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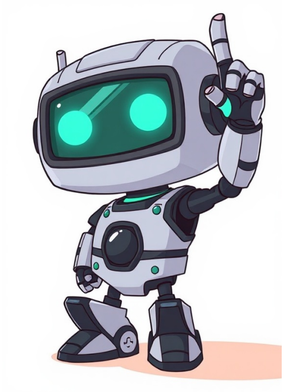

Quadrilaterals are two-dimensional four-sided polygons on a plane.Quadrilaterals have the following properties:four sides,two diagonals,four internal angles (or vertices),the interior angles add up to 360.The following diagram shows the properties of some quadrilaterals: square, rectangle,parallelogram, trapezoid, rhombus, kite.Scroll down the page for more examples on the properties of a quadrilaterals. A convex quadrilateral has all interior angles less than 180.A concave quadrilateral has at least one interior angle greater than 180.(memory tool: concave has a "cave" in it)Angles In A Quadrilateral WorksheetTypes Of QuadrilateralsWe will describe the following types of quadrilaterals: parallelogram,rhombus, rectangle, square, trapezoid,kite and trapezium.ParallelogramA parallelogram is a four-sided polygon that has the following properties:opposite sides are parallel,opposite sides are equal,opposite angles are equal,diagonals bisect each other. RhombusA rhombus is a four-sided polygon that has the following properties:opposite sides are parallel,all four sides are equal,opposite angles are equal,diagonals bisect each other at right angles,two lines of symmetry (which are the diagonals).A rhombus is a special case of a parallelogram with four equal sides.RectangleA rectangle is a four-sided polygon that has the following properties:opposite sides are parallel,opposite sides are equal,its angles are all right angles (i.e. 90),diagonals bisect each other,diagonals are equal,two lines of symmetry.A rectangle is a special case of a parallelogram with all angles equal to 90. A square is a four-sided polygon that has the following properties:opposite sides are parallel,all sides are equal,its angles are all right angles (i.e. 90),diagonals bisect each other,diagonals are equal,four lines of symmetry.A square is a special case of a rectangle in which all the sides are equal.Take note that a diagonal of a square makes two45-45-90 triangleswith the sides of the square. Therefore, when given the length of a side, you will be able towork out the length of the diagonal. Or when given the length of the diagonal, you will beable to figure out the length of the side.TrapezoidThere are two possible definitions for trapezoids.A trapezoid is a four-sided polygon that has exactly one pair of opposite sides parallel.Using this definition, a parallelogram would not be considered a trapezoid.A trapezoid is a four-sided polygon that has at least one pair of opposite sides parallel.Using this definition, a parallelogram is a special case of a trapezoid.A trapezoid is also called a trapezium (UK English).p is parallel to ql is parallel to mAn isosceles trapezoid has the following properties:the two non-parallel sides are equal in length,the base angles are equal.A right trapezoid is a trapezoid with two right angles. A kite is a four-sided polygon that has the following properties:two pairs of adjacent sides equal,one pair of opposite angles equal,longer diagonal bisects the shorter diagonal at right angles,one line of symmetry.TrapeziumA trapezium represents a different shape depending on whether you are in the US or not.In the US, a trapezium is a quadrilateral that has no parallel sides. (Outside the US, a quadrilateral that has no parallel sides is called an irregular quadrilateral.)Outside the US, a trapezium is a quadrilateral that has a pair of parallel sides. (In the US, this quadrilateral is called a trapezoid.)Worksheet on Properties of QuadrilateralsHow to identify and classify quadrilaterals given some propertiesShow Video LessonOverview of quadrilateralsConvex quadrilaterals, Concave Quadrilaterals, trapezoid, parallelograms, rectangles, rhombi and squares.Show Video LessonQuadrilaterals: classifying and the sum of their anglesShow Video LessonIdentify Special Quadrilaterals using a tree diagramShow Video Lesson Try out our new and fun Fraction Concoction Game.Add and subtract fractions to make exciting fraction concoctions following a recipe.There are four levels of difficulty: Easy, medium, hard and insane. Practice the basicsof fraction addition and subtraction or challenge yourself with the insane level. We welcome your feedback, comments and questions about this site or page. Please submit your feedback or enquiries via our Feedback page. 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 Quadrilateral is a two-dimensional figure characterized by having four sides, four vertices, and four angles. It can be broadly classified into two categories: concave and convex. Within the convex category, there are several specific types of quadrilaterals, including trapezoids, parallelograms, rectangles, rhombus, and squares.The sum of the interior angles of a Quadrilateral is 360. Let's learn what is a quadrilateral, its shapes, types, properties, formulas, and examples in detail.What are Quadrilaterals?A quadrilateral is defined as a four-sided polygon with four angles The quadrilateral is a type of polygon in which the sides are defined in a proper pattern.A Quadrilateral is a shape with four sides, four corners, and four angles. No matter what type of quadrilateral it is, the total of all its inside angles always adds up to 360 degrees. Quadrilaterals come in various forms, each with distinct properties that define their angles, sides, and symmetry. Examples of quadrilaterals include squares, rectangles, parallelograms, rhombuses, trapezoids, and kites. Each type has its special features and properties but they all are four-sided figures.For example, in the diagram above , the quadrilateral defined as ABCD, ADCB, BCDA, CDAB, etc. It cannot be defined as ACBD or BDAC. Here, the quadrilateral's sides are AB, BC, CD, and DA, and the diagonals are AC and BD.Properties of QuadrilateralThe properties of a quadrilateral are:It has 4 sides (AB, BC, CD, and DA) .It has 4 vertices (A, B, C, D) .It has 4 angles. (A, B, C, D) .It has 2 diagonals. (AC and BD) The sum of its internal angles is 360. (A + B + C + D = 360) .The sum of its exterior angles is 360.Convex and Concave QuadrilateralBased on their properties, quadrilaterals are divided into two major types: Convex quadrilaterals and Concave quadrilaterals.These concave and convex quadrilaterals can be further classified into their subdivisions.Shape of Different QuadrilateralsConcave QuadrilateralQuadrilaterals that have one interior angle greater than 180 and one diagonal lies outside the quadrilateral are called concave quadrilaterals.One of the examples of a concave quadrilateral is a Dart. It is a quadrilateral with bilateral symmetry like a kite, but with a reflex interior angle.Diagram of a DartHere, in the image given below, one of the interior angles of the quadrilateral is 210, which is greater than 180. Therefore, the quadrilateral is a concave quadrilateral.Concave QuadrilateralQuadrilaterals that have all four interior angles less than 180 are called concave quadrilaterals. There are various types of Concave Quadrilaterals, which are :TrapeziumKiteParallelogramRectangleRhombusSquareConvex QuadrilateralCommon Types of QuadrilateralsQuadrilaterals exhibit diverse shapes, ranging from the symmetrical squares and rectangles to the more complex and irregular parallelograms and trapezoids.SquareA quadrilateral that has all sides equal and opposite sides parallel and all interior angles equal to 90 is called a Diagonals of squares bisect each other perpendicularly. Note that all squares are rhombus but not vice-versa.Properties of SquareThe properties of a square are:All four sides of a square are equal to each other.The interior angles of a square are 90.The diagonal of a square bisects each other at 90.The opposite sides are parallel, and the adjacent sides are perpendicular in a square.Square Formula Area of Squareside2Perimeter of Square4 sideWhere side is the length of any one of the sides.RectangleRectangle is a quadrilateral whose opposite sides are equal and parallel and all the interior angles equal to 90. Diagonals of a rectangle bisect each other. Illustration of a RectangleNote that all the rectangles are parallelograms, but the reverse of this is not true. Rectangle PropertiesThese are some of the important properties of rectangle:The opposite sides of a rectangle are parallel and equal. In the above example, AB and CD are parallel and equal, and AC and BD are parallel and equal.All 4 angles of a rectangle are equal and are equal to 90. A = B = C = D = 90.The diagonals of a rectangle bisect each other and the diagonals of a rectangle are equal, here, AD = BC.Rectangle FormulasArea of Rectanglelength widthPerimeter of Rectangle2 (length + width)RhombusRhombus is a quadrilateral that has all sides equal and opposite sides parallel. Opposite angles of a rhombus are equal, and diagonals of the Rhombus bisect each other perpendicularly. .Rhombus DiagramNote all rhombus are parallelograms, but the reverse of this is not true.Properties of RhombusHere are some of the key properties of a Rhombus:All 4 sides of a rhombus are equal. AB = BC = CD = AD.The opposite sides of a rhombus are parallel and equal. In the image above, AB is parallel to CD and AD is parallel to BC.The diagonals of a rhombus Bisect each other at 90.Rhombus FormulasArea of Rhombus1/2 (diagonal1 diagonal2)Perimeter of Rhombus4 sideWhere side is the length of any one of the sides.ParallelogramParallelogram is a quadrilateral whose opposite sides are equal and parallel. Opposite angles of a Parallelogram are equal, and its diagonals bisect each other.Parallelogram IllustrationProperties of ParallelogramThe properties of a Parallelogram are:The opposite sides of a parallelogram are parallel and equal. In the above example, AB and CD are parallel and equal, and AC and BD are parallel and equal.The opposite angles in a parallelogram are equal. A = D and B = C.The diagonals of a parallelogram bisect each other.Paralellogram FormulasArea of Parallelogrambase heightPerimeter of Parallelogram2 (a+b)Where, a and b are the adjacent sides of a parallelogram.TrapeziumA trapezium is a quadrilateral that has one pair of opposite sides parallel. In a regular trapezium, non-parallel sides are equal, and its base angles are equal. The area of trapezium is 1/2 Sum of parallel sides Distance between them.Trapezium IllustrationProperties of TrapeziumHere are two important properties of a trapezium:The sides of the trapezium that are parallel to each other are known as the bases of trapezium. In the above image, AB and CD are the base of the trapezium.The sides of the trapezium that are non-parallel are called the legs. In the above image, AD and BC are the legs.Trapezium FormulasArea of Trapezium1/2 (a+b) (h)Perimeter of Trapeziuma+b+c+dWhere a, b, c, d are the side of trapezium and (a and b) are the parallel sides and the height (h) is the perpendicular distance between these parallel sides.KiteKite has two pairs of equal adjacent sides and one pair of opposite angles equal. Diagonals of kites intersect perpendicularly. The longest diagonal of the kite bisects the smaller one.Kite IllustrationProperties of KiteLet's discuss some of the properties of a kite.A kite has two pairs of equal adjacent sides. For example, AC = BC and AD = BD.The interior opposite angles that are obtuse are equal; here, A = B.The diagonals of a kite are perpendicular to each other; here, AB is perpendicular to CD.The longer diagonal of the kite bisects the shorter diagonal. Here, CD bisects AB.Kite FormulasArea of Kite (diagonal1 x diagonal2)Perimeter of Kite2(a + b)where, aandbrepresent the lengths of thetwo pairs of equal sidesof the kite.Quadrilateral TheoremsSum of Interior Angles Theorem: In any quadrilateral, the sum of the measures of its interior angles equals 360 degrees.Opposite Angles Theorem: Within a quadrilateral, the sum of the measures of two opposite angles is 180 degrees.Consecutive Angles Theorem: Adjacent (consecutive) angles in a quadrilateral are supplementary, meaning their measures sum up to 180 degrees.Diagonals of Parallelograms Theorem: The diagonals of a parallelogram bisect each other, dividing each diagonal into two equal segments.Opposite Sides and Angles of Parallelograms Theorem: In a parallelogram, opposite sides are equal in length, and opposite angles are congruent.Diagonals of Rectangles and Rhombuses Theorem: In rectangles and rhombuses, the diagonals are equal in length. Additionally, the diagonals of a rectangle are congruent, while those of a rhombus bisect each other at right angles.Diagonals of Trapezoids Theorem: The diagonals of a trapezoid may have different lengths. However, the segment joining the midpoints of the non-parallel sides is parallel to the bases and is equal to half their sum.Quadrilateral Lines of SymmetryA quadrilateral has lines of symmetry that are imaginary lines that pass through the center of the quadrilateral and divide it into two similar halves. A line of symmetry can:Match two vertices on one side of the line with two vertices on the other.Pass through two vertices, and the other two vertices pair up when folded over the line.A regular quadrilateral has four lines of symmetry.For example, a square has four lines of symmetry, including both its diagonals and the lines joining the midpoints of its opposite sides.A rectangle has two lines of symmetry, including the lines joining the midpoint of the opposite and parallel lines.The following table illustrates how the sides and angles of quadrilaterals make them different from one another:Characteristics of QuadrilateralsSides and anglesSquareRectangleRhombusParallelogramTrapezium/Trapezoid All sides are equalYesNoYesNoNoOpposite sides are parallelYesYesYesYesYes (Only one pair of opposite sides are parallels) Opposite sides are equalYesYesYesYesNoAll the angles are of the same measureYes (90)Yes (90)NoNoNoOpposite angles are of equal measureYesYesYesYesNoDiagonals bisect each otherYesYesYesYesNoTwo adjacent angles are supplementaryYesYesYesYesYes (Only adjacent Angles along the non parallel side are supplementary)Lines of Symmetry 42200Solved Examples on QuadrilateralsHere are some solved examples on quadrilaterals for your help.Question 1: The perimeter of quadrilateral ABCD is 46 units. AB = x + 7, BC = 2x + 3, CD = 3x - 8, and DA = 4x - 6. Find the length of the shortest side of the quadrilateral.Solution:Perimeter = Sum of all sides= 46 = 10x - 4 or [x = 5]That gives, AB = 12 units, BC = 13 units, CD = 7 units, DC = 14 unitsHence, length of shortest side is 7 units (i.e. CD).Question 2: Given a trapezoid ABCD (AB || DC) with median EF. AB = 3x - 5, CD = 2x -1 and EF = 2x + 1. Find the value of EF.Solution:We know that the Median of the trapezoid is half the sum of its bases.= EF = (AB + CD) / 2= 4x + 2 = 5x - 6 or [x = 8]Therefore EF = 2x + 1 = 2(8) + 1 => EF = 17 units.Question 3: In a Parallelogram, adjacent angles are in the ratio of 1:2. Find the measures of all angles of this Parallelogram.Solution:Let the adjacent angle be x and 2x.We know that in of a Parallelogram adjacent angles are supplementary.= x + 2x = 180 or [x = 60]Also, opposite angles are equal in a Parallelogram.Therefore measures of each angles are 60, 120, 60, 120.Quadrilateral Notes and Solution For Class 9Quadrilateral Class 9 Notes Quadrilateral Class 9 NCERT SolutionsQuadrilateral is a two-dimensional shape with four sides, corners, and angles, with a total interior angle sum of 360 degrees. There are two main types: concave, which has at least one angle greater than 180 degrees, and convex, where all angles are less than 180 degrees. Convex quadrilaterals include trapezoids, parallelograms, rectangles, rhombuses, squares, and kites. Each type has unique properties and formulas for calculating area and perimeter. For instance, the area of a rectangle is length times width, while a rhombuss area is half the product of its diagonals. Symmetry and properties like equal sides or right angles vary among these shapes, making each useful for different applications in fields like architecture and design. 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 TriangleSquareRegular HexagonIrregular polygons do not have all equalsides and do not have all equal angles. Interior angles are the angles inside the polygon. Right TriangleRectangleIrregular 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 The word Quadrilateral is taken from the two different words of the Latin language in which Quadri means four and lateral means sides, showcasing the fact that it has four sides. The interesting fact about a quadrilateral is that it includes a wide range of different shapes with various properties and not necessarily with all equal sides.1.0Quadrilateral Definition in MathematicsThe Quadrilateral is a two-dimensional geometric polygon with four sides, vertices, and four angles. The quadrilateral is constructed by joining the set of four points, for instance, A, B, C, and D, in a two-dimensional plane forming the sides AB, BC, CD, and DA and angles A, B, C, and D.The diagonals of the quadrilateral are formed by joining the opposite vertices; in quadrilateral ABCD, the diagonals are AC and BD.2.0Properties of QuadrilateralsThe properties of quadrilaterals differ with different shapes of the quadrilaterals, that is, rectangle, square, trapezium, etc. Here are some general properties of a quadrilateral, which remain constant for every quadrilateral shape:All quadrilaterals have four sides, four vertices, and four angles.The sum of the interior angles of any quadrilateral is always equal to 360.All the quadrilaterals have only two diagonals connecting the opposite side of the quadrilaterals.Quadrilaterals with all the interior angles less than 180 are known as the convex quadrilaterals. On the other hand, quadrilaterals with at least one interior angle greater than 180 are called concave quadrilaterals.The sum of all the exterior angles of any quadrilateral is also equal to 360.3.0Quadrilateral TypesQuadrilaterals, based on different properties and shapes, are divided into different types of quadrilaterals. Which includes:4.0Formulas Related to QuadrilateralsThe two types of basic formulas of quadrilaterals include the Area and Perimeter of all the quadrilaterals. The Formula for each which are:5.0Solved ProblemsProblem 1: A rectangular garden having a length of 15m and a width of 10m. The gardener wants to lay out grass over the entire garden. How much area does he need to cover with grass?Solution: According to question length = 15m and breadth = 10mArea of rectangular garden = lengthBreadth= 1510=150m2Hence, the Area he needs to cover with grass is 150m2Problem 2: In a trapezium, the lengths of the parallel sides are 10 cm and 14 cm. The distance between the parallel sides (height) is 8 cm. Find the area of the trapezium.Solution: According to the questionlength of the parallel side (1) let a = 10cmlength of the parallel side (2) let b = 14cmHeight between parallel sides = 8cmThe Area of the Trapezium = 21(sumofparallelsides)height= 21(10+14)8=244=96cm2Problem 3: A rhombus has one diagonal that is 12 cm longer than the other. The area of the rhombus is 144 cm. Find the lengths of both diagonals.Solution: According to the question,The area of the rhombus = 144 cm221diagonal1diagonal2=1442112diagonal(2)=1446diagonal(2)=144diagonal2=144/6=24cm Quadrilaterals are among the most fundamental shapes in geometry. Though simple in appearance, they form the basis of countless mathematical ideas and appear constantly in real life, from floor tiles and windows to playing cards and kites. In this article, well explore quadrilaterals in depthcovering definitions, properties, classifications, formulas, and applications.Definition of a QuadrilateralA quadrilateral is a polygon with exactly four straight sides and four vertices.QuadrilateralPolygon family: It belongs to the class of polygons because it is a closed figure formed by line segments.Angle sum: The sum of the four interior angles of a quadrilateral is always 360.Diagonals: Quadrilaterals have exactly two diagonals, formed by connecting opposite vertices.Quadrilaterals This result can be explained because every quadrilateral can be divided into two triangles, each with an angle sum of 180.Elements and Components of QuadrilateralsSides and VerticesAdjacent sides: Two sides that share a common vertexOpposite sides: Two sides that do not share a vertexAdjacent vertices: Two vertices connected by a sideOpposite vertices: Two vertices not connected by a sideSides and Vertices of QuadrilateralsAnglesInterior angles: Angles formed inside the quadrilateralExterior angles: Angles formed outside the quadrilateral (sum = 360)Adjacent angles: Two angles that share a common sideOpposite angles: Two angles that do not share a sideAngles of QuadrilateralsDiagonalsMain diagonal: Usually the longer diagonalSecondary diagonal: Usually the shorter diagonalDiagonal intersection: Point where diagonals cross (if they intersect)Diagonals of QuadrilateralsClassification of QuadrilateralsHierarchical Classification Thus, Trapezoid, Parallelogram, and Kite are not independent figures; they are special cases of quadrilaterals, belonging to the set of Quadrilaterals.Special QuadrilateralsParallelogramOpposite sides are parallel and equal.Opposite angles are equal.Consecutive angles are supplementary.Diagonals bisect each other.ParallelogramRectangleA parallelogram with four right angles.Opposite sides equal, diagonals equal in length.RectangleRhombusA parallelogram with all four sides equal.Diagonals are perpendicular and bisect each other.Opposite angles are equal.RhombusSquareA special quadrilateral that is both a rectangle and a rhombus.Four equal sides and four right angles.Diagonals equal, perpendicular, and bisect each other.SquareTrapezoidAt least one pair of opposite sides is parallel.Isosceles trapezoid: non-parallel sides are equal, diagonals equal, base angles equal.Right trapezoid: one right angle.TrapezoidKiteTwo pairs of adjacent sides are equal.One diagonal is an axis of symmetry; diagonals meet at right angles.KiteClassification by Geometric PropertiesBy ConvexityConvex Quadrilateral: All interior angles < 180; diagonals lie insideConcave Quadrilateral: One interior angle > 180; one diagonal lies outsideComplex Quadrilateral: Self-intersecting; sides cross each otherBy SymmetryNo symmetry: General quadrilateralLine symmetry: Kite, isosceles trapezoidPoint symmetry: ParallelogramBoth line and point symmetry: Rectangle, rhombusFour lines of symmetry: SquareBy Side RelationshipsNo equal sides: Scalene quadrilateralOne pair of equal sides: General quadrilateralTwo pairs of equal sides: Kite, isosceles trapezoid, parallelogramAll sides equal: Rhombus, squareKey FormulasAngle SumAngles of Quadrilaterals\[\angle A + \angle B + \angle C + \angle D = {360^0}\]Area FormulasSquare: $ A = a^2 $Rectangle: $ A = a \times b $Parallelogram: $ A = a \times h $Trapezoid: $ A = \frac{(a+b)\times h}{2} $Rhombus: $ A = \frac{d_1 \times d_2}{2} $Area FormulasReal-Life ApplicationsQuadrilaterals are everywhere:Rectangle: windows, doors, screens, books, whiteboards.Square: chessboards, tiles, Post-it notes.Parallelogram: slanted ramps, roofs, fabric patterns.Rhombus: road signs, kite frames, diamond patterns.Trapezoid: bridges, tables, trapezoidal stair steps.Kite: flying kites, jewelry, craft designs.In architecture, quadrilaterals ensure structural stability. In design, they create patterns. Even in computer graphics, quadrilaterals are essential building blocks. Related Lessons FAQsQ1: Is every quadrilateral convex? No. Concave and self-intersecting quadrilaterals exist.Q2: Can a quadrilateral be regular? Yes. the square is the only regular quadrilateral.Q3: Can a quadrilateral be inscribed in a circle? Yes. Such quadrilaterals are called cyclic quadrilaterals, and they satisfy the property: $\angle A + \angle C = 180^\circ$Q4: Can every quadrilateral be circumscribed around a circle? No. Only tangential quadrilaterals (all sides touch a circle inside) can. They satisfy: $a + c = b + d$Q5: Do diagonals always intersect at the midpoint? No. That property is true only for parallelograms and their special cases (rectangle, rhombus, square).Q6: Do all quadrilaterals have parallel sides? No. Only parallelograms, rectangles, rhombuses, squares, and trapezoids (at least one pair) have parallel sides.Q7: Can a quadrilateral have three right angles? No. If a quadrilateral has three right angles, the fourth must also be a right angle. That shape is a rectangle.Q8: Is every trapezoid also a parallelogram? No. A trapezoid has only one pair of parallel sides, while a parallelogram has two pairs.Q9: Do the diagonals of a rectangle always bisect each other at right angles? No. They bisect each other, but they are only perpendicular in a square.Q10: Can a quadrilateral have all sides different in length? Yes. Such shapes are called irregular quadrilaterals.Q11: Are all rhombuses squares? No. All squares are rhombuses, but not all rhombuses are squares, because a rhombus doesnt need right angles.Q12: Can a quadrilateral be both concave and cyclic? No. Only convex quadrilaterals can be cyclic (inscribed in a circle).Q13: Do kites always have equal diagonals? No. Kites have perpendicular diagonals, but only one diagonal is bisected.Q14: Is a square the only quadrilateral with equal diagonals? No. Rectangles and isosceles trapezoids also have equal diagonals.Q15: Do opposite angles of all quadrilaterals add up to 180? No. This only happens in cyclic quadrilaterals.Q16: Can a quadrilateral have an angle greater than 180? Yes. Thats called a concave quadrilateral.Q17: Is every quadrilateral symmetrical? No. Only special ones like squares, rectangles, rhombuses, kites, and isosceles trapezoids have lines of symmetry.Q18: Do all quadrilaterals tessellate the plane? Yes. Any quadrilateral can tile the plane without gaps or overlaps.Q19: Can the area of any quadrilateral always be found using side lengths only? No. Unlike triangles, quadrilaterals usually need more information (like diagonals, height, or angles).Q20: Do diagonals of all quadrilaterals always intersect inside the shape? No. In concave or self-intersecting quadrilaterals, the diagonals may cross outside the shape.Q21: Is it possible for a quadrilateral to have no parallel sides? Yes. These are called trapeziums (or general quadrilaterals).Final ThoughtsQuadrilaterals are much more than shapes with four sides. They are a bridge between simple polygons like triangles and more complex figures like polygons with many sides. With their rich set of classifications, unique properties, and numerous formulas, quadrilaterals provide essential knowledge in geometry that extends into architecture, engineering, computer science, and even art.Next time you look at a building, a floor pattern, or a kite in the skyremember, youre looking at geometry in action, powered by quadrilaterals. A 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 All quadrilaterals must have four sides and four angles. When you add all four angles together, you get a sum of 360.Quadrilaterals can be regular or irregular:Regular quadrilaterals are both equilateral (all sides have equal length) and equiangular (all angles are 90).Irregular quadrilaterals can be either equilateral or equiangular, or neither.Common Types of QuadrilateralsThere are plenty of quadrilateral examples. Lets focus on the most common quadrilaterals for kids in grade school math:SquareA square is the only quadrilateral that is both equilateral and equiangular. Because squares meet all the criteria for regular quadrilaterals, all squares can technically be considered other types of quadrilaterals.Examples: A chessboard, a slice of bread, a die faceRectangleA rectangle is a quadrilateral with four right angles and opposite sides equal in length. Rectangles are equiangular but not necessarily equilateral. Therefore, they are not regular quadrilaterals, except in the special case of a square.Examples: A book, a door, a chalkboardRhombusEach side of a rhombus has the same length, but all four angles are not necessarily 90. By this definition, a square can be a rhombus, but not all rhombuses are squares.Examples: A diamond shape in playing cards, a kite, a floor tileParallelogramA parallelograms parallel sides are equal, but the angles are not necessarily equal. A rectangle can be a parallelogram, but not vice versa.Examples: A leaning picture frame, a slanted book cover, an eraserTrapezoid / TrapeziumA trapezoid (or trapezium in UK English) has at least one pair of equilateral sides.Examples: A ramp, a lamp shade, a flower pot.Image suggestion: Illustrated quadrilateral family tree diagram showing how each type is related.Fun Activities To Explore QuadrilateralsMake learning geometry and quadrilaterals for kids more fun with these activities:Shape Hunt: Ask your kids to look around and identify different quadrilaterals around the house or classroom.Drawing Challenge: Draw each type of quadrilateral using rulers and grid paper. Encourage them to get creative and turn their drawings into objects or characters.Sorting Game: Sort shapes by sides, angles, or parallel sides. Just remember that some quadrilaterals can fall into multiple categories, like squares and rectangles.Tangram Play: Build shapes using tangram pieces to explore quadrilaterals.Interactive Quiz: Create a mini-quiz where kids guess the type of quadrilateral from images.Why Quadrilaterals Matter in MathQuadrilaterals are just one part of polygons. However, understanding the different types is important to learning geometry:Build Geometry Skills: Aside from laying the groundwork for solving perimeter and area math problems, recognizing different quadrilaterals helps understand symmetry. It also helps students build their spatial reasoning skills.Improve Logical Reasoning: Different types of quadrilaterals are formed based on a shapes sides length and angles. Recognizing which types of shapes can fit into one or more categories can help improve how they think.Connect With the Real World: Kids who want to become architects, engineers, or designers need to have a good spatial understanding of how shapes look and affect the spaces around them.Prodigy Math turns learning topics like quadrilaterals into interactive geometry activities. Kids can enjoy an immersive fantasy world where progressing requires answering math problems. The fun learning experience makes the process more memorable for learners while providing the tools parents and teachers need to track their progress.Image suggestions: An illustrated diagram showing different quadrilaterals (square, rectangle, rhombus, trapezoid, parallelogram) branching out from a central Quadrilaterals box, with side notes highlighting skills they build: geometry, logic, and real-world applications like architecture.Tips for Parents and TeachersEffective learning can look different for each child. However, some good techniques to make sure your kids can tell the difference between a rhombus and a rectangle include:Using Everyday Objects as Examples: Younger children better understand ideas grounded in what they already know. Instead of showing basic shape graphics, give examples in your room or show pictures of things they can see daily.Encourage Hands-On Activities: Kids learn better with practical application, not just by being told what is or isnt a quadrilateral. Give them some graphing paper, a ruler, and a protractor, and guide them through drafting these shapes.Keep Lessons Short and Fun: No matter how fun learning is, an overload of new ideas can lead to burnout or frustration. Keep lessons engaging and space out lessons so that theres enough time to track.Keep Learning Fun With Prodigy MathQuadrilaterals are everywhere, but its important for kids learning geometry to be able to tell the differences between the various types. Knowing what

separates each shape and how to spot it can help kids see math in action.With Prodigy Math, your kids can explore quadrilaterals and other geometry concepts in a playful way. Its free for students and teachers, while parents can sign up for premium memberships to keep the learning going even at home.

Inscribed quadrilaterals in circles. What quadrilaterals can always be inscribed in a circle.