as the centre, draw an arc of radius \(R P=6 \mathrm{~cm}\), which cuts the arc drawn in step \(-4\) at \(P\). Join \(Q S, R S, P S, P R\) and \(P Q\).\(P Q R S\) is the required quadrilateral formed. Q.1. Construct a parallelogram \(P Q R S\) in which \(P Q=6 \mathrm{~cm}, Q R=4.5 \mathrm{~cm}\) and diagonal \(P R=6.8 \mathrm{~cm}\).Ans: Draw a rough sketch of the required parallelogram and write down the given dimensions. Draw \(P Q=6 \mathrm{~cm}\)With \(P\) as centre and radius \(6.8 \mathrm{~cm}\), draw an arc.With \(Q\) as centre and radius, \(4.5 \mathrm{~cm}\) draw another arc, cutting the previous arc at \(R\)Join \(QR\) and \(PR\).With \(P\) as centre and radius \(4.5 \mathrm{~cm}\), draw an arc.With \(R\) as centre and radius, \(6 \mathrm{~cm}\) draw another arc, cutting the previously drawn arc at \(D\).Join \(SP\) and \(SR\). Then, \(P Q R S\) is the required parallelogram. Q.2. Construct a quadrilateral \(P Q R S\) in which \(P Q=3.5 \mathrm{~cm}, Q R=6.5 \mathrm{~cm}\) and \(\angle P=\angle R=105^{\circ}\) and \(\angle S=75^{\circ}\).Ans: From the rough sketch, it is clear that quadrilateral \(PQRS\) will be formed only when \(\angle Q\) is known. For this, we know that\(\angle P+\angle Q+\angle R+\angle S=360^{\circ}\)\(\Rightarrow 105^{\circ}+\angle Q+105^{\circ}+75^{\circ}=360^{\circ}\)\(\Rightarrow \angle Q=75^{\circ}\) Steps of construction: Draw a line segment \(Q R=6.5 \mathrm{~cm}\). At \(Q\), make \(\angle R Q A=75^{\circ}\)From \(Q A\), cut \(Q P=3.5 \mathrm{~cm}\)At \(R\), make \(\angle Q R B=105^{\circ}\)At \(P\), make \(\angle Q P S=105^{\circ}\)Ray \(P C\) meets ray \(R B\) at \(S\). \(P Q R S\) is the required quadrilateral formed. Q.3. Construct a quadrilateral \(PQRS\) in which \(PQ = 5.5~{\text{cm}},\,QR = 3.7~{\text{cm}},\,\angle P = 60^\circ ,\,\angle Q = 105^\circ\) and \(\angle R = 90^\circ \).Ans: Steps of construction: Draw a line segment \(Q=5.5 \mathrm{~cm}\).At \(P\), make \(\angle Q P Y=60^{\circ}\).At \(Q\), make \(\angle P Q R=105^{\circ}\).Taking \(Q\) as the centre, draw an arc of radius \(Q R=3.7 \mathrm{~cm}\), which cuts \(Q Z\) at \(R\).At \(R\), make \(\angle Q R X=90^{\circ}\). Ray \(R X\) cuts ray \(P Y\) at \(S\).\(P Q R S\) is the required quadrilateral formed. Q.4. Construct a quadrilateral \(PQRS\) in which \(P Q=4.2 \mathrm{~cm}, Q R=3.6 \mathrm{~cm}, R S=4.8 \mathrm{~cm}, \angle Q=30^{\circ}\) and \(\angle R = 150^\circ \).Ans: On drawing a rough sketch, it is clear that any of the triangles \(PQR\) and \(QRS\) can be first made because in both the triangles, two sides and included angle are known.Thus quadrilateral \(PQRS\) is formed. Steps of construction: Take a line segment \(Q R=3.6 \mathrm{~cm}\).At \(Q\), make \(\angle R Q Y=30^{\circ}\) and at \(R\) make \(\angle Q R Z=150^{\circ}\).Taking \(Q\) as centre, draw an arc \(P Q=4.2 \mathrm{~cm}\) which cuts \(Q Y\) at \(P\).Taking \(R\) as centre cut \(R S=4.8 \mathrm{~cm}\) from \(R Z\).Join \(P S\).\(P Q R S\) is the required quadrilateral formed. Q.5. Construct a quadrilateral \(PQRS\) in which \(P Q=2.8 \mathrm{~cm}, Q R=3.1 \mathrm{~cm}, R S=2.6 \mathrm{~cm}, S P=3.3 \mathrm{~cm}\) and \(\angle P = 60^\circ \).Ans: Steps of construction: Draw a line segment \(P Q=2.8 \mathrm{~cm}\).At \(P\), make \(\angle Q P Y=60^{\circ}\).Taking \(P\) as the centre, draw an arc of radius \(P S=3.3 \mathrm{~cm}\), which cuts \(P Y\) at \(S\).Taking \(S\) as the centre, draw an arc of radius \(S R=2.6 \mathrm{~cm}\).Taking \(Q\) as the centre, draw an arc of radius \(Q R=3.1 \mathrm{~cm}\), which cuts the arc drawn in step \(-4\) at \(R\).Join \(Q R\) and \(R S\).\(P Q R S\) is the required quadrilateral formed. In this article, we learnt the definition of Construction of Quadrilaterals, Basic Rules of Construction of Quadrilaterals, Construction of Quadrilaterals notes, Solved examples, Frequently Asked Questions. Learning Outcome: Method to construct a unique quadrilateral from the given measurement. Q.1. In which case can we construct a quadrilateral?Ans: A quadrilateral can be constructed if the following measurements are given:1. A quadrilateral can be constructed in a unique way if the lengths of its four sides and a diagonal is given.2. A quadrilateral can be constructed in a unique way if its two diagonals and three sides are given.3. A quadrilateral can be constructed in a unique way if its two adjacent sides and three angles are given.4. A quadrilateral can be constructed in a unique way if its three sides and two included angles are given. Q.2. How can we construct a quadrilateral?Ans: A unique quadrilateral can be drawn if five measurements of a quadrilateral are given. First of all, we draw a rough sketch of the quadrilateral and write the measurements of the five given parts of the quadrilateral in the rough figure. Then, we draw the quadrilateral analysing the given data (measurements). Q.3. How do you construct a quadrilateral with a compass?Ans: A quadrilateral can be constructed using a ruler and compass. In the construction of quadrilaterals, we use a compass to construct angles and to mark arcs to draw line segments. Q.4. How do you construct a quadrilateral with three sides and two included angles?Ans: To construct a quadrilateral \(PQRS\) in which \(P Q=4.2 \mathrm{~cm}, Q R=3.6 \mathrm{~cm}, \mathrm{RS}=4.8 \mathrm{~cm}, \angle Q=30^{\circ}\) and \(\angle R = 150^\circ \)Steps of construction:Take a line segment \(Q R=3.6 \mathrm{~cm}\).At \(Q\), make \(\angle R Q Y=30^{\circ}\) and at \(R\) make \(\angle Q R Z=150^{\circ}\).Taking \(Q\) as centre, draw an arc \(P Q=4.2 \mathrm{~cm}\) which cuts \(Q Y\) at \(P\).Taking \(R\) as centre cut \(R S=4.8 \mathrm{~cm}\) from \(R Z\).Join \(P S\).\(P Q R S\) is the required quadrilateral formed. Q.5. How do you construct a unique quadrilateral?Ans: A unique quadrilateral can be drawn if five measurements of a quadrilateral are given. In a quadrilateral, there are \(4\) sides, \(4\) angles and \(2\) diagonals. When any four parts of a quadrilateral are known, unique quadrilateral cannot be drawn. But if five parts of a quadrilateral are known, then a unique quadrilateral can be drawn. Quadrilateral just means "four sides"(quad means four, lateral means side). A quadrilateral has four-sides, it is 2-dimensional (a flat shape), closed (the lines join up), and has straight sides. Drag the points: geometry/images/geom-quad.js?mode=choose (Also see this on Interactive Quadrilaterals) Properties A quadrilateral has: four sides (edges) four vertices (corners) interior angles that add to 360 degrees: Try drawing a quadrilateral, and measure the angles. They should add to 360 Types of Quadrilaterals There are special types of quadrilateral: Some types are also included in the definition of other types! For example a square, rhombus and rectangle are also parallelograms. See below for more details. Let us look at each type in turn: The Rectangle the little squares in each corner mean "right angle" A rectangle is a four-sided shape where every angle is a right angle (90). Also opposite sides are parallel and of equal length. The Square the little squares in each corner mean "right angle" A square has equal sides (marked "s") and every angle is a right angle (90) Also opposite sides are parallel. A square also fits the definition of a rectangle (all angles are 90), and a rhombus (all sides are equal length). The Rhombus A rhombus is a four-sided shape where all sides have equal length (marked "s"). Also opposite sides are parallel and opposite angles are equal. Another interesting thing is that the diagonals (dashed lines) meet in the middle at a right angle. In other words they "bisect" (cut in half) each other at right angles. A rhombus is sometimes called a rhomb or a diamond. The Parallelogram A parallelogram has opposite sides parallel and equal in length. Also opposite angles are equal (angles "A" are the same, and angles "B" are the same). NOTE: Squares, Rectangles and Rhombuses are all Parallelograms! A parallelogram with: all sides equal and angles "A" and "B" as right angles is a square! Trapezoid Isosceles Trapezoid A trapezoid (called a trapezium in the UK) has a pair of opposite sides parallel. And a trapezium (called a trapezoid in the UK) is a quadrilateral with NO parallel sides: Trapezoid Trapezium In the US: a pair of parallel sides NO parallel sides In the UK: NO parallel sides a pair of parallel sides (the US and UK definitions are swapped over!) 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Using the chart below we can answer such questions as: Is a Square a type of Rectangle? (Yes) Is a Rectangle a type of Kite? (No) Complex Quadrilaterals Oh Yes! when two sides cross over, we call it a "Complex" or "Self-Intersecting" quadrilateral, like these: They still have 4 sides, but two sides cross over. Polygon A quadrilateral is a polygon. In fact it is a 4-sided polygon, just like a triangle is a 3-sided polygon, a pentagon is a 5-sided polygon, and so on. Play with Them Now that you know the different types, you can play with the Interactive Quadrilaterals. Other Names A quadrilateral can sometimes be called: a Quadrangle ("four angles"), so it sounds like "triangle" a Tetragon ("four polygon"), so it sounds like "pentagon", "hexagon", and so on 621,622,623,624,763,764, 2128, 2129, 3230, 3231 Copyright 2025 Rod PierceA quadrilateral is a polygon with 4 edges, corners, and interior angles. The main shapes are square, rectangle, rhombus, kite, parallelogram, and trapezoid.In geometry, a quadrilateral is a two-dimensional closed shape or polygon that has four straight sides, four corners or vertices, and four interior angles. The sum of the interior angles is 360 degrees. The word quadrilateral comes from the Latin words quadri, meaning four, and latus, meaning side. A less common name for the shape is a tetragon, which comes from the Greek words tetra, meaning four, and gon, meaning corner or angle.Quadrilaterals are important not only in geometry, but for understanding complex geometric shapes and for their wide practical applications.There are several common types of quadrilaterals. The terminology is mostly the same in both American and British English, except for a trapezoid (American) which is often referred to as a trapezium in British English.Square: A square is a quadrilateral with all sides of equal length and all internal angles of 90 degrees.Rectangle: A rectangle is a quadrilateral with opposite sides of equal length and all internal angles of 90 degrees.Rhombus (Rhomb or Diamond): A rhombus is a quadrilateral with all sides of equal length, opposite angles of equal measure, but not necessarily angles of 90 degrees.Parallelogram: A parallelogram is a quadrilateral with opposite sides of equal length and opposite angles of equal measure. Adjacent angles are supplementary (they add up to 180 degrees).Trapezoid (American) / Trapezium (British): A trapezoid is a quadrilateral with at least one pair of parallel sides. In American usage, it refers to a quadrilateral with exactly one pair of parallel sides, while the British usage typically includes shapes with at least one pair of parallel sides.Trapezium (American) / Irregular Quadrilateral (British): In American usage, a trapezium refers to a quadrilateral with no parallel sides. The British often refer to this as an irregular quadrilateral.Kite: A kite is a quadrilateral with two pairs of adjacent sides of equal length. This implies that a kite has a pair of equal angles.Remember, all these figures are quadrilaterals, meaning they all have four sides and the sum of their internal angles equals 360 degrees. The specific names (like square, rectangle, etc.) just give more information about the properties of the sides and angles of the quadrilateral.Some of the quadrilateral shapes are types of other shapes. For example:A square is also a rectangle and a rhombus.However, a rectangle and rhombus are not square.A square, rectangle, and rhombus are all types of parallelograms.A parallelogram is a trapezoid (American) or trapezium (British). However, a parallelogram is not an American trapezium.Similarly, a British irregular quadrilateral is not a parallelogram.A kite is not necessarily a parallelogram. However, a rhombus is a type of kite and is also a parallelogram.Both a square and a rhombus are types of quadrilaterals that have four congruent sides.Each quadrilateral shape has its own perimeter and area formula:Square:Perimeter = 4a (where a = length of a side)Area = a (where a = length of a side)Rectangle:Perimeter = 2(l + w) (where l = length and w = width)Area = l * w (where l = length and w = width)Rhombus (Rhomb or Diamond):Perimeter = 4a (where a = length of a side)Area = dd / 2 (where d and d are the lengths of the diagonals)Parallelogram:Perimeter = 2(l + w) (where l = length and w = width)Area = b * h (where b = base and h = height)Trapezoid (American) / Trapezium (British):Perimeter = a + b + c + d (where a, b, c, and d are the lengths of the sides)Area = (a + b) / 2 * h (where a and b are the lengths of the parallel sides and h is the height)Trapezium (American) / Irregular Quadrilateral (British):Perimeter = a + b + c + d (where a, b, c, and d are the lengths of the sides)Area: Depending on the information available, there are different methods for calculating area. One common method for irregular quadrilaterals is dividing them into triangles and adding the areas of those triangles.Kite:Perimeter = 2(a + b) (where a and b are the lengths of the different sides)Area = dd / 2 (where d and d are the lengths of the diagonals)The distinction between convex and concave quadrilaterals lies in their interior angles and the relative positioning of their vertices.Convex Quadrilaterals: These are quadrilaterals in which all the interior angles are less than 180. Another key characteristic is that for any two points within the shape, the line segment that connects them is also be entirely within the shape. All the types of quadrilaterals we discussed earlier (square, rectangle, rhombus, parallelogram, trapezoid/trapezium, kite) are examples of convex quadrilaterals.Concave Quadrilaterals: These are quadrilaterals in which at least one interior angle is more than 180. This forms a dent or cave in the shape (which is why its called concave). For some pairs of points within the shape, the line segment that connects them is not entirely within the shape. Concave quadrilaterals are also known as re-entrant quadrilaterals.Its important to note that the sum of interior angles in both convex and concave quadrilaterals is always 360 since they both have four sides. The distinction lies in the measure of individual angles and how their vertices are arranged.Quadrilaterals, four-sided polygons, are an important concept in geometry due to their variety and ubiquity. They serve as a bridge between simpler shapes, like triangles, and more complex polygons. Heres a detailed explanation of their importance:Basic geometry understanding: Understanding the properties of quadrilaterals is a key part of learning about two-dimensional shapes. This includes understanding their angles, sides, diagonals, and area.Variety of types: There are several types of quadrilaterals, each with their own unique properties. For example, rectangles have four right angles, parallelograms have opposite sides that are equal in length, and trapezoids have one pair of parallel sides. Understanding these varieties enriches ones comprehension of geometrical shapes and their properties.Foundational to complex concepts: The principles learned from quadrilaterals apply to more complex shapes and principles. For example, any polygon divides into triangles, but quadrilaterals provide a simpler step up in complexity from triangles that prepares students for dealing with polygons that have even more sides.Practical applications: Quadrilaterals are common in everyday life and various fields such as architecture, design, engineering, and computer graphics. For instance, rectangles are important in the design of buildings and furniture. In computer graphics, meshes consisting of quadrilaterals (usually rectangles) model complex shapes.Analytical skills: Studying the properties of quadrilaterals also develops deductive reasoning and problem-solving skills. For instance, if a student knows that the opposite angles of a parallelogram are equal, they deduce the measure of missing angles in a given problem.Problem: A rectangle has a length of 12 cm and a width of 5 cm. What is the area and the perimeter of the rectangleSolution:The area of a rectangle is found by multiplying the length by the width, so area = length x width = 12 cm x 5 cm = 60 cm.The perimeter of a rectangle is found by adding up all its sides, so perimeter = 2(length + width) = 2(12 cm + 5 cm) = 2(17 cm) = 34 cm.Problem: A parallelogram has a base of 8 cm and a height of 6 cm. What is the area of the parallelogram?Solution: The area of a parallelogram is the base multiplied by the height, so area = base x height = 8 cm x 6 cm = 48 cm.Problem: A rhombus has diagonals of lengths 10 cm and 6 cm. What is the area of the rhombus?Solution: Find the area of a rhombus by multiplying the lengths of the diagonals and then dividing by 2, so area = (d1 x d2) / 2 = (10 cm x 6 cm) / 2 = 30 cm.Problem: The three angles of a quadrilateral are 85, 95, and 100. Find the measure of the fourth angle.Solution: In any quadrilateral, the sum of all interior angles is 360. To find the fourth angle, we subtract the sum of the known angles from 360. fourth angle = 360 (85 + 95 + 100) = 360 280 = 80.Problem: In a square, the length of one side is 7 cm. Find the perimeter of the square.Solution: In a square, all sides are equal. Therefore, the perimeter is four times the length of one side. perimeter = 4 * side = 4 * 7 cm = 28 cm.Problem: One angle in a parallelogram is 120. Find the measure of the adjacent and opposite angles.Solution: In a parallelogram, consecutive angles are supplementary (add up to 180) and opposite angles are equal.The measure of the adjacent angle = 180 120 = 60 (because consecutive angles are supplementary).The measure of the opposite angle = 120 (because opposite angles are equal).Alsina, Claudi; Nelsen, Roger (2010). Charming Proofs : A Journey Into Elegant Mathematics. Mathematical Association of America. ISBN 978-0-88385-348-1.Beauregard, R. A. (2009). Diametric Quadrilaterals with Two Equal Sides. College Mathematics Journal. 40 (1): 1721. doi:10.1080/07468342.2009.11922331Hartshorne, R. (2005). Geometry: Euclid and Beyond. Springer. ISBN 978-1-4419-3145-0.Jobbings, A. K. (1997). Quadric Quadrilaterals. The Mathematical Gazette. 81 (491): 220224. doi:10.2307/3619199Martin, George Edward (1982). Transformation Geometry: An Introduction to Symmetry. Springer-Verlag. ISBN 0-387-90636-3. doi:10.1007/978-1-4612-5680-9Related Posts QUADRILATERALS are 2D shapes that are a type of polygon with 4 sides and 4 angles. The sum of all interior angles of a quadrilateral is 360 degrees.(QUAD means four, LATERALS means side) There are SIX basic types of quadrilaterals:ParallelogramRectangleRhombusSquareTrapezoid / TrapeziumKite Opposite sides are parallel and equal.Opposite angles are equal.Diagonals bisect each other. Opposite sides are parallel and equal.All angles are 90.The diagonals bisect each other. Opposite sides are parallel and all sides are equal.All angles are 90.Diagonals bisect each other at right angles. A trapezoid is a quadrilateral with EXACTLY ONE PAIR of parallel sides. Sides do NOT have to be equal in length.Isosceles trapezoid: A trapezoid in which the nonparallel sides (the legs) are congruent. FUN FACT: Trapezoid defination are different for different people. Some people say that a trapezoid has AT LEAST ONE PAIR of parallel sides instead of EXACTLY ONE PAIR of parallel sides. Two pairs of adjacent sides are equal.One pair of opposite angles is equal.Diagonals intersect at right angles.The longest diagonal bisects the shortest diagonal into two equal parts. Q.1 Which figure must contain four right angles and four sides of equal length?a) Quadrilateral, b) Rectangle, c) Rhombus, d) Square Q.2 How many pairs of parallel sides are there in a parallelogram?a) 1, b) 2, c) 3, d) 4 Q.3 Which quadrilateral does not have two sets of parallel sides?a) square, b) rhombus, c) trapezoid, d) parallelogram Q.4 Which of the following is a parallelogram that must have 4 equal angles?a) rectangle, b) rhombus, c) trapezoid, d) kite Q.5 Which figure always has 4 congruent sides and exactly 2 sets of parallel sides?a) rectangle, b) rhombus, c) trapezoid, d) parallelogram Q.6 Which of the following always have 90-degree angles?a) rectangle and square, b) rhombus and square, c) square and trapezoid, d) square and parallelogram Q.7 A quadrilateral with 1 pair of parallel sides and 1 pair of side that are not parallel?a) rectangle, b) rhombus, c) square, d) trapezoid Answer: 1 d, 2 b, 3 c, 4 a, 5 b, 6 a, 7 d A square has 4 right angles and 4 equal sides.Its relatives, the rhombus (has 4 equal sides, but not necessarily 4 right angles), the rectangle (4 right angles, but not necessarily 4 equal sides) are the closest as far as quadrilaterals are concerned. A quadrilateral is a closed shape that is formed by joining four points among which any three points are non-collinear. In simple words, a quadrilateral is a polygon with 4 sides, 4 angles, and 4 vertices. Let us learn more about the quadrilateral shape, the properties of quadrilaterals, the different types of quadrilaterals along with a few quadrilateral examples. Quadrilateral Definition A quadrilateral is a polygon with four sides, four angles and four vertices. Whenever we name a quadrilateral, we need to keep in mind the order of the vertices. For example, the following quadrilateral should be named ABCD, BCDA, ADCB, or, DCBA. It cannot be named as ACBD or DBAC, since they change the order of vertices in which a quadrilateral is formed. The following quadrilateral ABCD has four sides: AB, BC, CD, DA, and two diagonals: AC and BD.Meaning of QuadrilateralThe word 'Quadrilateral' is derived from a Latin word, in which, 'Quadra' means four and 'Latus' means sides. It should be noted that all 4 sides of a quadrilateral may or may not be equal. There are different types of quadrilaterals and they are uniquely identified on the basis of their distinct properties.Types of Quadrilateral Although a quadrilateral always has four sides, four angles, and four vertices, the measure of the sides and angles differ. It is to be noted that the sum of the interior angles of a quadrilateral is always equal to 360. The following table lists the different types of quadrilaterals.Properties of Quadrilateral Each of the quadrilaterals discussed above has its own properties. Though, there are some properties that are common to all quadrilaterals. They are as follows.All quadrilaterals have four sides.All quadrilaterals have four vertices.All quadrilaterals have two diagonals.The sum of the interior angles of quadrilaterals is 360.Now, let us read about the other properties of different quadrilaterals in detail. We can identify a quadrilateral by using the following properties of quadrilaterals.SquareA square is a quadrilateral with four equal sides and four right angles.Observe the square given above and relate it to the following properties:A square has 4 equal sides. Here, AB = BC = CD = DAIt 4 right angles. Here, A= B = C = D = 90It has 2 pairs of parallel sides. Here, AB DC and AD BCIt has 2 equal diagonals. Here, AC = BDIt has diagonals that are perpendicular to each other. Here, AC BD and the diagonals bisect each other.RectangleA rectangle is a quadrilateral in which the opposite sides are equal and parallel and each of its interior angles is 90.Observe the rectangle given above and relate it to the following properties:A rectangle has 2 pairs of parallel sides. Here, AB DC and AD BCIt has 4 right angles. Here, A = B = C = D = 90The opposite sides of a rectangle are equal. Here, AB = DC and AD = BCIt has 2 equal diagonals. Here, AC = BD and the diagonals bisect each other.ParallelogramA parallelogram is a quadrilateral in which the opposite sides are parallel. Observe the parallelogram given above and relate it to the following properties:A parallelogram has 2 pairs of parallel sides. Here, PQ RT and PR QTThe opposite sides of a parallelogram are equal. Here, PQ = RT and PR = QTThe opposite angles of a parallelogram are equal. Here, P = T and Q = RIt has 2 diagonals that bisect each other.TrapeziumA trapezium is a quadrilateral in which one pair of opposite sides is parallel.Observe the trapezium given above and relate it to the following properties:In a trapezium, the sides that are parallel to each other are called bases. Here, EF and GH are the bases.The sides that are not parallel to each other are called legs. Here, EG and FH are the legs.There is nothing special about the sides, angles, or diagonals of a trapezium. But if the two non-parallel opposite sides are of equal length, then it is called an isosceles trapezium. The following quadrilateral XYZW is an isosceles trapezium, in which the legs are equal, i.e., WX = ZY, and the diagonals are also equal, i.e., XZ = WY.RhombusA rhombus is a quadrilateral with four equal sides.Observe the rhombus given above and relate it to the following properties:A rhombus has 2 pairs of parallel sides. Here, EH FG and EF HGIt has 4 equal sides. Here, EH = HG = GF = FEThe opposite angles of a rhombus are equal. Here, E = G and H = FIt has diagonals that are perpendicular to each other. Here, EG HF and the diagonals bisect each other.KiteA kite is a quadrilateral in which two pairs of adjacent sides are equal.Observe the properties of a kite given below and relate it to the figure given above.A kite has 2 pairs of equal adjacent sides. Here, AB = BC and CD = DAIt has one pair of opposite angles (which are obtuse) that are equal. Here, A = CIt has diagonals that are perpendicular to each other. Here, AC BDThe longer diagonal bisects the shorter diagonal.Think TankCan a kite be called a parallelogram?What elements of a trapezium should be changed to make it a parallelogram?Area of QuadrilateralsThe area of a quadrilateral is the number of unit squares that can be fit into it. The following table lists the formulas for finding the area of quadrilaterals.Topics Related to QuadrilateralsCheck out some interesting articles related to quadrilaterals. Example 1: Find the value of angle x in the following figure.Solution:We know that the sum of the angles in a quadrilateral is 360.This can be written as: x + 67 + 77 + 101 = 360x + 245 = 360Therefore, x =115Example 2: State true or false with reference to the properties of a quadrilateral.a.) A quadrilateral is a parallelogram.b.) A quadrilateral has one diagonal.Solution:a.) True, a quadrilateral can be a parallelogram if its opposite sides are parallel. However, a quadrilateral is not always necessarily a parallelogram, it can also be a trapezium or a kite.b.) False, a quadrilateral has two diagonals.Example 3: Name the quadrilateral according to its unique properties.a.) Name the quadrilateral with four equal sides and four right angles.b.) Name the quadrilateral in which only one pair of opposite sides is parallel.Solution:a.) Squareb.) TrapeziumShow Solution >go to slidego to slidego to slideHave questions on basic mathematical concepts?Become a problem-solving champ using logic, not rules. Learn the why behind math with our Cuemaths certified experts.Book a Free Trial ClassFAQs on Quadrilateral A quadrilateral is a closed two-dimensional figure that has 4 sides, 4 angles, and 4 vertices. A few examples of quadrilaterals are square, rectangle, kite, and trapezium.What are the Different Types of Quadrilaterals?There are different types of quadrilaterals that are identified on the basis of their unique properties. For example, square, rectangle, parallelogram, rhombus, kite, trapezium, isosceles trapezium are all categorized under quadrilaterals.What is the Sum of the Interior Angles in a Quadrilateral?In any type of quadrilateral, the sum of the interior angles is always equal to 360. For example, a rectangle is a quadrilateral with each of its interior angles equal to 90 which makes it (90 4) = 360.What are the Common Properties of all Quadrilaterals?Though there are different types of quadrilaterals, they share a few properties that are common. They are listed as follows:All quadrilaterals have four sides.They have four vertices.They have two diagonals.The sum of all interior angles is 360.How to Find the Area of a Quadrilateral?The area of a quadrilateral is the space occupied by it. Since each quadrilateral has its own unique properties, their area is calculated using different formulas. However, it is to be noted that the area of a quadrilateral is always expressed in square units. A few examples of quadrilaterals are square and rectangle. The area of a square of side 'a' is calculated by the formula: Area = 'a a' or a2 and the area of a rectangle whose length is 'l' and width is 'w' is calculated by the formula: Area = 'l w'.How to Find the Perimeter of a Quadrilateral?The perimeter of a quadrilateral is the total length of its boundary. As we know that a quadrilateral has 4 sides, the perimeter of a quadrilateral can be found by adding all the sides of the quadrilateral. For example, if a rectangle has a length of 6 units and a width of 4 units then we use the formula for the perimeter of a rectangle which is: 2(length + width). Substituting the values in the formula, we get 2 (6 + 4) = 20 units.What is the Sum of the Angles of a Quadrilateral?The sum of the interior angles of a quadrilateral is always 360. This rule applies to all quadrilaterals like the square, rectangle, trapezium, kite, rhombus, and so on.Is a Quadrilateral a Parallelogram?Yes, a quadrilateral can be a parallelogram if its opposite sides are parallel. However, a quadrilateral is not always necessarily a parallelogram, it can also be a trapezium or a kite. This is because a quadrilateral is defined as any polygon that has four sides, four angles and four vertices.Are all Sides of a Quadrilateral Equal?All sides of a quadrilateral may not always be necessarily equal. In some cases, if all sides of a quadrilateral are equal, then that particular quadrilateral is identified as a square or a rhombus.Q1: If the ratio of the interior angles of a quadrilateral is 1 : 2 : 3 : 4, the largest angle value is:62 degrees30 degrees108 degrees144 degreesQ2: The interior angle sum property of a quadrilateral states that:Sum of all the interior angles adds upto 180 degrees.Sum of all the interior angles adds upto 90 degrees.Sum of all the interior angles adds upto 190 degrees.Sum of all the interior angles adds upto 360 degrees.Q3: For a quadrilateral ABCD, if $$A = 3x+9, B = 5x+20, C = 3x and D = 2x+6,$$ what is the value of $$D$$?$$66$$$$36$$$$46$$$$56$$Q4: A quadrilateral has _____ & _____ number of edges and vertices.2,48,124,84,4Q5: The opposite angles of a quadrilateral PQRS are given to be equal. If $$PQ = 7 cm$$, the value of RS is:Cannot be determined4 cm3 cm7 cm Examine the properties of the quadrilateral, including side and angle relationships. Quadrilateral A has two pairs of opposite parallel sides and two pairs of opposite congruent sides. Quadrilateral A also has two pairs of opposite congruent angles. Quadrilateral B has one pair of opposite parallel sides and two pairs of congruent angles. Quadrilateral B also has one pair of opposite congruent sides. The quadrilaterals are the same because they have a pair of opposite parallel sides, a pair of opposite congruent sides, and two pairs of congruent angles. They are different because Quadrilateral A has two pairs of opposite parallel sides and Quadrilateral B only has one pair. Quadrilateral A has two pairs of opposite congruent sides, and quadrilateral B only has one. Also, Quadrilateral A has two pairs of opposite angles that are congruent, whereas Quadrilateral B has adjacent angles (next to each other) that are congruent. Page 2 Here you will learn about 2D shapes, including the attributes of various 2D shapes and symmetry. Students first learn about 2D shapes in kindergarten and first grade with their work in geometry, identifying and classifying shapes by their properties. They expand their knowledge of 2D shapes as they progress through elementary and middle school. 2D shapes are flat shapes that can be drawn on a flat surface (or plane). They have two dimensions, length and width, and have no thickness. 2D shapes can be grouped by the dimensions they have. Here are some familiar 2D shapes. Polygons are 2D shapes made from straight lines that meet at points called vertices. There are two different types of polygons. Regular polygonsIrregular polygonsRegular polygons have equal side lengths and equal interior angles. Interior angles are the angles inside the polygon. Equilateral Triangle Square Regular Hexagon Irregular polygon Irregular polygons do not have all equalsides and do not have all equal angles. Interior angles are the angles inside the polygon. Right Triangle Rectangle Irregular Hexagon Step-by-step guide: Polygons Step-by-step guide: Regular polygons Step-by-step guide: Irregular polygons Use this quiz to check your 2nd, 3rd, and 4th grade students understanding of 2D shape. 10+ questions with answers to identify areas of strength and support! DOWNLOAD FREE x Use this quiz to check your 2nd, 3rd, and 4th grade students understanding of 2D shape. 10+ questions with answers to identify areas of strength and support! DOWNLOAD FREE Symmetry is when an object can be divided into equal halves, where the two halves are mirror images of each other. Line symmetryLine symmetry is when an object can be divided in half with the two halves being reflections of each other. Both regular polygons and irregular polygons can have lines symmetry. Square A square has 4 lines of symmetry. Equilateral Triangle An equilateral triangle has 3 lines of symmetry. The lines of symmetry of a regular polygon are equal to the number of sides. Trapezoid This trapezoid is not a regular polygon and has only 1 line of symmetry. Step-by-step guide: Line symmetry Step-by-step guide: Symmetry Lets look at the properties of some of the most common 2D Shapes. Name of polygonProperties of polygonEquilateral triangle 3 vertices 3 equal sides 3 equal angles Each interior angle is 60^{\circ} 3 lines of symmetry 3 times of rotational symmetry within one full turn Square 4 vertices 4 equal sides 4 equal angles Each interior angle is 90^{\circ} 4 lines of symmetry 4 times of rotational symmetry within one full turn Regular pentagon 5 vertices 5 equal sides 5 equal angles Each interior angle is 108^{\circ} 5 lines of symmetry 5 times of rotational symmetry within one full turn Regular hexagon 6 vertices 6 equal sides 6 equal angles Each interior angle is 120^{\circ} 6 lines of symmetry 6 times of rotational symmetry within one turn Regular octagon 8 vertices 8 equal sides 8 equal angles Each interior angle is 135^{\circ} 8 lines of symmetry 8 times of rotational symmetry within one turn Step-by-step guide: Pentagon shape Step-by-step guide: Hexagon shape Step-by-step guide: How to draw a hexagon Step-by-step guide: Octagon shape How does this relate to kindergarten 5 th grade math? Kindergarten: Geometry (K.G.A.3)Identify shapes as two-dimensional (lying in a plane, flat) or three-dimensional (solid). Grade 1: Geometry (1.G.A.2)Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape and compose new shapes from the composite shape. Grade 2: Geometry (2.G.A.1)Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. Grade 4: Geometry (4.G.A.3)Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. Grade 5: Geometry (5.G.B.4)Classify two-dimensional figures in a hierarchy based on properties. There are a lot of ways to use 2D shapes. For more specific step-by-step guides, check out the individual pages linked in the What are 2D shapes? section above or read through the examples below. In order to identify a 2D shape, a polygon, or a regular polygon. Recall the definition. Explain how the 2D shape fits the definition. What type of 2D shape is a stop sign? A stop sign is a polygon with 8 sides. 2Explain how the 2D shape fits the definition. Polygons that have 8 sides are called octagons. So, a stop sign is an octagon. Is a circle a polygon? A polygon is a 2D shape made up of straight lines that meet at points called vertices. Explain how the 2D shape fits the definition. A circle is a 2D shape, but it is not made up of straight lines, so it is not a polygon. Is a pentagon a polygon? A polygon is a 2D shape made up of straight lines. Explain how the 2D shape fits the definition. A pentagon is a 2D shape made up of straight lines, so it is a polygon. Is the parallelogram a regular polygon? Regular polygons have equal side lengths and equal interior angles. Explain how the 2D shape fits the definition. The parallelogram does not have equal side lengths and does not have equal interior angles, so it is not a regular polygon. How many lines of symmetry does this rectangle have? Line symmetry is when an object can be divided in half, with the two halves being mirror images or reflections of each other. Explain how the 2D shape fits the definition. In this case, the rectangle can be divided down the middle vertically and across the middle horizontally. So there are 2 lines of symmetry. Name the shape. Octagons are polygons with 8 sides. Irregular polygons are polygons that do not have equal sides and equal angles. Explain how the 2D shape fits the definition. The shape is an octagon because it has eight sides and eight angles. The sides and the angles are not equal, so it is also an irregular polygon. The shape is an irregular octagon. Instead of relying on worksheets, use manipulatives and real world objects in class so that students can see and understand the different shapes. Link art projects to 2D shapes and symmetry so that students can apply the math to creative projects. Provide students with cut-outs of the actual shapes so that they can measure the side lengths and angle measurements to develop their understanding of regular shapes versus irregular shapes. Include in lesson plans math centers where your learners can rotate through various 2D shape activities that are comprised of hands-on activities with pattern blocks, shape flashcards, and digital activities with math games so that students can learn shapes and their attributes. Reinforce essential vocabulary as it pertains to the geometrical shapes so students can recall the shapes names and see how they are used in real life. Confusing the different shapesFor example, thinking that a pentagon is a hexagon or vice versa. Thinking that a rectangle is a regular polygonSquares are the only regular quadrilaterals. Rectangles have the same interior angles, but they do not have the same side lengths. Thinking that figures cant have more than one line of symmetry2D shapes can have more than one line of symmetry or no lines of symmetry. Rotational symmetry/lines of symmetryLines of symmetry are often confused with rotational symmetry. A line of symmetry on a two-dimensional shape divides the shape equally into two symmetrical pieces. Rotational symmetry is the number of times a shape fits into itself when rotated around its center. Thinking that an irregular hexagon is not a hexagonIf students have too much exposure to regular hexagons and not enough of irregular hexagons, they may believe that a regular hexagon is the only type of hexagon. Be sure to vary their exposure to hexagonal shapes and give them opportunities to work with and draw hexagons that are not regular. This applies to all other types of polygons as well. Regular polygons have equal side lengths and equal interior angles. The only figure that has equal side lengths and equal interior angles is the regular hexagon. The pentagon has five vertices. The vertices are the corners of the shape. An irregular hexagon is a 6 sided shape that does not have equal side lengths or equal interior angles. This polygon was the only one with 6 sides. A square is a regular polygon with four equal sides and four equal interior angles. So it will have four lines of symmetry. A rectangle will only have two lines of symmetry, a kite and a parallelogram have no lines of symmetry. By definition, line symmetry is when an object can be divided in half, with the two halves being mirror images or reflections of each other. In this case, the snowflake has six lines of symmetry. No lines of symmetry. Two lines of symmetry No lines of symmetry One line of symmetry Are geometric figures that are two dimensional with curved line edges polygons? By definition, polygons are enclosed 2D shapes made up of straight lines that meet at points. If a shape has a curved line edge, it will not be a polygon. How do you find the area and perimeter of polygons? Perimeter is the distance around the shapes, so you can just add up the side lengths. The area is the space within the shapes. There are various formulas you will learn to find the areas of shapes such as triangles, squares, rectangles, and parallelograms. How do you find the sum of the interior angle measurements of all regular polygons? The sum of the interior angles of a polygon is always the number of sides minus 2 times 180 . You will learn this as you move into high school. What is a cuboid? A cuboid is another name for a cube, which are 3D shapes where each face is a square. What is a rhombus? A rhombus is a parallelogram, so opposite sides are equal and opposite sides are parallel, and in addition to that, all four sides are equal. Triangles Quadrilateral Perimeter At Third Space Learning, we specialize in helping teachers and school leaders to provide personalized math support for more of their students through high-quality, online one-on-one math tutoring delivered by subject experts. Each week, our tutors support thousands of students who are at risk of not meeting their grade-level expectations, and help accelerate their progress and boost their confidence. Find out how we can help your students achieve success with our math tutoring programs. We use essential and non-essential cookies to improve the experience on our website. Please read our Cookies Policy for information on how we use cookies and how to manage or change your cookie settings.AcceptPrivacy & Cookies Policy In geometry, a quadrilateral is a polygon with four sides or edges. There are several polygons that share the characteristics of a quadrilateral. However, while at least six shapes can be considered quadrilaterals, only two have four right angles rectangles and squares. Quadrilateral quite literally means "four sides." It can refer to any mathematical shape that is made up of four edges and four corners; however, the edges must be straight lines. Another property of a quadrilateral is that the sum of the interior angles must equal 360 degrees. As long as a shape fits within these parameters, it can be considered a quadrilateral. A rectangle is one kind of quadrilateral with four right angles. The definition of a rectangle is a shape with four sides and four right angles. This means each angle in a rectangle measures 90 degrees. Another property of a rectangle is that opposite sides are parallel to each other and equal in length. A square is the other type of quadrilateral with four right angles. The definition of a square is a shape with four equal sides and four right angles. A square is distinguished from a rectangle in that every side of a square is equal in length. Opposite sides are also parallel to each other. There are several other shapes that fit the parameters of a quadrilateral, though they do not have four right angles. A parallelogram is a simply a quadrilateral with parallel opposite sides. Different from a rectangle, a parallelogram does not have to have four right angles. A rhombus is a quadrilateral where all four sides are equal in length. Different from a square, a rhombus does not have to have four right angles. A trapezoid is a shape with only one pair of opposite parallel sides. Johnson, Baptist. "Which Quadrilaterals Have Four Right Angles?" sciencing.com, . 24 April 2017. APA Johnson, Baptist. (2017, April 24). Which Quadrilaterals Have Four Right Angles?. sciencing.com. Retrieved from Chicago Johnson, Baptist. Which Quadrilaterals Have Four Right Angles? last modified March 24, 2022. Quadrilateral just means "four sides"(quad means four, lateral means side). A quadrilateral has four-sides, it is 2-dimensional (a flat shape), closed (the lines join up), and has straight sides. Drag the points: geometry/images/geom-quad.js?mode=choose (Also see this on Interactive Quadrilaterals) Properties A quadrilateral has: four sides (edges) four vertices (corners) interior angles that add to 360 degrees: Try drawing a quadrilateral, and measure the angles. They should add to 360 Types of Quadrilaterals There are special types of quadrilateral: Some types are also included in the definition of other types! For example a square, rhombus and rectangle are also parallelograms. See below for more details. Let us look at each type in turn: The Rectangle the little squares in each corner mean "right angle" A rectangle is a four-sided shape where every angle is a right angle (90). Also opposite sides are parallel and of equal length. The Square the little squares in each corner mean "right angle" A square has equal sides (marked "s") and every angle is a right angle (90) Also opposite sides are parallel. A square also fits the definition of a rectangle (all angles are 90), and a rhombus (all sides are equal length). The Rhombus A rhombus is a four-sided shape where all sides have equal length (marked "s"). Also opposite sides are parallel and opposite angles are equal. Another interesting thing is that the diagonals (dashed lines) meet in the middle at a right angle. In other words they "bisect" (cut in half) each other at right angles. A rhombus is sometimes called a rhomb or a diamond. The Parallelogram A parallelogram has opposite sides parallel and equal in length. Also opposite angles are equal (angles "A" are the same, and angles "B" are the same). NOTE: Squares, Rectangles and Rhombuses are all Parallelograms! A parallelogram with: all sides equal and angles "A" and "B" as right angles is a square! Trapezoid Isosceles Trapezoid A trapezoid (called a trapezium in the UK) has a pair of opposite sides parallel. And a trapezium (called a trapezoid in the UK) is a quadrilateral with NO parallel sides: Trapezoid Trapezium In the US: a pair of parallel sides NO parallel sides In the UK: NO parallel sides a pair of parallel sides (the US and UK definitions are swapped over!) An Isosceles trapezoid, as shown above, has left and right sides of equal length that join to the base at equal angles. The Kite Hey, it looks like a kite (usually). It has two pairs of sides: Each pair is made of two equal-length sides that join up. Also: the angles where the two pairs meet are equal the diagonals, shown as dashed lines above, meet at a right angle one of the diagonals bisects (cuts equally in half) the other ... and that's it for the special quadrilaterals. The only regular (all sides equal and all angles equal) quadrilateral is a square. So all other quadrilaterals are irregular. Quadrilateral definitions are inclusive. So we include a square in the definition of a rectangle. (We don't say "Having all 90 angles makes it a rectangle except when all sides are equal then it is a square.") This may seem odd, as in daily life we think of a square as not being a rectangle ... but in mathematics it is. Using the chart below we can answer such questions as: Is a Square a type of Rectangle? (Yes) Is a Rectangle a type of Kite? (No) Complex Quadrilaterals Oh Yes! when two sides cross over, we call it a "Complex" or "Self-Intersecting" quadrilateral, like these: They still have 4 sides, but two sides cross over. Polygon A quadrilateral is a polygon. In fact it is a 4-sided polygon, just like a triangle is a 3-sided polygon, a pentagon is a 5-sided polygon, and so on. Play with Them Now that you know the different types, you can play with the Interactive Quadrilaterals. Other Names A quadrilateral can sometimes be called: a Quadrangle ("four angles"), so it sounds like "triangle" a Tetragon ("four polygon"), so it sounds like "pentagon", "hexagon", and so on 621,622,623,624,763,764, 2128, 2129, 3230, 3231 Copyright 2025 Rod Piercehome / geometry / shape / quadrilateralA quadrilateral is a polygon that has four sides. The following are a few examples. Parts of quadrilateral Quadrilateral ABCD, shown below, has the following properties: Four sides: AB, BC, CD, and AD. Opposite sides do not share a common vertex. Four interior angles at each of the vertices: A, B, C, and D. Opposite angles do not share a common side. Sum of interior angles equals 360. A diagonal can be drawn from vertex A above dividing the quadrilateral into two triangles, ABC and ADC. Since the sum of the interior angles of a triangle is 180, the sum of the interior angles for the quadrilateral is 2180 = 360. Special quadrilaterals Quadrilaterals are widely studied in geometry. They are often categorized further based on their angles and sides. Parallelogram A parallelogram is a quadrilateral with two pairs of parallel sides.

The opposite angles and sides of a parallelogram are congruent. Rectangle A rectangle is a quadrilateral with four right angles. The opposite sides of a rectangle are congruent and parallel. Rhombus A rhombus is a quadrilateral with four congruent sides. The opposite sides of a rhombus are parallel. The opposite angles of a rhombus are congruent. Square A square is quadrilateral with four congruent sides and four congruent angles. The four angles of a square are right angles. A square is a regular quadrilateral. Trapezoid A trapezoid is a quadrilateral with one pair of parallel opposite sides. Kite A kite is a quadrilateral with two pairs of congruent adjacent sides. The following diagram summarizes the various quadrilaterals described above. A quadrilateral is a closed shape that is formed by joining four points among which any three points are non-collinear. In simple words, a quadrilateral is a polygon with 4 sides, 4 angles, and 4 vertices. Let us learn more about the quadrilateral shape, the properties of quadrilaterals, the different types of quadrilaterals along with a few quadrilateral examples. Quadrilateral Definition A quadrilateral is a polygon with four sides, four angles and four vertices. Whenever we name a quadrilateral, we need to keep in mind the order of the vertices. For example, the following quadrilateral should be named ABCD, BCDA, ADCB, or, DCBA. It cannot be named as ACBD or DBAC, since they change the order of vertices in which a quadrilateral is formed. The following quadrilateral ABCD has four sides: AB, BC, CD, DA, and two diagonals: AC and BD.Meaning of QuadrilateralThe word 'Quadrilateral' is derived from a Latin word, in which, 'Quadra' means four and 'Latus' means sides. It should be noted that all 4 sides of a quadrilateral may or may not be equal. There are different types of quadrilaterals and they are uniquely identified on the basis of their distinct properties.Types of Quadrilateral Although a quadrilateral always has four sides, four angles, and four vertices, the measure of the sides and angles differ. It is to be noted that the sum of the interior angles of a quadrilateral is always equal to 360. The following table lists the different types of quadrilaterals.Properties of Quadrilateral Each of the quadrilaterals discussed above has its own properties. Though, there are some properties that are common to all quadrilaterals. They are as follows.All quadrilaterals have four sides.All quadrilaterals have four vertices.All quadrilaterals have two diagonals.The sum of the interior angles of quadrilaterals is 360.Now, let us read about the other properties of different quadrilaterals in detail. We can identify a quadrilateral by using the following properties of quadrilaterals.SquareA square is a quadrilateral with four equal sides and four right angles.Observe the square given above and relate it to the following properties:A square has 4 equal sides. Here, AB = BC = CD = DAIt 4 right angles. Here, A= B = C = D = 90It has 2 pairs of parallel sides. Here, AB DC and AD BCIt has 2 equal diagonals. Here, AC = BDIt has diagonals that are perpendicular to each other. Here, AC BD and the diagonals bisect each other.RectangleA rectangle is a quadrilateral in which the opposite sides are equal and parallel and each of its interior angles is 90.Observe the rectangle given above and relate it to the following properties:A rectangle has 2 pairs of parallel sides. Here, AB DC and AD BCIt has 4 right angles. Here, A = B = C = D = 90The opposite sides of a rectangle are equal. Here, AB = DC and AD = BCIt has 2 equal diagonals. Here, AC = BD and the diagonals bisect each other.ParallelogramA parallelogram is a quadrilateral in which the opposite sides are parallel. Observe the parallelogram given above and relate it to the following properties:A parallelogram has 2 pairs of parallel sides. Here, PQ RT and PR QTThe opposite sides of a parallelogram are equal. Here, PQ = RT and PR = QTThe opposite angles of a parallelogram are equal. Here, P = T and Q = RIt has 2 diagonals that bisect each other.TrapeziumA trapezium is a quadrilateral in which one pair of opposite sides is parallel.Observe the trapezium given above and relate it to the following properties:In a trapezium, the sides that are parallel to each other are called bases. Here, EF and GH are the bases.The sides that are not parallel to each other are called legs. Here, EG and FH are the legs.There is nothing special about the sides, angles, or diagonals of a trapezium. But if the two non-parallel opposite sides are of equal length, then it is called an isosceles trapezium. The following quadrilateral XYZW is an isosceles trapezium, in which the legs are equal, i.e., WX = ZY, and the diagonals are also equal, i.e., XZ = WY.RhombusA rhombus is a quadrilateral with four equal sides.Observe the rhombus given above and relate it to the following properties:A rhombus has 2 pairs of parallel sides. Here, EH FG and EF HGIt has 4 equal sides. Here, EH = HG = GF = FEThe opposite angles of a rhombus are equal. Here, E = G and H = FIt has diagonals that are perpendicular to each other. Here, EG HF and the diagonals bisect each other.KiteA kite is a quadrilateral in which two pairs of adjacent sides are equal.Observe the properties of a kite given below and relate it to the figure given above.A kite has 2 pairs of equal adjacent sides. Here, AB = BC and CD = DAIt has one pair of opposite angles (which are obtuse) that are equal. Here, A = CIt has diagonals that are perpendicular to each other. Here, AC BDThe longer diagonal bisects the shorter diagonal.Think TankCan a kite be called a parallelogram?What elements of a trapezium should be changed to make it a parallelogram?Area of QuadrilateralsThe area of a quadrilateral is the number of unit squares that can be fit into it. The following table lists the formulas for finding the area of quadrilaterals.Topics Related to QuadrilateralsCheck out some interesting articles related to quadrilaterals. Example 1: Find the value of angle x in the following figure.Solution:We know that the sum of the angles in a quadrilateral is 360.This can be written as: x + 67 + 77 + 101 = 360x + 245 = 360Therefore, x =115Example 2: State true or false with reference to the properties of a quadrilateral.a.) A quadrilateral is a parallelogram.b.) A quadrilateral has one diagonal.Solution:a.) True, a quadrilateral can be a parallelogram if its opposite sides are parallel. However, a quadrilateral is not always necessarily a parallelogram, it can also be a trapezium or a kite.b.) False, a quadrilateral has two diagonals.Example 3: Name the quadrilateral according to its unique properties.a.) Name the quadrilateral with four equal sides and four right angles.b.) Name the quadrilateral in which only one pair of opposite sides is parallel.Solution:a.) Squareb.) TrapeziumShow Solution >go to slidego to slidego to slideHave questions on basic mathematical concepts?Become a problem-solving champ using logic, not rules. Learn the why behind math with our Cuemaths certified experts.Book a Free Trial ClassFAQs on Quadrilateral A quadrilateral is a closed two-dimensional figure that has 4 sides, 4 angles, and 4 vertices. A few examples of quadrilaterals are square, rectangle, kite, and trapezium.What are the Different Types of Quadrilaterals?There are different types of quadrilaterals that are identified on the basis of their unique properties. For example, square, rectangle, parallelogram, rhombus, kite, trapezium, isosceles trapezium are all categorized under quadrilaterals.What is the Sum of the Interior Angles in a Quadrilateral?In any type of quadrilateral, the sum of the interior angles is always equal to 360. For example, a rectangle is a quadrilateral with each of its interior angles equal to 90 which makes it (90 4) = 360.What are the Common Properties of all Quadrilaterals?Though there are different types of quadrilaterals, they share a few properties that are common. They are listed as follows:All quadrilaterals have four sides.They have four vertices.They have two diagonals.The sum of all interior angles is 360.How to Find the Area of a Quadrilateral?The area of a quadrilateral is the space occupied by it. Since each quadrilateral has its own unique properties, their area is calculated using different formulas. However, it is to be noted that the area of a quadrilateral is always expressed in square units. A few examples of quadrilaterals are square and rectangle. The area of a square of side 'a' is calculated by the formula: Area = 'a a' or a2 and the area of a rectangle whose length is 'l' and width is 'w' is calculated by the formula: Area = 'l w'.How to Find the Perimeter of a Quadrilateral?The perimeter of a quadrilateral is the total length of its boundary. As we know that a quadrilateral has 4 sides, the perimeter of a quadrilateral can be found by adding all the sides of the quadrilateral. For example, if a rectangle has a length of 6 units and a width of 4 units then we use the formula for the perimeter of a rectangle which is: 2(length + width). Substituting the values in the formula, we get 2 (6 + 4) = 20 units.What is the Sum of the Angles of a Quadrilateral?The sum of the interior angles of a quadrilateral is always 360. This rule applies to all quadrilaterals like the square, rectangle, trapezium, kite, rhombus, and so on.Is a Quadrilateral a Parallelogram?Yes, a quadrilateral can be a parallelogram if its opposite sides are parallel. However, a quadrilateral is not always necessarily a parallelogram, it can also be a trapezium or a kite. This is because a quadrilateral is defined as any polygon that has four sides, four angles and four vertices.Are all Sides of a Quadrilateral Equal?All sides of a quadrilateral may not always be necessarily equal. In some cases, if all sides of a quadrilateral are equal, then that particular quadrilateral is identified as a square or a rhombus.Q1: If the ratio of the interior angles of a quadrilateral is 1 : 2 : 3 : 4, the largest angle value is:62 degrees30 degrees108 degrees144 degreesQ2: The interior angle sum property of a quadrilateral states that:Sum of all the interior angles adds upto 180 degrees.Sum of all the interior angles adds upto 90 degrees.Sum of all the interior angles adds upto 190 degrees.Sum of all the interior angles adds upto 360 degrees.Q3: For a quadrilateral ABCD, if $$A = 3x+9, B = 5x+20, C = 3x and D = 2x+6,$$ what is the value of $$D$$?$$66$$$$36$$$$46$$$$56$$Q4: A quadrilateral has _____ & _____ number of edges and vertices.2,48,124,84,4Q5: The opposite angles of a quadrilateral PQRS are given to be equal. If $$PQ = 7 cm$$, the value of RS is:Cannot be determined4 cm3 cm7 cm Quadrilateral just means "four sides"(quad means four, lateral means side). A quadrilateral has four-sides, it is 2-dimensional (a flat shape), closed (the lines join up), and has straight sides. Drag the points: geometry/images/geom-quad.js?mode=choose (Also see this on Interactive Quadrilaterals) Properties A quadrilateral has: four sides (edges) four vertices (corners) interior angles that add to 360 degrees: Try drawing a quadrilateral, and measure the angles. They should add to 360 Types of Quadrilaterals There are special types of quadrilateral: Some types are also included in the definition of other types! For example a square, rhombus and rectangle are also parallelograms. See below for more details. Let us look at each type in turn: The Rectangle the little squares in each corner mean "right angle" A rectangle is a four-sided shape where every angle is a right angle (90). Also opposite sides are parallel and of equal length. The Square the little squares in each corner mean "right angle" A square has equal sides (marked "s") and every angle is a right angle (90) Also opposite sides are parallel. A square also fits the definition of a rectangle (all angles are 90), and a rhombus (all sides are equal length). The Rhombus A rhombus is a four-sided shape where all sides have equal length (marked "s"). Also opposite sides are parallel and opposite angles are equal. Another interesting thing is that the diagonals (dashed lines) meet in the middle at a right angle. In other words they "bisect" (cut in half) each other at right angles. A rhombus is sometimes called a rhomb or a diamond. The Parallelogram A parallelogram has opposite sides parallel and equal in length. Also opposite angles are equal (angles "A" are the same, and angles "B" are the same). NOTE: Squares, Rectangles and Rhombuses are all Parallelograms! A parallelogram with: all sides equal and angles "A" and "B" as right angles is a square! Trapezoid Isosceles Trapezoid A trapezoid (called a trapezium in the UK) has a pair of opposite sides parallel. And a trapezium (called a trapezoid in the UK) is a quadrilateral with NO parallel sides: Trapezoid Trapezium In the US: a pair of parallel sides NO parallel sides In the UK: NO parallel sides a pair of parallel sides (the US and UK definitions are swapped over!) An Isosceles trapezoid, as shown above, has left and right sides of equal length that join to the base at equal angles. The Kite Hey, it looks like a kite (usually). It has two pairs of sides: Each pair is made of two equal-length sides that join up. Also: the angles where the two pairs meet are equal the diagonals, shown as dashed lines above, meet at a right angle one of the diagonals bisects (cuts equally in half) the other ... and that's it for the special quadrilaterals. The only regular (all sides equal and all angles equal) quadrilateral is a square. So all other quadrilaterals are irregular. Quadrilateral definitions are inclusive. So we include a square in the definition of a rectangle. (We don't say "Having all 90 angles makes it a rectangle except when all sides are equal then it is a square.") This may seem odd, as in daily life we think of a square as not being a rectangle ... but in mathematics it is. Using the chart below we can answer such questions as: Is a Square a type of Rectangle? (Yes) Is a Rectangle a type of Kite? (No) Complex Quadrilaterals Oh Yes! when two sides cross over, we call it a "Complex" or "Self-Intersecting" quadrilateral, like these: They still have 4 sides, but two sides cross over. Polygon A quadrilateral is a polygon. In fact it is a 4-sided polygon, just like a triangle is a 3-sided polygon, a pentagon is a 5-sided polygon, and so on. Play with Them Now that you know the different types, you can play with the Interactive Quadrilaterals. Other Names A quadrilateral can sometimes be called: a Quadrangle ("four angles"), so it sounds like "triangle" a Tetragon ("four polygon"), so it sounds like "pentagon", "hexagon", and so on 621,622,623,624,763,764, 2128, 2129, 3230, 3231 Copyright 2025 Rod Pierce Examine the properties of the quadrilateral, including side lengths and angle measurement. Shape A : 4 equal angles (right angles), each pair of opposite sides are equal in length, 2 pairs of parallel sides. Shape B : One pair of equal angles (right angles), one pair of parallel sides. Shape C : 4 equal angles (right angles), 4 equal sides, 2 pairs of parallel sides. Shape D : 4 equal angles (right angles), each pair of opposite sides are equal in length, 2 pairs of parallel sides. Shape E : 2 pairs of equal angles, each pair of opposite sides are equal in length, 2 pairs of parallel sides. Page 2 Here you will learn about 2D shapes, including the attributes of various 2D shapes and symmetry. Students first learn about 2D shapes in kindergarten and first grade with their work in geometry, identifying and classifying shapes by their properties. They expand their knowledge of 2D shapes as they progress through elementary and middle school. 2D shapes are flat shapes that can be drawn on a flat surface (or plane). They have two dimensions, length and width, and have no thickness. 2D shapes can be grouped by the dimensions they have. Here are some familiar 2D shapes. Polygons are 2D shapes made from straight lines that meet at points called vertices. There are two different types of polygons. Regular polygonsIrregular polygonsRegular polygons have equal side lengths and equal interior angles. Interior angles are the angles inside the polygon. Equilateral Triangle Square Regular Hexagon Irregular polygons do not have all equalsides and do not have all equal angles. Interior angles are the angles inside the polygon. Right Triangle Rectangle Irregular Hexagon Step-by-step guide: Polygons Step-by-step guide: Regular polygons Step-by-step guide: Irregular polygons Use this quiz to check your 2nd, 3rd, and 4th grade students understanding of 2D shape. 10+ questions with answers to identify areas of strength and support! DOWNLOAD FREE x Use this quiz to check your 2nd, 3rd, and 4th grade students understanding of 2D shape. 10+ questions with answers to identify areas of strength and support! DOWNLOAD FREE Symmetry is when an object can be divided into equal halves, where the two halves are mirror images of each other. Line symmetryLine symmetry is when an object can be divided in half with the two halves being reflections of each other. Both regular polygons and irregular polygons can have lines symmetry. Square A square has 4 lines of symmetry. Equilateral Triangle An equilateral triangle has 3 lines of symmetry. The lines of symmetry of a regular polygon are equal to the number of sides. Trapezoid This trapezoid is not a regular polygon and has only 1 line of symmetry. Step-by-step guide: Line symmetry Step-by-step guide: Symmetry Lets look at the properties of some of the most common 2D Shapes. Name of polygonProperties of polygonEquilateral triangle 3 vertices 3 equal sides 3 equal angles Each interior angle is 60^{\circ} 3 lines of symmetry 3 times of rotational symmetry within one full turn Square 4 vertices 4 equal sides 4 equal angles Each interior angle is 90^{\circ} 4 lines of symmetry 4 times of rotational symmetry within one full turn Regular pentagon 5 vertices 5 equal sides 5 equal angles Each interior angle is 108^{\circ} 5 lines of symmetry 5 times of rotational symmetry within one full turn Regular hexagon 6 vertices 6 equal sides 6 equal angles Each interior angle is 120^{\circ} 6 lines of symmetry 6 times of rotational symmetry within one turn Regular octagon 8 vertices 8 equal sides 8 equal angles Each interior angle is 135^{\circ} 8 lines of symmetry 8 times of rotational symmetry within one turn Step-by-step guide: Pentagon shape Step-by-step guide: Hexagon shape Step-by-step guide: How to draw a hexagon Step-by-step guide: Octagon shape How does this relate to kindergarten 5 th grade math? Kindergarten: Geometry (K.G.A.3)Identify shapes as two-dimensional (lying in a plane, flat) or three-dimensional (solid). Grade 1: Geometry (1.G.A.2)Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape and compose new shapes from the composite shape. Grade 2: Geometry (2.G.A.1)Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. Grade 4: Geometry (4.G.A.3)Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. Grade 5: Geometry (5.G.B.4)Classify two-dimensional figures in a hierarchy based on properties. There are a lot of ways to use 2D shapes. For more specific step-by-step guides, check out the individual pages linked in the What are 2D shapes? section above or read through the examples below. In order to identify a 2D shape, a polygon, or a regular polygon. Recall the definition. Explain how the 2D shape fits the definition. What type of 2D shape is a stop sign? A stop sign is a polygon with 8 sides. 2Explain how the 2D shape fits the definition. Polygons that have 8 sides are called octagons. So, a stop sign is an octagon. Is a circle a polygon? A polygon is a 2D shape made up of straight lines that meet at points called vertices. Explain how the 2D shape fits the definition. A circle is a 2D shape, but it is not made up of straight lines, so it is not a polygon. Is a pentagon a polygon? A polygon is a 2D shape made up of straight lines. Explain how the 2D shape fits the definition. A pentagon is a 2D shape made up of straight lines, so it is a polygon. Is the parallelogram a regular polygon? Regular polygons have equal side lengths and equal interior angles. Explain how the 2D shape fits the definition. The parallelogram does not have equal side lengths and does not have equal interior angles, so it is not a regular polygon. How many lines of symmetry does this rectangle have? Line symmetry is when an object can be divided in half, with the two halves being mirror images or reflections of each other. Explain how the 2D shape fits the definition. In this case, the rectangle can be divided down the middle vertically and across the middle horizontally. So there are 2 lines of symmetry. Name the shape. Octagons are polygons with 8 sides. Irregular polygons are polygons that do not have equal sides and equal angles. Explain how the 2D shape fits the definition. The shape is an octagon because it has eight sides and eight angles. The sides and the angles are not equal, so it is also an irregular octagon. Instead of relying on worksheets, use manipulatives and real world objects in class so that students can see and understand the different shapes. Link art projects to 2D shapes and symmetry so that students can apply the math to creative projects. Provide students with cut-outs of the actual shapes so that they can measure the side lengths and angle measurements to develop their understanding of regular shapes versus irregular shapes. Include in lesson plans math centers where your learners can rotate through various 2D shape activities that are comprised of hands-on activities with pattern blocks, shape flashcards, and digital activities with math games so that students can learn shapes and their attributes. Reinforce essential vocabulary as it pertains to the geometrical shapes so students can recall the shapes names and see how they are used in real life. Confusing the different shapesFor example, thinking that a pentagon is a hexagon or vice versa. Thinking that a rectangle is a regular polygonSquares are the only regular quadrilaterals. Rectangles have the same interior angles, but they do not have the same side lengths. Thinking that figures cant have more than one line of symmetry2D shapes can have more than one line of symmetry or no lines of symmetry. Rotational symmetry/lines of symmetryLines of symmetry are often confused with rotational symmetry. A line of symmetry on a two-dimensional shape divides the shape equally into two symmetrical pieces. Rotational symmetry is the number of times a shape fits into itself when rotated around its center. Thinking that an irregular hexagon is not a hexagonIf students have too much exposure to regular hexagons and not enough of irregular hexagons, they may believe that a regular hexagon is the only type of hexagon. Be sure to vary their exposure to hexagonal shapes and give them opportunities to work with and draw hexagons that are not regular. This applies to all other types of polygons as well. Regular polygons have equal side lengths and equal interior angles. The only figure that has equal side lengths and equal interior angles is the regular hexagon. The pentagon has five vertices. The vertices are the corners of the shape. An irregular hexagon is a 6 sided shape that does not have equal side lengths or equal interior angles. This polygon was the only one with 6 sides. A square is a regular polygon with four equal sides and four equal interior angles. So it will have four lines of symmetry. A rectangle will only have two lines of symmetry, a kite and a parallelogram have no lines of symmetry. By definition, line symmetry is when an object can be divided in half, with the two halves being mirror images or reflections of each other. In this case, the snowflake has six lines of symmetry. No lines of symmetry. Two lines of symmetry No lines of symmetry One line of symmetry Are geometric figures that are two dimensional with curved line edges polygons? By definition, polygons are enclosed 2D shapes made up of straight lines that meet at points. If a shape has a curved line edge, it will not be a polygon. How do you find the area and perimeter of polygons? Perimeter is the distance around the shapes, so you can just add up the side lengths. The area is the space within the shapes. There are various formulas you will learn to find the areas of shapes such as triangles, squares, rectangles, and parallelograms. How do you find the sum of the interior angle measurements of all regular polygons? The sum of the interior angles of a polygon is always the number of sides minus 2 times 180 . You will learn this as you move into high school. What is a cuboid? A cuboid is another name for a cube, which are 3D shapes where each face is a square. What is a rhombus? A rhombus is a parallelogram, so opposite sides are equal and opposite sides are parallel, and in addition to that, all four sides are equal. Triangles Quadrilateral Perimeter At Third Space Learning, we specialize in helping teachers and school leaders to provide personalized math support for more of their students through high-quality, online one-on-one math tutoring delivered by subject experts. Each week, our tutors support thousands of students who are at risk of not meeting their grade-level expectations, and help accelerate their progress and boost their confidence. Find out how we can help your students achieve success with our math tutoring programs. We use essential and non-essential cookies to improve the experience on our website. Please read our Cookies Policy for information on how we use cookies and how to manage or change your cookie settings.AcceptPrivacy & Cookies Policy Share copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. A quadrilateral is a flat geometric shape having four straight sides and four vertices. It is a type of polygon. The word quadrilateral is derived from the Latin words quadri, meaning four, and latus, meaning side. Quadrilateral Quadrilateral Angle Sides Has four straight sides; if ABCD is a quadrilateral, AB, BC, CD, and DA are the four sidesHas four vertices creating four angles; points A, B, C and Dare the four vertices creating angles ABC, BCD, CDA, and DABAll four interior angles add up to 360; so ABC+ BCD + CDA + DAB = 360 In a quadrilateral ABCD, find BCD, if ABC = 80, CDA = 110, and DAB = 100.Solution:As we know,In quadrilateral ABCD, ABC+ BCD + CDA + DAB = 360, here ABC = 80, CDA = 110, and DAB = 10080 + BCD +110 + 100 = 360BCD = 360- (80 + 110 + 100)BCD = 360 290BCD = 70 There are six basic types of quadrilaterals: 1) rectangle, 2) square, 3) parallelogram, 4) rhombus, 5) trapezoid, and 6) kite. Each one of them and their basic properties are given below: Special Quadrilateral Shapes Types a) Convex Quadrilateral It is a type of quadrilateral with all its interior angles measuring less than 180. A convex quadrilateral has both its diagonals inside the closed figure. Square, rectangle, rhombus, and trapezoid are examples of a convex quadrilateral. b) Concave Quadrilateral It is a type of quadrilateral with at least one of its interior angles measuring greater than 180. A concave quadrilateral has one of its diagonals outside the closed figure. Dart or arrowhead is an example of concave quadrilateral. a) Regular Quadrilateral It is a type of quadrilateral with four sides of equal length and four angles of equal measure. Square is the only regular quadrilateral. b) Irregular Quadrilateral It is a type of quadrilateral having one or more sides of unequal length and one or more angles of unequal measure. Trapezoid and Kite are examples of irregular quadrilateral. a) Simple Quadrilateral It is a type of quadrilateral with no self-intersecting sides. It can be either convex or concave. Square, rectangle, and dart are some examples of simple quadrilateral. b) Complex Quadrilateral Also known as a crossed quadrilateral, it is a type of quadrilateral having self-intersecting sides. A complex quadrilateral is also known as a crossed quadrilateral, bow-tie quadrilateral, or butterfly quadrilateral. Crossed trapezoid, crossed-square, and crossed-rectangle are some examples of complex quadrilateral. Rectangle-shaped objects Books, tabletops, mobile phones, and TV screens.Square-shaped objects Chessboard, wall clock, and a slice of bread.Parallelogram-shaped objects Street and traffic sign, the structures on the neck of a guitar, and the United States Postal Service logo.Rhombus-shaped objects Section of a baseball field, mirrors, earrings, and rings.Trapezoid-shaped objects Handbags, popcorn tins, guitar-like dulcimer, and truss bridge supports.Kite-shaped objects A flying kite, wall hanging, and earrings. Q1. Is a trapezoid always a quadrilateral? Ans. Yes, all trapezoids are quadrilaterals. Q2. Are all parallelograms quadrilaterals? Ans. Yes, all parallelograms are quadrilaterals. Q3. Is a kite always a quadrilateral? Ans. Yes, a kite is always a quadrilateral. Q4. Are all quadrilaterals a polygon? Ans. Yes, quadrilaterals are a four-sided polygon. Q5. Are all rectangles a quadrilateral? Ans. Yes, all rectangles are quadrilaterals. Q6. Is every quadrilateral a rectangle? Ans. No, all quadrilaterals are not rectangles. Q7. Are all quadrilaterals a square? Ans. No, all quadrilaterals are not squares. Q8. Is a square always a quadrilateral? Ans. Yes, a square is always a quadrilateral. Q9. Are all quadrilaterals a rhombus? Ans. No, every quadrilateral is not a rhombus. Q10. Name the quadrilateral with exactly one pair of parallel sides. Ans. Trapezoid. Q11. Name the quadrilateral with two pairs of opposite sides parallel. Ans. Parallelogram. Q12. Name three quadrilaterals with no right angles. Ans. Parallelogram, rhombus and kite are three quadrilaterals with no right angles. Q13. Name a quadrilateral with four right angles. Ans. Rectangle. Q14. Name a quadrilateral with four congruent sides. Ans. Square. Q15. Name a quadrilateral with only two right angles. Ans. Right trapezoid. Q16. Name a quadrilateral that is equilateral but not equiangular. Ans. Rhombus. Q17. Name a quadrilateral that is equiangular but not equilateral. Ans. Rectangle. Q18. Name the quadrilaterals having diagonals perpendicular to each other. Ans. The quadrilaterals that have their diagonals perpendicular to each other are a square, a rhombus and a kite. Q19. Which quadrilaterals have congruent diagonals? Ans. A square, an isosceles trapezoid, and a rectangle are quadrilaterals having congruent diagonals. Q20. Is a diamond a quadrilateral? Ans. Yes, a diamond is a quadrilateral because it has four closed straight sides. Last modified on June 8th, 2024

What shape has 4 sides and 2 right angles. Which shapes has 4 equal sides. What shape has 4 right angles. A shape with 4 sides and 3 corners. What shape has 4 sides and 4 angles. Which shape has 4 sides. What do you call a shape with 4 sides. What shapes have 4 equal sides and 4 right angles.

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