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"CLASS 10th"

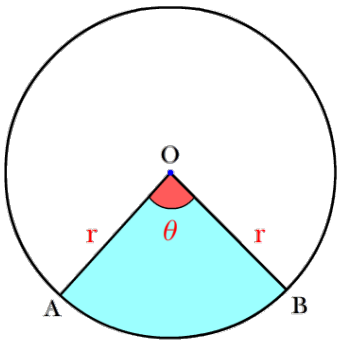
AREAS RELATED TO CIRCLES

FORMULA/CONCEPT LIST

1. Area of sector

A sector is a region enclosed by an arc and two radii of the circle, drawn from the center to the arc's endpoints.

$$\text{Area of Sector} = \frac{\theta}{360} \text{ x } \pi r^2$$

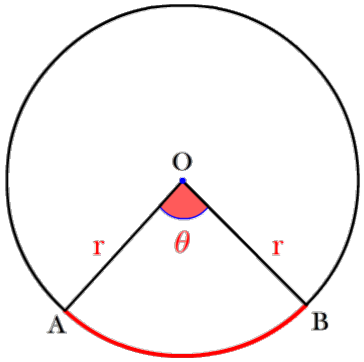


Note: To find the area of major sector, use the same formula but with different angle, 360 - q.

2. Length of arc

An arc is a portion of the circle's boundary that connects two points on the circle's circumference.

$$\text{Length of an arc of a sector of angle } \theta = \frac{\theta}{360} \text{ x } 2\pi r$$

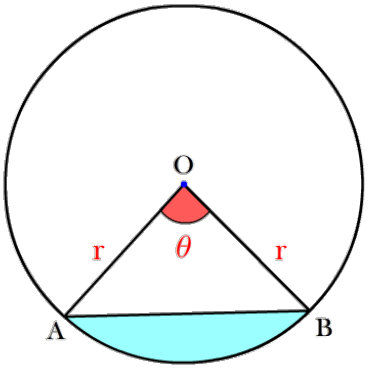


3. Area of segment

A segment is an area within a circle, bounded by a chord and an arc.

Area of segment = Area of Sector – Area of Triangle

Note:
Area of major segment = Area of circle – Area of minor segment



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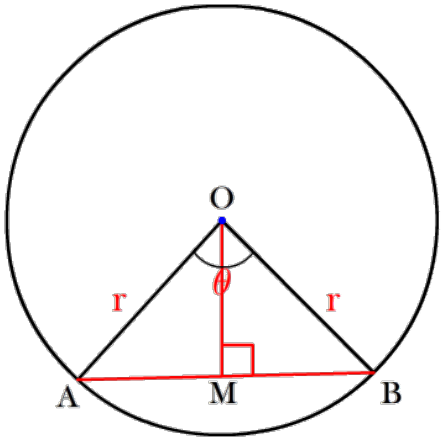
4. Different cases to find area of triangle.

Case 1: Draw OM ⊥ Chord AB

"The perpendicular bisector of any chord of any given circle must pass through the center of that circle"

So, M is the mid-point of chord AB.

AM = MB



DAMO & DBMO are right angled triangle. So, we can apply Pythagoras & Trigonometric ratios to find the missing dimensions.

In DAMO & DBMO,

OM = OB (Common)
AM = MB (M is the mid-point of AB)
OA = OB (Radius)

So, DAMO @ DBMO (SSS Criteria)

∠AOM = ∠BOM (CPCT)

So, **OM is also the angle bisector of Angle ∠O**. Use this concept to find trigonometric angle, and which will further be helpful in applying trigonometric ratios.

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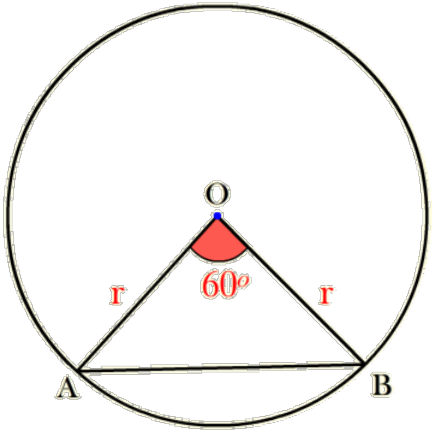
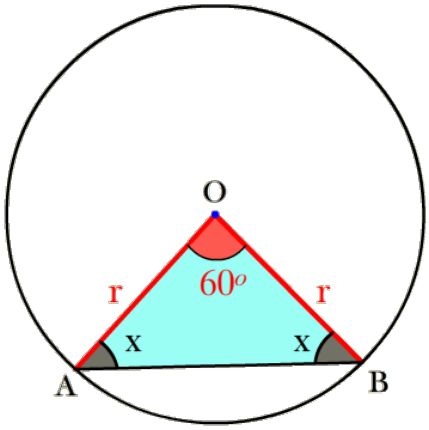
Case 2: q is 60°.



AO = BO (Both are radius, r)

∠A = ∠B (Angle opposite to equal sides are equal)



Let's assume ∠A & ∠B as x.

∠A + ∠B + ∠C = 180° (Sum property of Triangles)

60° + x + x = 180°

x = 60°

So, DAOB is an Equilateral triangle.

Area of Equilateral D = $\frac{\sqrt{3}}{4}a^2$ (a = r, radius)

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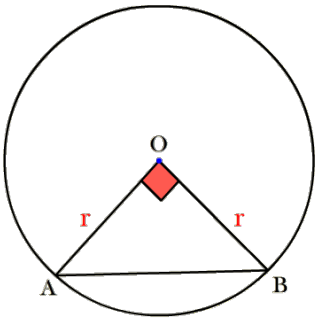
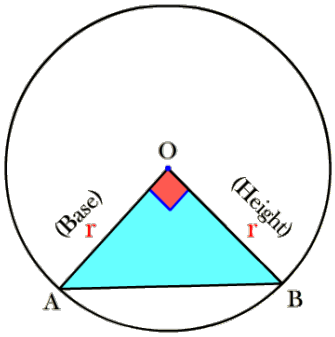
Case 3: q is 90°.



Area of Triangle = $\frac{1}{2}$ x Base x Height

Area of Triangle = $\frac{1}{2}$ x r x r



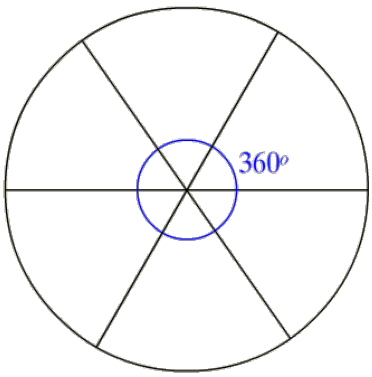
5. Finding angle q

In question where equal sectors are given but angle q is missing.

The complete revolution of circle is 360°.

$$\theta = \frac{360}{6} = 60^{o}$$

$$\theta = \frac{360}{\text{No of sectors}}$$



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6. Check out complete chapter Areas related to Circles class 10th lecture series on YouTube.

All the lectures are created using animation and visual tools, for better learning experience.

The complete series includes following lectures:

1. Chapter Areas related to circles-All concepts covered: https://youtu.be/lIBA-ObK9qY
2. Exercise 11.1 Q1 to Q5: https://youtu.be/HcYbldaMmlQ
3. Exercise 11.1 Q6 to Q10: https://youtu.be/USC-ld5KBwM
4. Exercise 11.1 Q11 to Q13: https://youtu.be/hzEhvDnfn-A
5. **Revision: https://youtu.be/G-ropl9N0R4**

NOTES:

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