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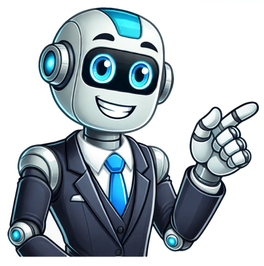

The browser you are using is out of date and not officially supported. You may encounter problems while using the site, please upgrade for a better experience. A quadrilateral is a closed shape that is formed by joining four points among which any three points are non-collinear. In simple words, a quadrilateral 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 Quadrilateral The 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. Square A 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 = DA It 4 right angles. Here, ∠ A= ∠B = ∠C = ∠D = 90° It has 2 pairs of parallel sides. Here, AB ∥ DC and AD ∥ BC It has 2 equal diagonals. Here, AC = BD It has diagonals that are perpendicular to each other. Here, AC ⊥ BD and the diagonals bisect each other. Rectangle A 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 ∥ BC It has 4 right angles. Here, ∠A = ∠B = ∠C = ∠D = 90° The opposite sides of a rectangle are equal. Here, AB = DC and AD = BC It has 2 equal diagonals. Here, AC = BD and the diagonals bisect each other. Parallelogram A 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 ∥ QT The opposite sides of a parallelogram are equal. Here, PQ = RT and PR = QT The opposite angles of a parallelogram are equal. Here, ∠P = ∠T and ∠Q = ∠R It has 2 diagonals that bisect each other. Trapezium A 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. Rhombus A 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 ∥ HG It has 4 equal sides. Here, EH = HG = GF = FE The opposite angles of a rhombus are equal. Here, ∠E = ∠G and ∠H = ∠F It has diagonals that are perpendicular to each other. Here, EG ⊥ HF and the diagonals bisect each other. Kite A 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 = DA It has one pair of opposite angles (which are obtuse) that are equal. Here, ∠A = ∠C It has diagonals that are perpendicular to each other. Here, AC ⊥ BD The longer diagonal bisects the shorter diagonal. Think Tank Can a kite be called a parallelogram? What elements of a trapezium should be changed to make it a parallelogram? Area of Quadrilaterals The 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 Quadrilaterals Check 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 = 360° x + 245 = 360° Therefore, x =115° Example 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.) Square b.) Trapezium Show Solution > go to slidego to slidego to slide Have questions on basic mathematical concepts? Become a problem-solving champ using logic, not rules. Learn the why behind math with our Cuemath's certified experts. Book a Free Trial Class FAQs 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 $$∠D$$?$$66º$$$$36º$$$$46º$$$$56º$$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 Last updated2 October 2014Simple worksheet for angles in triangles and quadrilaterals lesson. With PowerPoint to scribble over if needed.Tes classic free licenceSelect overall rating(no rating)Your rating is required to reflect your happiness.Write a reviewUpdate existing reviewIt's good to leave some feedback.Something went wrong, please try again later.Empty reply does not make any sense for the end userExcellent questions, thank youEmpty reply does not make any sense for the end userWell done.Empty reply does not make any sense for the end userEmpty reply does not make any sense for the end userPlentiful work for differing abilities! Thank you for sharing!Empty reply does not make any sense for the end userReport this resourceto let us know if it violates our terms and conditions. Our customer service team will review your report and will be in touch. . . angle, right, straight line, point, full turn, vertically, opposite, basic, facts, triangle, quadrilateral 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. 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 has four sides, four angles and two 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. , the free encyclopedia that anyone can edit. 117,937 active editors 7,001,122 articles in English The English-language Wikipedia thanks its contributors for creating more than seven million articles! Learn how you can take part in the encyclopedia's continued improvement. GL Mk. II transmitter van Radar, Gun Laying, Mark I, or GL Mk. I for short, was an early World War II radar system developed by the British Army to provide information for anti-aircraft artillery. There were two upgrades, GL/EF (elevation finder) and GL Mk. II (pictured), both improving the ability to determine a target's bearing and elevation. GL refers to the radar's ability to direct the guns onto a target, known as gun laying. The first GL sets were developed in 1936 using separate transmitters and receivers mounted on gun carriages. Several were captured in 1940, leading the Germans to believe falsely that British radar was much less advanced than theirs. The GL/EF attachment provided bearing and elevation measurements accurate to about a degree: this caused the number of rounds needed to destroy an aircraft to fall to 4,100, a tenfold improvement over early-war results. The Mk. II, which was able to directly guide the guns, lowered the rounds-per-kill to 2,750. About 410 Mk. Is and 1,679 Mk. IIs were produced. (Full article...) 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Ma Xifan (d. 947)Colin Blythe (b. 1879)Norris Bradbury (b. 1909)Wynonna Judd (b. 1964) More anniversaries: May 29 May 30 May 31 Archive By email List of days of the year About Seventeen performing "Oh My!" in 2018 South Korean boy band Seventeen made their debut on May 26, 2015, when they performed a showcase for their debut EP 17 Carat in front of a crowd of 1,000 people. Since then, the group have held 9 concert tours, 13 fan meetings, and have performed at a number of music festivals and awards shows. Their concert tours include the Right Here World Tour, which sold over one million tickets, and the Follow Tour, which was noted by Billboard as being the top grossing K-pop tour of 2023. In 2024, Seventeen made their first appearances at festivals in Europe, when they were the first South Korean act to perform at Glastonbury Festival's Pyramid Stage and as headliners for Lollapalooza Berlin. Seventeen's live performances are well regarded by fans and critics alike, and garnered them the award for Top K-pop Touring Artist at the 2024 Billboard Music Awards. (Full list...) Recently featured: Accolades received by Top Gun: Maverick National preserve 76th Primetime Emmy Awards Archive More featured lists Ignace Tonené (1840 or 1841 – 15 March 1916), also known as Nias or by his Ojibwe name Maiagizis ('right/correct sun'), was a Teme-Augama Anishnabai chief, fur trader, and gold prospector in Upper Canada. He was a prominent employee of the Hudson's Bay Company. Tonené was the elected deputy chief before being the lead chief and later the life chief of his community. In his role as deputy, he negotiated with the Canadian federal government and the Ontario provincial government, advocating for his community to receive annual financial support from both. His attempts to secure land reserves for his community were thwarted by the Ontario premier Oliver Mowat. Tonené's prospecting triggered a 1906 gold rush and the creation of Kerr Addison Mines Ltd., although one of his claims was stolen from him by white Canadian prospectors. This photograph shows Tonené in 1909. Photograph credit: William John Winter; restored by Adam Cuerden Recently featured: Australian white ibis Hell Gate Bridge Anemonoides blanda Archive More featured pictures Community portal – The central hub for editors, with resources, links, tasks, and announcements. Village pump – Forum for discussions about Wikipedia itself, including policies and technical issues. Site news – Sources of news about Wikipedia and the broader Wikimedia movement. Teahouse – Ask basic questions about using or editing Wikipedia. Help desk – Ask questions about using or editing Wikipedia. Reference desk – Ask research questions about encyclopedic topics. Content portals – A unique way to navigate the encyclopedia. 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It was released on May 29, 2015, by Pledis Entertainment and distributed by LOEN Entertainment. "Adore U" serves as the lead single for the EP. 17 Carat features five tracks written, co-written, and co-produced by Seventeen's group members. "Adore U" was chosen as the lead single for the EP and was performed on multiple music shows by the group. "Shining Diamond" was used as a pre-single on the group's reality debut show. The group stated that the tracklist was chosen to reflect Seventeen's core concept of "boys' passion".[1] The album has two physical versions: one with a "black" themed photo card set, and the other with a "white" themed photo card set. All copies include a CD containing the songs and a fold-up poster/lyric sheet. "Adore U" is the lead single of the extended play. It was written by Woozi, S.Coups, and Yeon Dong-geon.[2] The Korea Herald states "'Adore U' is a funky pop song about a teenage boy trying to navigate through puppy love."[3] It marks the beginning of the group's trilogy composed of the singles Adore U, Mansae, and Pretty U about a boy meeting, falling in love and asking out a girl. The track was composed and arranged by Woozi, Bumzu, and Yeon Dong-geon. The music video for the single was released on May 29, 2015, and was directed by Dee Shin. The dance choreography accompaniment to the song was choreographed by Hoshi and focuses on "storytelling, and on highlighting each member's strengths onstage".[4] The single has sold more than 38,000 digital copies and peaked at number 13 on the Billboard US World Chart. The EP has sold over 82,972 copies in South Korea.[5] It peaked at number 4 on the Korean Gaon Album Chart[6] and number 8 on the US World Billboard Chart.[7] Year-end lists Critic/publication List Rank Ref. Billboard The 10 Best K-pop Album of 2015 Placed [8] Hoshi participated in the choreography of "Adore U" and "Shining Diamond", Dino choreographed "Jam Jam".[9] Official track list[10]No.TitleLyricsMusicArrangementsLength1."Shining Diamond"WooziVernonS.CoupsKim Min-jeongWooziMasterKeyRishiMasterKeyRishi3:242.""Adore U"" (; Akkinda)WooziVernonS.CoupsBumzuWooziBumzuYeon Dong-geonWooziBumzuYeon Dong-geon3:073."Ah Yeah" (Hip-Hop unit)S. CoupsVernonWonwooMingyuCream DoughnutRishiCream DoughnutRishi3:294."Jam Jam" (Performance unit + Vernon)WooziHoshiDinoVernonWooziCream DoughnutCream Doughnut3:255."20" (Vocal unit)WooziWooziWon Yeong-heonWon Yeong-heonDong Ne-hyeong3:23 Weekly chart performance for 17 Carat Chart (2015-2023) Peakposition Japanese Albums (Oricon)[11] 46 South Korean Albums (Gaon)[12] 4 US World Albums (Billboard)[13] 8 Year-end chart performance for 17 Carat Chart (2015) Peakposition South Korean Albums (Gaon)[14] 47 ^ "Seventeen hopes to shine like diamonds with '17 Carat'". The Korea Herald. 26 May 2015. Retrieved 30 November 2016. ^ "Adore U". Color Coded Lyrics. 29 May 2015. Retrieved 29 November 2016. ^ "Seventeen hopes to shine like diamonds with '17 Carat'". The Korea Herald. 26 May 2015. Retrieved 30 November 2016. ^ "Seventeen hopes to shine like diamonds with '17 Carat'". The Korea Herald. 26 May 2015. Retrieved 30 November 2016. ^ Cumulative sales of 17 Carat: "2015 Album Chart". 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Gaon Chart (in Korean). Archived from the original on May 7, 2017. Retrieved February 17, 2024. Retrieved from " 3 The following pages link to 17 Carat External tools (link count transclusion count sorted list) · See help page for transcluding these entries Showing 50 items. View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Main Page (links | edit) Pledis Entertainment discography (links | edit) List of 2015 albums (links | edit) 2015 in South Korean music (links | edit) Seventeen (South Korean band) (links | edit) S.Coups (links | edit) Vernon (rapper) (links | edit) Wonwoo (links | edit) List of awards and nominations received by Seventeen (links | edit) Seventeen discography (links | edit) Love & Letter (links | edit) Joshua (singer) (links | edit) Seventeen TV (links | edit) 17 carat (redirect page) (links | edit) Going Seventeen (links | edit) List of Seventeen live performances (links | edit) Teen, Age (links | edit) Al1 (links | edit) Bumzu (links | edit) Boys Be (EP) (links | edit) You Make My Day (links | edit) You Made My Dawn (links | edit) Jun (Chinese entertainer) (links | edit) List of Stray Kids live performances (links | edit) The8 (links | edit) An Ode (links | edit) Seungkwan (links | edit) Fallin' Flower (links | edit) Heng:garæ (links | edit) Semicolon (EP) (links | edit) Your Choice (links | edit) Going Seventeen (web series) (links | edit) Not Alone (Seventeen song) (links | edit) Attacca (EP) (links | edit) Rock with You (Seventeen song) (links | edit) Woozi (links | edit) Hoshi (South Korean singer) (links | edit) Don't Wanna Cry (Seventeen song) (links | edit) Darl+ing (links | edit) Face the Sun (links | edit) Left & Right (Seventeen song) (links | edit) 24H (EP) (links | edit) We Make You (links | edit) Hot (Seventeen song) (links | edit) Dream (Seventeen EP) (links | edit) BSS (band) (links | edit) FML (EP) (links | edit) Super (Seventeen song) (links | edit) Always Yours (album) (links | edit) Seventeenth Heaven (links | edit) View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500) Retrieved from " WhatLinksHere/17_Carat" TutrsStringent selection, robust training, and continuous upskilling.To match your child's unique personality and learning style.Exam prep, Homework help, Advanced learning, and Remedial support.Helping 200,000+ students succeed!Received prestigious President's Education Awards Program from the President of US. Tops her class with an outstanding score of 77.5/80.Received prestigious Pradhan Mantri Rashtriya Bal Puraskar from the Prime Minister of India.Got Level 5 in the STAAR exam at the Renaissance Institute for Competitive Exams.Secured Rank 1 at SOF IMO Level 1 2023, by scoring an outstanding 100/100! Received prestigious President's Education Awards Program from the President of US. Tops her class with an outstanding score of 77.5/80.Received prestigious Pradhan Mantri Rashtriya Bal Puraskar from the Prime Minister of India.Got Level 5 in the STAAR exam at the Renaissance Institute for Competitive Exams.Secured Rank 1 at SOF IMO Level 1 2023, by scoring an outstanding 100/100! Received prestigious President's Education Awards Program from the President of US. Tops her class with an outstanding score of 77.5/80.Received prestigious Pradhan Mantri Rashtriya Bal Puraskar from the Prime Minister of India.Got Level 5 in the STAAR exam at the Renaissance Institute for Competitive Exams.My son started Cuemath in Grade 1 & now he is in Grade 7. All these years, I have been reassured for math subject! I'm sure he will continue with Cuemath till it serves!Cuemath has helped my kids learn math concepts and practice them in an online setting. It is a great online platform with 1:1 learning experience.Our daughter was losing interest in math. After 4-5 classes, I could see her asking for homework. She started liking math again and has now developed a lot of interest.Cuemath keeps introducing new methods, systems, & make it interesting for learners. Unlike the traditional teaching system, it has innovated a different way of teaching.My son has been taking coaching from Cuemath and is showing consistent improvement. It is mainly because of the standard curriculum, mentoring, supervision, & teaching.Have been a great platform with multiple avenues to augment my 8yr old's math skills. Good support from teacher too!My son started Cuemath in Grade 1 & now he is in Grade 7. All these years, I have been reassured for math subject! I'm sure he will continue with Cuemath till it serves!Cuemath has helped my kids learn math concepts and practice them in an online setting. It is a great online platform with 1:1 learning experience.Our daughter was losing interest in math. After 4-5 classes, I could see her asking for homework. She started liking math again and has now developed a lot of interest.Cuemath keeps introducing new methods, systems, & make it interesting for learners. Unlike the traditional teaching system, it has innovated a different way of teaching.My son has been taking coaching from Cuemath and is showing consistent improvement. It is mainly because of the standard curriculum, mentoring, supervision, & teaching.Have been a great platform with multiple avenues to augment my 8yr old's math skills. Good support from teacher too!We had a great experience with Cuemath. He started in 2021 and was quite weak but since joining Cuemath he has been getting better grades.Cuemath's app facilitates teacher-student interaction. The teacher in India understands our Australian math curriculum. We couldn't find such a teacher even locally.Private 1-to-1 tutoring that just works1-3 classes per week, with hassle-free scheduling.Customized learning plan for every child.Get regular insights on your child's progress.What is the frequency and duration of your classes?Typically, the number of classes is two per week for grades K to 8, and three per week for high school. But the schedule is flexible, according to your child's requirements and availability. Also, each class runs for 55 minutes, extendable to an hour.What devices do I need for attending your classes?A desktop or laptop computer that supports video calling is necessary for attending our classes. We also highly recommend a writing tablet for the best learning experience.My child has specific learning requirements. Is your program flexible enough?Absolutely. Our tutors will always customize the classes according to what your child needs - be it homework help, exam or test prep, remedial support for past gaps, or advanced learning.Can your tutors teach the topics covered in my child's school or curriculum?Our tutors are trained to teach according to various curricula across countries. Further, we have a fully customizable curriculum, tailored to your child's needs.Can my child join anytime of the year?Yes. Our tutors always customize the learning plan according to your child's needs, and the time left in the current academic year. If you wish to cover additional topics in the same time, you can always schedule extra classes.What if I don't like the tutor?In the rare case that happens, please raise a ticket with our helpdesk. We'll be happy to diagnose the issue, and find you a different tutor that aligns better with your child's needs.What if I do not like your classes after I enroll? Will I get my money back?We have a no questions asked refund policy. If you're unhappy with the experience, you can cancel anytime for a full refund of the unused classes.What happens if my child misses a Cuemath class?We have a flexible leave policy that allows for both planned and unplanned leaves. Just keep your tutor informed.How can I keep track of my child's maths progress?We have a dedicated parent app, that lets you track the progress of your child, and also lets you connect with their tutor.How do I enroll for your classes?Please tap on the 'Get Started' button. We'll ask you a few questions about your child to understand their needs better. Once we receive the details, our admissions counselor will call you to match your child with the right tutor, and schedule a free trial class as per your availability. If you like the experience, you can choose a plan and make the payment to begin your classes.Affordable and personalized. Try a class for free. In this section, you will learn how to find missing angles in triangles and quadrilaterals. In a triangle, the sum of interior angles is 180°. In a quadrilateral, the sum of interior angles is 360°. Practice Problems Problem 1 :Find the missing angle in the triangle shown below. Solution :In any triangle, the sum of interior angles is 180°.In the triangle above, angle B is right angle. That is 90°.Then, ∠A + ∠B + ∠C = 180°Substitute.40° + 90° + ∠C = 180°130° + ∠C = 180°∠C = 180° - 130°∠C = 50°So, the missing angle is 50°.Problem 2 :Find the missing angle in the quadrilateral shown below. Solution :In any quadrilateral, the sum of interior angles is 360°.Then, ∠A + ∠B + ∠C + ∠D = 360°Substitute.85° + 95° + 120° + ∠D = 360°300° + ∠D = 360°Subtract 300° from each side. ∠D = 60°So, the missing angle is 60°.Problem 3 :Find the missing angle in the square shown below. Solution :In any quadrilateral, the sum of interior angles is 360°.Then, ∠D + ∠E + ∠F + ∠G = 360°Substitute.87° + 110° + 65° + ∠G = 360°262° + ∠G = 360°Subtract 262° from each side. ∠G = 98°So, the missing angle is 98°.Problem 4 :Find the value of x in the square shown below. Solution :In a square all angles are right angles. ∠S = 16 x - 6 = 90°16x - 6 = 90°16x = 90° + 616x = 96°Divide by 16 on both sides16x/16 = 96/16x = 6° Kindly mail your feedback to v4formath@gmail.comWe always appreciate your feedback. ©All rights reserved. onlinemath4all.com Example Video Questions Lesson Share to Google Classroom Example Video Questions Lesson Share to Google Classroom The angles inside a quadrilateral add to 360°. To find the missing angle, add up the 3 known angles and subtract this from 360°. 75° + 85° + 140° = 300°. The three known angles add to 300°. We subtract this from 360°. 360° – 300° = 60° and so the missing angle is 60°. The four angles in a quadrilateral always add up to 360°. This rule is true for all quadrilaterals. A quadrilateral is any 4-sided shape. Quadrilaterals also always have 4 angles. For example, the 4 angles in a rectangle are all 90°. Four lots of 90° is 360°. Here are some more examples of quadrilaterals where the angles are shown adding up to 360°. How to Find a Missing Angle in a Quadrilateral The 4 angles in a quadrilateral always add up to 360°. To find a missing angle in a quadrilateral, add up the 3 known angles and subtract this result from 360°. For example, here is a quadrilateral containing 3 known angles of 75°, 85° and 140°. The first step is to add up the 3 known angles. 75° + 85° + 140° = 300°. The second step is to subtract this result from 360°. 360° – 300° = 60° and so, the missing angle is 60°. How to Find Angles in a Parallelogram If one angle in a parallelogram is known, all other angles can be calculated. To find missing angles in a parallelogram, use the following rules: Opposite angles are equal. Adjacent angles add to 180°. In the example below, one angle is known to be 120°. The angle opposite to this angle is the same size and so, angle a = 120°. Angles b and c are both next to the 120° angle. Therefore 120° + b = 180° and angle b = 60°. 120° + c = 180° and angle c = 60°. b and c are opposite to each other, so we can see that they too are equal. We can check the angles in our parallelogram by making sure that all 4 angles add to 360°. 120° + 120° + 60° + 60° = 360° and so, the result is correct. Sum of Angles in a Quadrilateral Formula The formula for the sum of the angles in a polygon is (n-2) × 180°, where n is the number of sides. A quadrilateral has 4 sides and so, n = 4. The formula (n-2) × 180° becomes 2 × 180° = 360°. Therefore the sum of the angles in a quadrilateral is 360°. The formula for the sum of the angles in any polygon is (n-2) × 180°. The (n-2) part of the formula tells us how many triangles can be drawn inside any polygon. n is the number of sides the shape has. Every time a new side is added, a new triangle can be formed. In a quadrilateral, we can only form 2 triangles. For a quadrilateral, n = 4 and so the (n-2) becomes 4 – 2 which equals 2. We have 2 triangles, so 2 lots of 180°. 2 × 180° = 360° and so, all 4 angles in a quadrilateral add to 360°. Why do Angles in a Quadrilateral Sum to 360 Degrees? Angles in a quadrilateral add to 360° because two triangles can be made inside any quadrilateral by drawing straight lines from one corner to the other corners. Each triangle contains 180° and so, two triangles contain 360°. In the example below, we see the four-sided shape divided into two triangles. The 3 angles in each triangle add up to 180°. The combination of both triangle angles makes the full angles of the quadrilateral. 2 lots of 180° is 360°. Therefore the angles in a quadrilateral sum to 360°. All quadrilaterals sum to 360° because we can always draw two triangles inside them by connecting two opposite corners. Exterior Angles of a Quadrilateral The exterior angles of a quadrilateral always add up to 360°. If the quadrilateral is shrunk down to the size of a point, all that is left are the exterior angles around the outside of it. Angles around a point add to 360° and so, the exterior angles add to 360°. In the image below, we can see the exterior angles of a quadrilateral marked. We can see that these exterior angles encircle a point completely. Angles around a point add to 360° because 360° is a full turn. All 4 exterior angles on a quadrilateral add to 360°. This rule is true for all polygons. The exterior angles of any polygon always add up to 360°. Now try our lesson on Right Angles where we learn how to identify right angles in a variety of situations. Right Angles An angle is a figure formed by two rays with the same initial point. In geometry, different names are given to different angels and their combinations depending upon the type of angles they make. Different geometrical shapes such as a triangle or a quadrilateral contain a set of angles that are governed by a set of rules. For example, there are three interior angles in a triangle, the sum of which is always equal to 180o. This means that if we are aware of two of the angles in a triangle we can find the third. Similarly using different rules and the available information we can find the missing angle in a geometrical figure. But, before understanding different situations where we can find the missing angles, we should first recall some of the properties of different geometric shapes that will be useful in finding missing angles. We know that there are three interior angles in a triangle. Let us see what are the different properties and the rules that define the relations between different angles in a triangle. The sum of the measure of the three interior angles of a triangle is always 180o. In the above triangle, ∠x + ∠y + ∠z = 180o If one of the angles of a triangle is 90o, the sides that make the right angle are called the base and the perpendicular while the third side is called the hypotenuse. According to Pythagoras Theorem In a right-angled triangle, the square of the hypotenuse side is equal to the sum of squares of the other two sides. Mathematically, Base2 + Perpendicular2 = Hypotenuse2 Therefore, if "a" is the base, "b" is the perpendicular and "c" is the hypotenuse in a right angled triangle, then c2 = a2 + b2 According to this property, the exterior angle of a triangle is always equal to the sum of the interior opposite angles. For example, in the above triangle, the exterior angle a equals the sum of the interior angles b and c. ∠a = ∠b + ∠c Let us now look at some of the angle properties in quadrilaterals. We know that A quadrilateral is a closed shape that is formed by joining four points among which any three points are non-collinear. In other words, a quadrilateral is a polygon made up of four sides. Let us see what are the different properties and the rules that define the relations between different angles in quadrilaterals. The sum of the measure of the three interior angles of a quadrilateral is always 360o. Therefore, in the above quadrilateral, ABCD, ∠A + ∠B + ∠C + ∠D = 360o Also, the sum of any two adjacent angles in a quadrilateral is equal to 180o. Following properties of angles in a square or a rectangle are relevant to finding missing angles in a figure. The interior angle of a square or a rectangle at each vertex is 90°.The diagonals of a square or a rectangle bisect each other at 90°. Sum of the interior angles of a pentagon (a quadrilateral having 5 sides) = 540o Sum of the interior angles of a hexagon (a quadrilateral having 6 sides) = 720o Complementary angles – Two angles are said to be complementary if their sum is 90o. For example, two angles, 30o and 60o are complementary because their sum, 30o + 60o = 90o. Supplementary angles – Two angles are said to be supplementary if their sum is 180o. For example, two angles, 130o and 50o are supplementary because their sum, 130o + 50o = 180o. Together, the supplementary angles form a straight line. Let l and m be two lines and let n be the transversal intersecting them at P and Q respectively as shown below – Clearly, lines l and m make eight angles with the transversal n, four at P and four at Q. we have labelled them 1 to 8 for the sake of convenience and shall now classify them in the following groups – The angles whose arms do not include the line segment PQ are called exterior angles. Therefore, in the above figure, angles 1, 2, 7 and 8 are exterior angles. The angles whose arms include the line segment PQ are called interior angles. Therefore, in the above figure, angles 6, 4, 5 and 6 are interior angles. A pair of angles in which one arm of both the angles is on the same side of the transversal and their other arms are directed in the same sense is called a pair of corresponding angles. In the above figure, there are four pairs of corresponding angles, ∠1 and ∠ 5, ∠ 2 and ∠ 6, ∠ 3 and ∠ 7, ∠ 4 and ∠ 8. We can also say that two angles on the same side of the transversal are known as corresponding angles if both lie either above the lines or below the two lines. A pair of angles in which one arm of each of the angles is on opposite sides of the transversal and whose other arms include segment PQ is called a pair of alternate interior angles. In other words, Alternate interior angles are angles formed when two parallel or non-parallel lines are intersected by a transversal. The angles are positioned at the inner corners of the intersections and lie on opposite sides of the transversal. In the above figures, ∠ 3 and ∠ 5 form a pair of alternate interior angles. Another pair of alternate interior angles in this figure is ∠ 4 and ∠ 6. A pair of angles in which one arm of each of the angles is on opposite sides of the transversal and whose other arms are directed in opposite directions and do not include segment PQ is called alternate exterior angles in a transversal. In the above figure, ∠ 2 and ∠ 8 form a pair of alternate exterior angles. Another pair of alternate exterior angles in this figure is ∠ 1 and ∠ 7. Now, let us use the above properties to find missing angles in different figures. Example 1 Find the measures of the angles x, y and z in the following figure – Solution We have been a figure where some of the angles are known while we are required to find the values of the angles x, y and z. Now, let us consider the Δ BEC. We know that the sum of the measure of the three interior angles of a triangle is always 180o. Therefore, ∠ BEC + ∠ EBC + ∠ ECB = 180o ……………………………. (1) Now, we have been given that, ∠ BEC = 90o ∠ ECB = 30o ∠ EBC = y Substituting these values in equation (1) we will get, y + 90o + 30o= 180o ⇒ y + 120o= 180o ⇒ y = 180o – 120o ⇒ y = 60o Now, let us consider Δ AC. Again, we will use that property that the sum of the measure of the three interior angles of a triangle is always 180o. Therefore, ∠ ADC + ∠ ACD + ∠ DAC = 180o ……………………………. (2) Now, we have been given that, ∠ DAC = 50o ∠ ACD = 30o Substituting these values in equation (2) we will get, ∠ ADC + 50o + 30o= 180o ⇒ ∠ ADC + 80o= 180o ⇒ ∠ ADC = 180o – 80o ⇒ ∠ ADC = 100o Now that we know the value of ∠ ADC, we can find the value of ∠ ADB. We can see that ∠ ADC and ∠ ADE form a supplementary [air of angles. We also know that the sum of supplementary angles is always equal to180o. Therefore, ∠ ADC + ∠ ADE = 180o ……………………. (3) We have been given that ∠ ADE = x and we have obtained above that ∠ ADC = 100o Substituting these values in equation (3) we will get, 100o + x = 180o ⇒ x = 180o – 100o ⇒ x = 80o Now, let us consider the Δ AOB. We can clearly see that the angle z is an exterior angle for the two angles x and y. by the definition of the exterior angle property of a triangle, The exterior angle of a triangle is always equal to the sum of the interior opposite angles. Therefore, we can say that ∠ z = ∠ x + ∠ y ……………………… (4) We have already obtained the values of and y above as – x = 80o y = 60o Substituting these values in equation (4) we will get, z = 80o + 60o ⇒ z = 140o Thus, we have the values of x, y and z we have as – x = 80o y = 60o z = 140o Example 2 In the given figure, the lines l and m are parallel. n is a transversal and ∠ 1 = 40o. Find all the angles marked in the figure. Solution We have been given that lines l and m are parallel. n is a transversal and ∠ 1 = 40o. we need to find the remaining angles. Let us start with each angle one by one. First, let us find ∠ 2. We can clearly see that ∠ 1 and ∠ 2 form a supplementary pair of angles. This means that the sum of ∠ 1 and ∠ 2 should be equal to 180o. Hence, we have, ∠ 1 + ∠ 2 = 180o ⇒ 40o + ∠ 2 = 180o ⇒ ∠ 2 = 180o – 40o ⇒ ∠ 2 = 140o Now, that we have found the value of ∠ 2, we will find the value of ∠ 6 Note that ∠ 2 and ∠ 6 form a pair of corresponding angles. Since the lines that have been intersected by a transversal are parallel, therefore, the pair of corresponding angles should be equal. Hence, we have, ∠ 2 = ∠ 6 = 140o Similarly, ∠ 1 = ∠ 5 = 40o Note that ∠ 3 and ∠ 5 form a pair of alternate interior angles. Since the lines that have been intersected by a transversal are parallel, therefore, the pair of alternate interior angles should be equal. Hence, we have, ∠ 3 = ∠ 5 = 40o Similarly, ∠ 4 = ∠ 6 = 140o Similarly, we can see that ∠ 5 and ∠ 8 form a supplementary pair of angles. This means that the sum of ∠ 5 and ∠ 8 should be equal to 180o. Hence, we have, ∠ 5 + ∠ 8 = 180o ⇒ 40o + ∠ 8 = 180o ⇒ ∠ 8 = 180o – 40o ⇒ ∠ 8 = 140o Again, we can see that ∠ 6 and ∠ 7 form a supplementary pair of angles. This means that the sum of ∠ 6 and ∠ 7 should be equal to 180o. Hence, we have, ∠ 6 + ∠ 7 = 180o ⇒ 140o + ∠ 7 = 180o ⇒ ∠ 7 = 180o – 140o ⇒ ∠ 7 = 40o Hence, we have, ∠ 1 = ∠ 3 = ∠ 5 = ∠ 7 = 40o and ∠ 2 = ∠ 4 = ∠ 6 = ∠ 8 = 140o Example 3 Find the missing values in the following figure – Solution We have been given a figure and we need to find the missing values in it. Let us first observe the angles that have been given to us. We have, ∠ TPX = 70o ∠ RQY = 60o Now, we can see that ∠ TPX and ∠ TPQ form a pair of supplementary angles. We know that the sum of the supplementary angles is always equal to 180o. Therefore, we have, ∠ TPX + ∠ TPQ = 180o ……………………… (1) Substituting the value of ∠ TPX in equation (1) we get, ∠ TPQ + 70o = 180o ⇒ ∠ TPQ = 180o – 70o ⇒ ∠ TPQ = 110o which is the value of ∠ 1. Again, we can see that that ∠ RQP and ∠ RQY form a pair of supplementary angles. We know that the sum of the supplementary angles is always equal to 180o. Therefore, we have, ∠ RQP + ∠ RQY = 180o ……………………… (2) Also, ∠ RQY = 60o Subtituting the value of ∠ RQY in equation (2) we get, ∠ RQP + 60o = 180o ⇒ ∠ RQP = 180o – 60o ⇒ ∠ RQP = 120o which is the value of ∠ 2 Now, if we see can see the figure enclosed by the points, P, Q, R, S and T form a pentagon. We also know that Sum of the interior angles of a pentagon is always equal to 540o. Therefore, we have, ∠ PQR + ∠ QRS + ∠ RST + ∠ STP +∠ TPQ = 540o ……………………… (3) Also, we have, ∠ PQR = 120o (as calculated above) ∠ QRS = x (given in the question) ∠ RST = 30o (given in the question) ∠ STP = x (given in the question) ∠ TPQ = 110o(as calculated above) Substituting these values in equation (3), we will get, 120o + x + 30o +x + 110o = = 540o ⇒ 2x + 260o = 540o ⇒ 2x = 540o – 260o ⇒ 2x = 280o ⇒ x = 140o Hence, the missing angles in the figure are – x = 140o ∠ TPQ = ∠ 1 = 110o ∠ TPQ = ∠ 2 = 110o The sum of the measure of the three interior angles of a triangle is always 180o.If one of the angles of a triangle is 90o, the sides that make the right angle are called the base and the perpendicular while the third side is called the hypotenuse.The exterior angle of a triangle is always equal to the sum of the interior opposite angles.The sum of the measure of the three interior angles of a quadrilateral is always 360o.Sum of any two adjacent angles in a quadrilateral is equal to 180o.The interior angle of a square or a rectangle at each vertex is 90°.The diagonals of a square or a rectangle bisect each other at 90°.Sum of the interior angles of a pentagon (a quadrilateral having 5 sides) = 540oSum of the interior angles of a hexagon (a quadrilateral having 6 sides) = 720oTwo angles are said to be complementary if their sum is 90o.Two angles are said to be supplementary if their sum is 180o.Alternate interior angles are angles formed when two parallel or non-parallel lines are intersected by a transversal.A pair of angles in which one arm of each of the angles is on opposite sides of the transversal and whose other arms are directed in opposite directions and do not include segment PQ is called alternate exterior angles in a transversal. 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