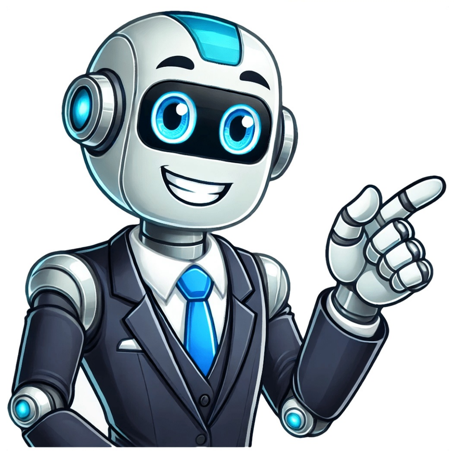

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The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. 86%(7)86% found this document useful (7 votes)18K viewsThe document discusses theorems related to circles, tangents, secants, and segments. It defines a tangent as a line intersecting a circle at one point and a secant as a line intersecting at …AI-enhanced title and descriptionSaveSave Math 10 Q 2 Module 5 For Later86%86% found this document useful, undefined A sector of a circle is a portion or part of a circle that is composed of an arc and its two radii. You can compare the sector of a circle to the shape of a pizza slice. A sector is formed when two radii of the circle meet at both ends of the arc. An arc is simply a portion of the circumference of the circle. The definition of the sector of a circle in geometry can be given as the part of the circle enclosed by two radii and an arc of the circle. The arc of the circle is a part of the boundary/circumference of the circle. Two radii meet at the center of the circle to form two sectors. Minor sector Major sector A sector of a circle is called the minor sector if the minor arc of the circle is a part of its boundary. It is the sector with a smaller area. The angle of a minor sector is less than 180 degrees. A sector is called the major sector if the major arc of the circle is a part of its boundary. It is the sector with the greater area. The angle of a major sector is greater than 180 degrees. Let's learn how to find the area of a sector of a circle. The formula for determining the area of a sector is given in two ways, with an angle and without an angle. If the radius of a circle is given as "r" and the angle of the sector is given as . This angle is made by the two radii at the center. As we know, for a complete circle, the angle made at the center is equal to 2 or 360°. If is measured in degrees, then "the area of a sector of a circle formula" is given by Area of sector $= \frac{\theta}{360^\circ} \times \pi r^2$ If is measured in radians, then "the area of a sector of a circle formula" is given by Area of sector $= \frac{1}{2} \times \theta \times r^2$ Perimeter of sector $=2r + \frac{\theta}{360} \times 2\pi r$ How can we find the area of a sector of a circle when the central angle is not given? Let's find out. If l is the length of the arc, r is the radius of the circle and θ is the angle subtended at the center, then the angle is expressed in terms of l and r as $\theta = \frac{l}{r}$, where is in radians. If the angle of the sector $=2\pi$, the area of the sector (full circle) is r^2. Similarly, for the angle $= 1$, the area of the sector $= \frac{\pi r^2}{2\pi} = \frac{r^2}{2}$ Thus, for the angle , area of the sector $\theta = \frac{r^2}{2} = \frac{l}{r}\times\frac{r^2}{2} = \frac{lr}{2}$ Area of the sector without an angle $= \frac{lr}{2}$. Perimeter of sector $= 2r + l$ The length of the arc "l" of the sector with angle is given by: $l = \frac{\theta}{360}\times2\pi r$ …when θ is given in degrees $l = \theta r$ …whenθ is given in radians More Worksheets A section or part of a circle involved by two radii with a central angle 90° is called a quadrant. A section or part of a circle involved by two radii with a central angle of 180° is called a semicircle. The combination of any two hands (minute hands and hour hands or hour hands and second hands or minute hands and second hands) of a circular analog clock form sectors. In this article, we learned about the sector of a circle, minor and major sector, the sector formula for area, perimeter and arc length with and without angle. Now, let us look at some solved examples and practice questions. Calculate the area of the sector. Solution: The radius of sector $= r = 6$ inches Angle of sector $= \theta = 60^\circ$ The area of sector $= \frac{\theta}{360^\circ}\times\pi r^2 = \frac{60^\circ}{360^\circ}\times3.14\times6^2 = 18.84$ sq. in. Find the area of a sector of a circular region whose central angle is 3 radians with a radius of 5 feet. Solution: The radius of sector $= r = 5$ feet Angle of sector $= \theta = 3$ radians If is measured in radians, then The area of the sector $= \frac{\theta}{2}\times r^2 = \frac{3}{2}\times5^2 =37.5$ sq. feet. Find the central angle of a sector (in degrees) which has a 25 sq. yard area and a radius of 4 yards. Use $\pi = 3.14$. Solution: Radius of sector $= r = 4$ yards Area of sector $= 25$ sq. yards If is measured in degrees, then Area of the sector $= \frac{\theta}{360^\circ} \times \pi r^2$ $25 = \frac{\theta}{360^\circ}\times3.14\times4^2$ $\theta = \frac{25\times360}{3.14\times4^2} = 179.14^0$ Find the perimeter of the sector shown below. Solution: The radius of sector $= r = 8$ inches Angle of sector $= \theta = 115^\circ$ The perimeter of sector $= 2r + \frac{\theta}{360}\times2\pi r$ $=(2\times8) + \frac{115^\circ}{360^\circ}\times(2\times3.14\times8)$ $=16 + (\frac{1}{4}\times23.14\times8)$ $=16 + 12.56$ $=28.56$ in Find the area and perimeter of a sector with a radius of 10 feet and an arc length of 12.56 feet. Solution: The radius of sector $= r = 10$ feet Arc length $= l = 12.56$ feet Area of the sector without an angle $= \frac{lr}{2} = \frac{12.56\times10}{2}=62.8$ sq. feet Perimeter of sector $= 2r + l = 2(10) + 12.56 = 32.56$ feet. Find the arc length of a sector having a radius of 5 feet and a central angle of 120°. Solution: The radius of sector $= r = 5$ feet Angle of sector $= \theta = 120^\circ$ The length of the arc "l" of the sector with angle is given by; $l = \frac{\theta \pi r}{180} = \frac{120\times3.14\times5}{180} = 10.47$ feet Attend this quiz & Test your knowledge.Correct answer is: radiiThe sector of a circle is formed by two radii and an arc.Correct answer is: less than 180 degreesThe central angle of the minor sector is less than 180 degrees.Correct answer is: 90°The quadrant of a circle can be a sector of a circle with a central angle of 90°.Area of sector $=\frac{\theta}{180^\circ}\times\pi r^2$Area of sector $=\frac{\theta}{360^\circ}\times\pi r^2$Area of sector $=\theta r^2$Area of sector $=\frac{\theta}{2}\times r^2$Correct answer is: Area of sector $=\frac{\theta}{2}\times r^2$If θ is measured in radians, then Area of sector $= \frac{\theta}{2}\times r^2$Correct answer is: $\frac{1}{4}$The area of the quadrant of a circle is equal to one-fourth, i.e., $\frac{1}{4}$ of that of the circle. What is the difference between a sector and an arc? Arc represents the part of the circumference. The sector of a circle is a part of the circle that is enclosed by two radii and an arc of the circle as a part of its boundary. What is the area of the sector of a circle composed of? The area of the sector of a circle is the area of the part of a circle composed of an arc and two radii. What is the formula for the perimeter of a sector of a circle? The perimeter of a sector is formed by two radii and an arc. Perimeter of the sector $= 2r + l = 2r + \frac{\theta}{360} \times 2\pi r$, where $r =$ radius of the circle, $l =$ arc length, $\theta =$ angle of the sector. How many types of sectors are in a circle? There are two types of a sector, which can be categorized as a minor or a major part. What is the formula for the area of a sector without an angle? Area of the sector without an angle $= \frac{lr}{2}$, where $r =$ radius of the circle, $l =$ arc length. How to find the arc length of a sector of a circle? The arc length of a sector of a circle can be found using the formula: $l = \frac{\theta}{360} \times 2\pi r$ or, $l = \frac{\theta \pi r}{180}$. Where, $r =$ radius of the circle, $l =$ arc length, $\theta =$ angle of the sector. One stop for learning fun!Games, activities, lessons - it's all here!Explore All 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. 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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 move ahead with the classes.Affordable and personalized. Try a class for free. Portion of a disk enclosed by two radii and an arc Not to be confused with circular section. The minor sector is shaded in green while the major sector is shaded white. A circular sector, also known as circle sector or disk sector or simply a sector (symbol: ⌔), is the portion of a disk (a closed region bounded by a circle) enclosed by two radii and an arc, with the smaller area being known as the minor sector and the larger being the major sector.[1] In the diagram, θ is the central angle, r the radius of the circle, and L is the arc length of the minor sector. The angle formed by connecting the endpoints of the arc to any point on the circumference that is not in the sector is equal to half the central angle.[2] A sector with the central angle of 180° is called a half-disk and is bounded by a diameter and a semicircle. Sectors with other central angles are sometimes given special names, such as quadrants (90°), sextants (60°), and octants (45°), which come from the sector being one quarter, sixth or eighth part of a full circle, respectively. The arc of a quadrant (a circular arc) can also be termed a quadrant. See also: Circular arc § Sector area The total area of a circle is πr2. The area of the sector can be obtained by multiplying the circle's area by the ratio of the angle θ (expressed in radians) and 2π (because the area of the sector is directly proportional to its angle, and 2π is the angle for the whole circle, in radians): A = π r 2 θ 2 π = r 2 θ 2 {\displaystyle A=\pi r^{2}\,{\frac {\theta }{2\pi }}={\frac {r^{2}\theta }{2}}} The area of a sector in terms of L can be obtained by multiplying the total area πr2 by the ratio of L to the total perimeter 2πr. A = π r 2 L 2 π r = r L 2 {\displaystyle A=\pi r^{2}\,{\frac {L}{2\pi r}}={\frac {rL}{2}}} Another approach is to consider this area as the result of the following integral: A = ∫ 0 θ ∫ 0 r d S = ∫ 0 θ ∫ 0 r r ~ d r ~ d θ ~ = ∫ 0 θ 1 2 r 2 d θ ~ = r 2 θ 2 {\displaystyle A=\int _{0}^{\theta }\int _{0}^{r}dS=\int _{0}^{\theta }\int _{0}^{r}{\tilde {r}}\,d{\tilde {r}}\,d{\tilde {\theta }}=\int _{0}^{\theta }{\frac {1}{2}}r^{2}\,d{\tilde {\theta }}={\frac {r^{2}\theta }{2}}} Converting the central angle into degrees gives[3] A = π r 2 θ ∘ 360 ∘ {\displaystyle A=\pi r^{2}{\frac {\theta ^{\circ }}{360^{\circ }}}} The length of the perimeter of a sector is the sum of the arc length and the two radii: P = L + 2 r = θ r + 2 r = r (θ + 2) {\displaystyle P=L+2r=\theta r+2r=r(\theta +2)} where θ is in radians. The formula for the length of an arc is:[4] L = r θ {\displaystyle L=r\theta } where L represents the arc length, r represents the radius of the circle and θ represents the angle in radians made by the arc at the centre of the circle.[5] If the value of angle is given in degrees, then we can also use the following formula by:[6] L = 2 π r θ 360 {\displaystyle L=2\pi r{\frac {\theta }{360}}} The length of a chord formed with the extremal points of the arc is given by C = 2 R sin θ 2 {\displaystyle C=2R\sin {\frac {\theta }{2}}} where C represents the chord length, R represents the radius of the circle, and θ represents the angular width of the sector in radians. Circular segment – the part of the sector which remains after removing the triangle formed by the center of the circle and the two endpoints of the circular arc on the boundary. Conic section Earth quadrant Hyperbolic sector Sector of (mathematics) Spherical sector – the analogous 3D figure ^ Dewan, Rajesh K. (2016). Saraswati Mathematics. New Delhi: New Saraswati House India Pvt Ltd. p. 234. ISBN 978-8173358371. ^ Achatz, Thomas; Anderson, John G. (2005). Technical shop mathematics. Kathleen McKenzie (3rd ed.). New York: Industrial Press. p. 376. ISBN 978-0831130862. OCLC 56559272. ^ Uppal, Shveta (2019). Mathematics: Textbook for class X. New Delhi: National Council of Educational Research and Training. pp. 226, 227. ISBN 978-81-7450-634-4. OCLC 1145113954. ^ Larson, Ron; Edwards, Bruce H. (2002). Calculus I with Precalculus (3rd ed.). Boston, MA.: Brooks/Cole. p. 570. ISBN 978-0-8400-6833-0. OCLC 706621772. ^ Wicks, Alan (2004). Mathematics Standard Level for the International Baccalaureate : a text for the new syllabus. West Conshohocken, PA: Infinity Publishing.com. p. 79. ISBN 0-7414-2141-0. OCLC 58869667. ^ Uppal (2019). Gerard, L. J. V. (1874). The Elements of Geometry, in Eight Books; or, First Step in Applied Logic. London: Longmans, Green, Reader and Dyer. p. 285. Legendre, Adrien-Marie (1858). Davies, Charles (ed.). Elements of Geometry and Trigonometry. New York: A. S. Barnes & Co. p. 119. Retrieved from " A sector of a circle is a pie-shaped part of a circle made of the arc along with its two radii. A portion of the circumference (also known as an arc) of the circle and 2 radii of the circle meet at both endpoints of the arc formed a sector. The shape of a sector of a circle looks like a pizza slice or a pie. In geometry, a circle is one of the most perfect figures. The shape of a sector of a circle is the simplest shape in geometry. It has various parts of its own. Such as diameter, radius, circumference, segment, sector. In this article, we will learn about what is a sector of a circle, formulas related to the sector of a circle along with solving a few examples on the sector of a circle. What is Sector of a Circle? A sector is a portion of a circle that can be defined based on the four points mentioned below: A portion of a circle is covered by two radii and an arc. A circle is divided into two sectors and the divided parts are known as minor sectors and major sectors. The large portion of the circle is the major sector whereas the smaller portion is the minor sector. In the case of semi-circles, the circle is divided into two equal-sized sectors. The 2 radii meet at the part of the circumference of a circle known as an arc, formed a sector of a circle. Look at the following figure to distinguish between the minor sector and major sector. The portion OAPB of the circle is called the minor sector and the portion OAQB of the circle is called the major sector. The semi-circle is also a sector with an angle of 180 degrees. Formulas of Sector of a Circle The area of a sector of a circle is the amount of space occupied within the boundary of a sector of a circle. A sector always initiates from the center of the circle. The semi-circle is also a sector of a circle, in this case, a circle is having two sectors of equal size. Let's learn about how to calculate the area of a sector. If the radius of the circle is (r) and the angle of the sector is (θ) is given, then the formula used to calculate the area of the sector is of : Area of sector (A) = (θ/360°) × πr2 θ is the angle in degrees. r is the radius of the circle. Length of the Arc of Sector Formula Similarly, the length of the arc of the sector with angle θ is given by; l = (θ/360) × 2πr or l = (θπr) /180. Area of a Sector of a Circle Without an Angle Formula When the angle of the sector is not given and the length of the arc of a sector of a circle is given we can calculate the area of the sector of a circle by using length. Assuming the length of an arc, 'l' and radius of a circle is 'r'. According to the radian definition angle of the sector of a circle is equal to the ratio of the length of an arc of a sector of a circle to the radius of a circle. θ = l/r, where θ is in radians. Area of a sector of a circle = (l × r)/2 Perimeter of a Sector of a Circle Formula The following are the formulas for the perimeter of a sector of a circle. Perimeter of sector = 2 radius + arc length Arc length is calculated as, Arc length = l = (θ/360) × 2πr Therefore, Perimeter of a Sector = 2 Radius + ((θ/360) × 2πr) Related Articles on Sector of a Circle Check out these interesting articles to know more about Sector of a Circle and its related topics. Area of a Circle What is Pi? Diameter Segment of a Circle Example 1: What is the length of the sector of a circle if the radius of the circle is 7 units and the angle of the sector is 40°? Solution: Area of sector = (θ/360°) × πr2 = (40°/360°) × (22/7) × 7 × 7 = 154/9 square units The length of the sector = (θ/360°)× 2πr l = (40°/360°) × 2 × (22/7) × 7 l = 44/9 units Example 2: Find the area of the sector of a circle if the radius of the circle is 20 units, and the length of the arc is 8 units. Solution: Given, radius = 20 units and length of an arc of a sector of circle = 8 units Area of sector of circle = (lr)/2 = (8 × 20)/2 = 80 square units. Example 3: Find the perimeter of the sector of a circle whose radius is 8 units and a circular arc makes an angle of 30° at the center. Use π = 3.14. Solution : Given that r = 8 units, θ = 30° = 30° × (π/180°) = π/6 Perimeter of sector is given by the formula; P = 2 r + r θ P = 2 (8) + 8 (π/6) P = 16 + 4π/3 P = 16 + (4 × 3.14)/3 = 20.187 units Hence, Perimeter of sector is 20.187 units. Show Answer > 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 ourCuemath's certified experts. Book a Free Trial Class FAQs on Sector of a Circle To calculate the area of a sector of a circle we have to multiply the central angle by the radius squared, and divide it by 2. Area of a sector of a circle = (θ × r2)/2 where θ is measured in radians. The formula can also be represented as Sector Area = (θ/360°) × πr2, where θ is measured in degrees. What do you understand by the Sector of a Circle? The part of a circle covered by 2 radii of a circle and their intercepted arc(the arc coming in that portion) is a sector of a circle. It is also known by the term pie-shaped part of a circle. What is a Perimeter of a Sector of a Circle? The total length of the circumference of the circle extends within the angle "θ" is a perimeter of a sector of a circle or in other words the sum of the lengths of the arc and the two radii. Formula to calculate the perimeter of a sector of a circle = 2 Radius + ((θ/360) × 2πr) How do you find the Area of a Sector of a Circle Without an Angle? We can find an area of a sector of a circle when the angle is missing. An angle of sector of a circle subtended by the arc length(radius of the circle) at the center is equal to one radian also equal to the ratio of the length of an arc of a sector of circle and radius of a circle. Hence, a formula of the area of a sector of a circle without an angle is mentioned below. Area of a sector of a circle = (l × r)/2 What are Sector and Arc? An arc is a fraction of the circumference and part of a circle whereas a sector is a pie-shaped part of a circle covered with 2 radii. How Many Sectors Are in a Circle? There are two sectors in a circle. If the circle is divided into two equal portions that are in semicircles then the sectors are of the same size otherwise in other cases like, if part of a circle is pie-shaped then one sector is larger than the other. The larger one is known as the major sector and the smaller one is known as a minor sector of a circle. Q1: Find the area of a sector of cirlce with angle 60° and radius 5 cm.19.89 cm215.57 cm223.92 cm213.08 cm2Q2: Find the area of quadrant of a circle with radius measuring 4 units.55/7 sq. units44/7 sq. units22/7 sq. units88/7 sq. unitsQ3: A cake in the shape of a circle is cut into 9 equal slices. If the cake had a radius of 15 cm, find the area of each slice.98.54 cm243.98 cm265.49 cm278.53 cm2Q4: Two circles with radius 6 cm and 9 cm have two sectors with the same area. The ratio of the angles of these sectors will be:2:58:39:29:4Q5: The area of a sector is π/2 times the square of the radius of the circle. ____ is the angle subtended at the centre by the sector.45°22.5°225°180°