CDS-AFCAT 1 2025

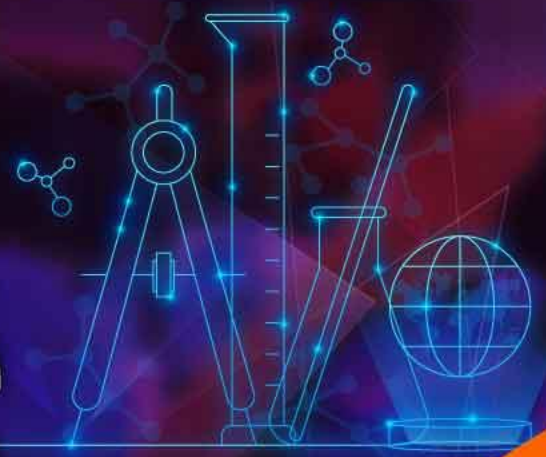
SSBCrack EXAMS

LIVE

MATHS

MENSURATION 2D

CLASS 2



NAVJYOTI SIR

28 Oct 2024 Live Classes Schedule

8:00AM	28 OCTOBER 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	28 OCTOBER 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

NDA 1 2025 LIVE CLASSES

11:30AM	GK - POLITY - CONSTITUTIONAL BODIES	RUBY MA'AM
1:00PM	CHEMISTRY - CARBON	SHIVANGI MA'AM
4:00PM	MATHS - ANALYTICAL GEOMETRY 3D - CLASS 1	NAVJYOTI SIR
5:30PM	ENGLISH - FILL IN THE BLANKS - CLASS 1	ANURADHA MA'AM

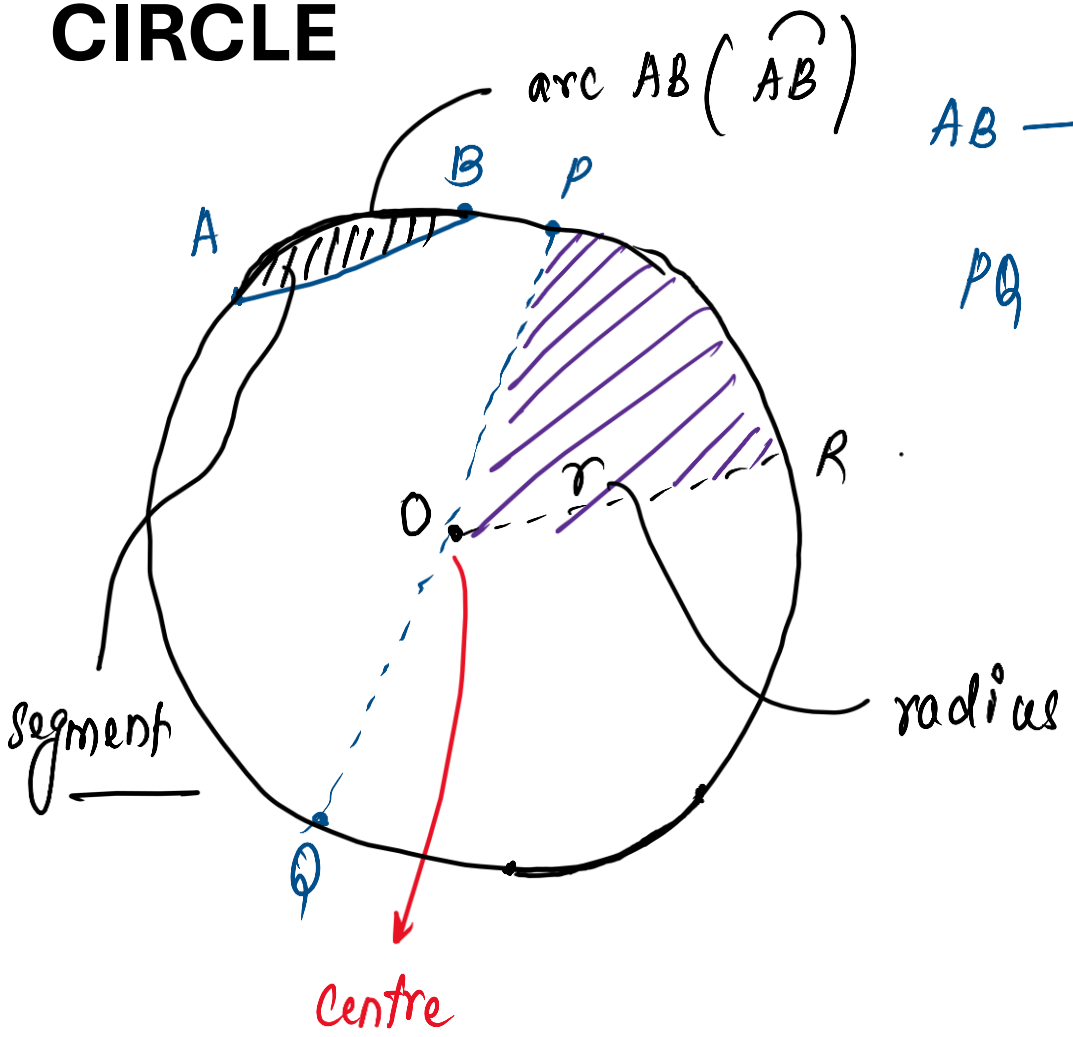
CDS 1 2025 LIVE CLASSES

11:30AM	GK - POLITY - CONSTITUTIONAL BODIES	RUBY MA'AM
1:00PM	CHEMISTRY - CARBON	SHIVANGI MA'AM
5:30PM	ENGLISH - FILL IN THE BLANKS - CLASS 1	ANURADHA MA'AM
7:00PM	MATHS - MENSURATION 2D - CLASS 2	NAVJYOTI SIR

AFCAT 1 2025 LIVE CLASSES

4:00PM	STATIC GK - POLITY - CLASS 2	DIVYANSHU SIR
5:30PM	ENGLISH - FILL IN THE BLANKS - CLASS 1	ANURADHA MA'AM
7:00PM	MATHS - MENSURATION 2D - CLASS 2	NAVJYOTI SIR

CIRCLE



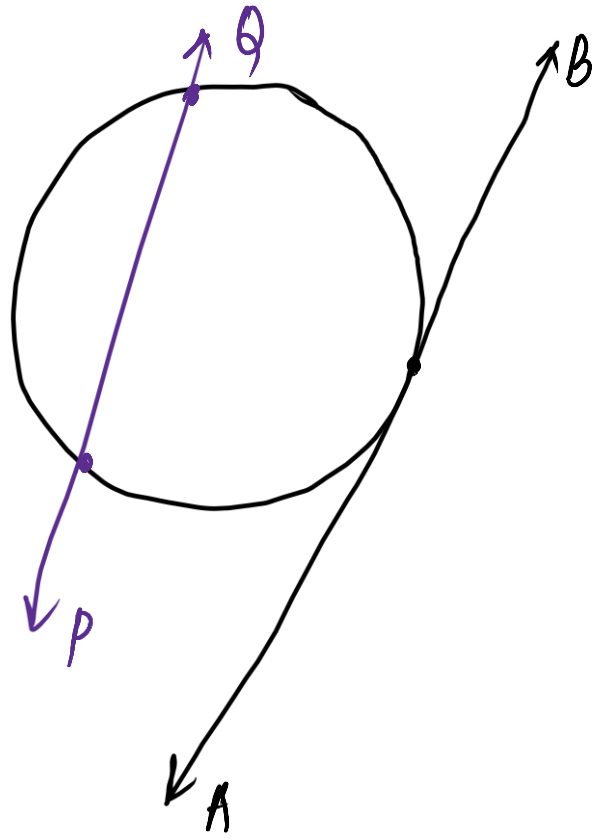
AB → chord

PQ → longest chord (chord passing through centre)
(diameter) — (d)

$d = 2r$

region between — sector (OPR)
2 radius

region between chord — segment
and arc

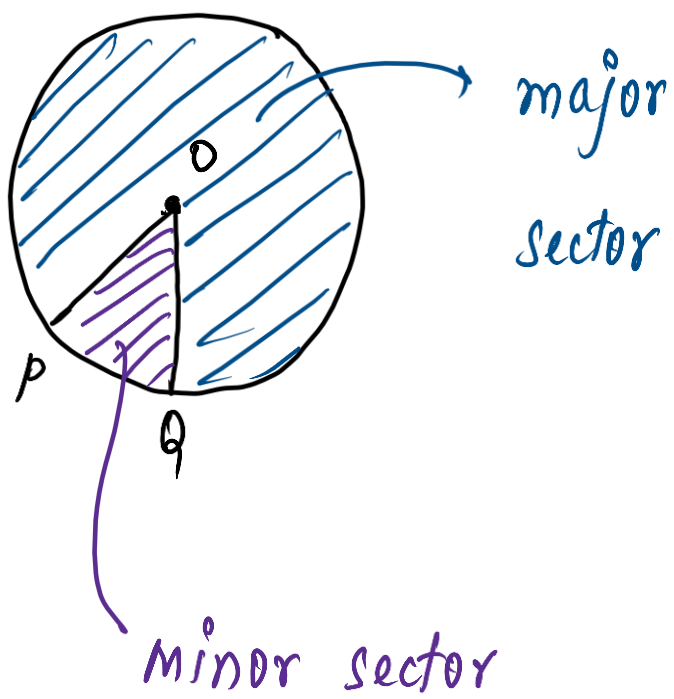


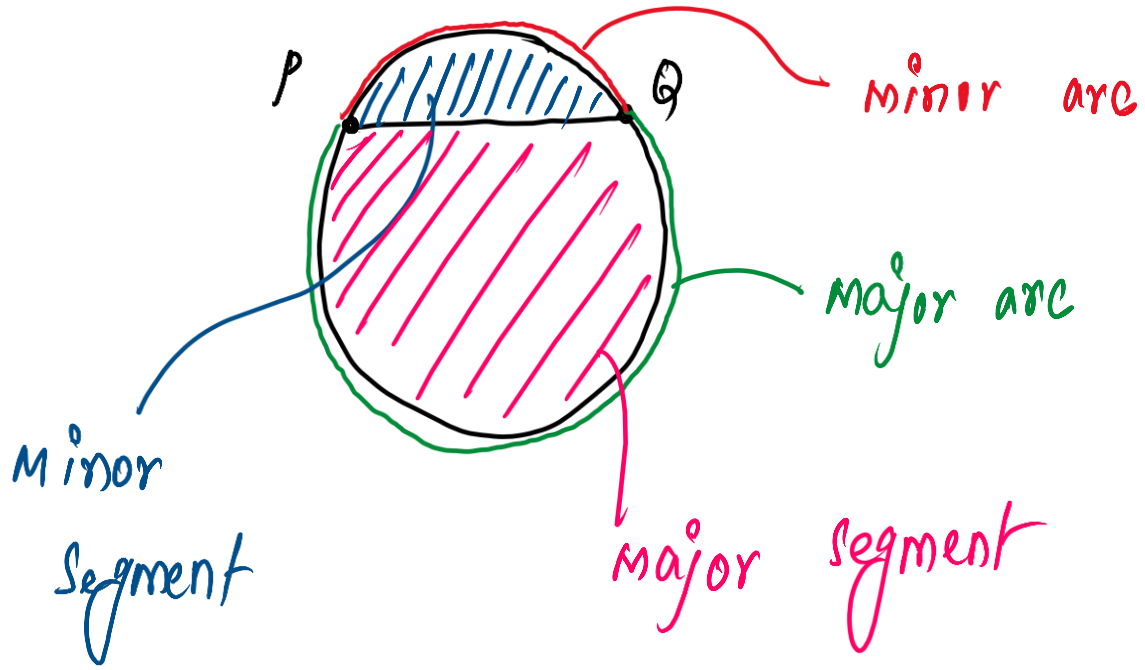
AB — tangent

(line touching circle at exactly one point)

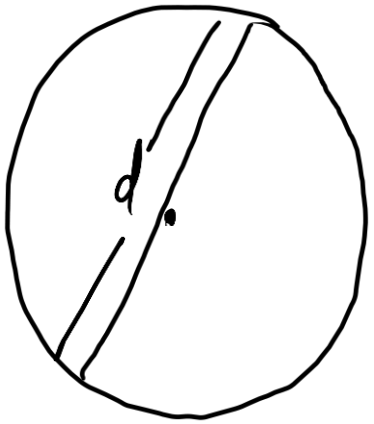
PQ — Secant

(line touching circle at two points)


O
P
Q
major sector
minor sector


P
Q
minor arc
major arc
Minor Segment
major segment

CIRCUMFERENCE AND AREA OF CIRCLE



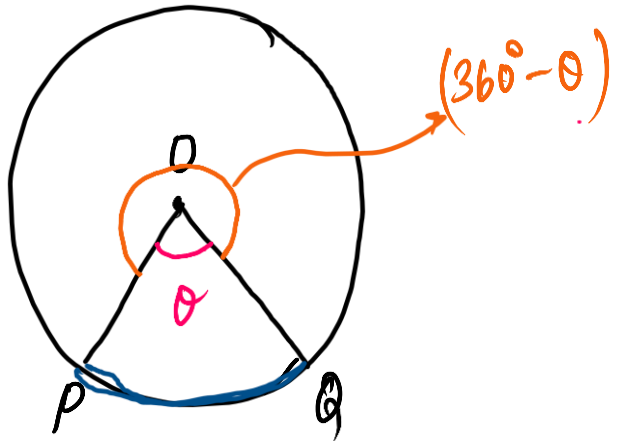
circle 's perimeter,

$$\frac{\text{CIRCUMFERENCE}}{(C)} = \frac{C}{d} = \pi$$

$$C = \pi d = \pi(2r)$$

$$\text{Area} = \pi r^2$$

SECTOR OF A CIRCLE



Area of sector OPQ =

$360^\circ \longrightarrow \pi r^2$

$1^\circ \longrightarrow \frac{\pi r^2}{360^\circ}$

$\theta \longrightarrow \theta \times \frac{\pi r^2}{360^\circ}$

Area of sector $= \left(\frac{\theta}{360^\circ}\right) \times \pi r^2$ (minor sector)

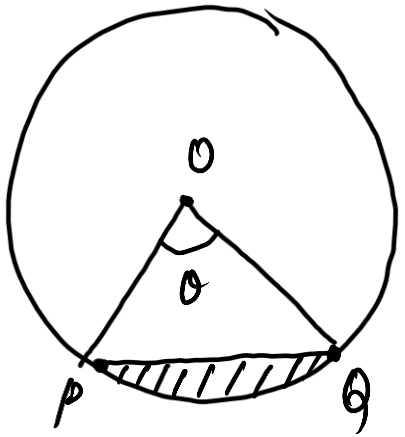
Length of arc PQ

$\left(\frac{\theta}{360^\circ} \times 2\pi r\right)$

Area of major sector

$\left(\pi r^2\right) - \left(\frac{\theta}{360^\circ} \times \pi r^2\right)$

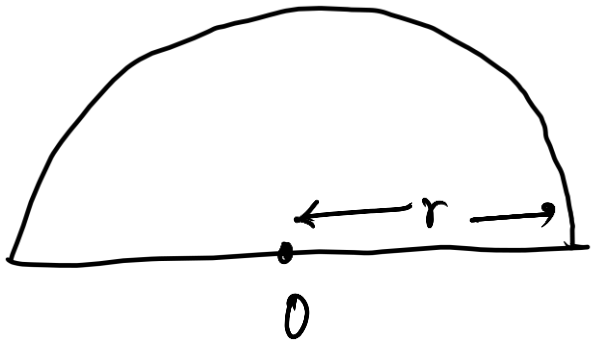
SEGMENT OF A CIRCLE



Area of minor segment PQ,

(Area of minor sector OPQ − Area of triangle OPQ)

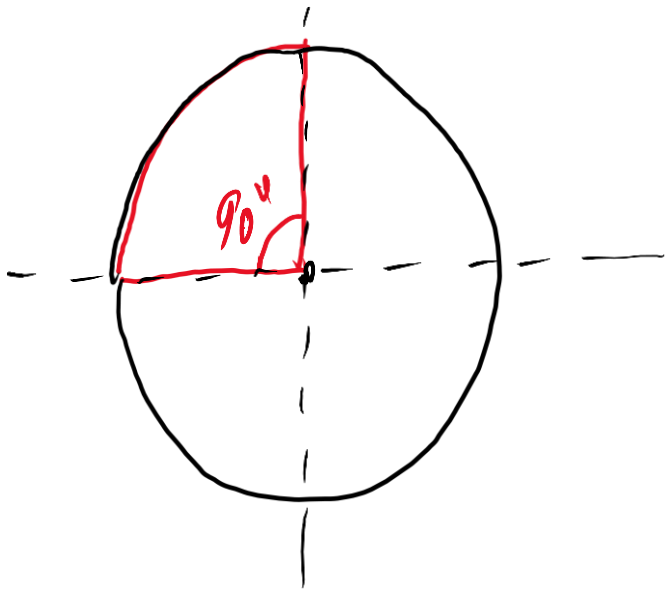
SEMI CIRCLE



$$\text{perimeter} = \frac{2\pi r}{2} = \pi r$$

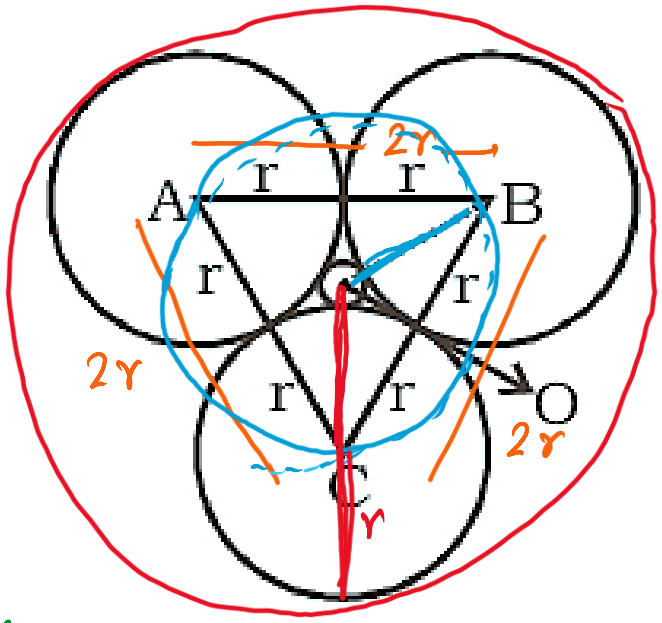
$$\text{Area} = \frac{\pi r^2}{2}$$

QUADRANT



perimeter $= \frac{2\pi r}{4} = \frac{\pi r}{2}$

Area $= \frac{\pi r^2}{4}$ ✓



(Each circle is such that it is touching the other 2 circles)

$\triangle ABC \longrightarrow$ equilateral triangle

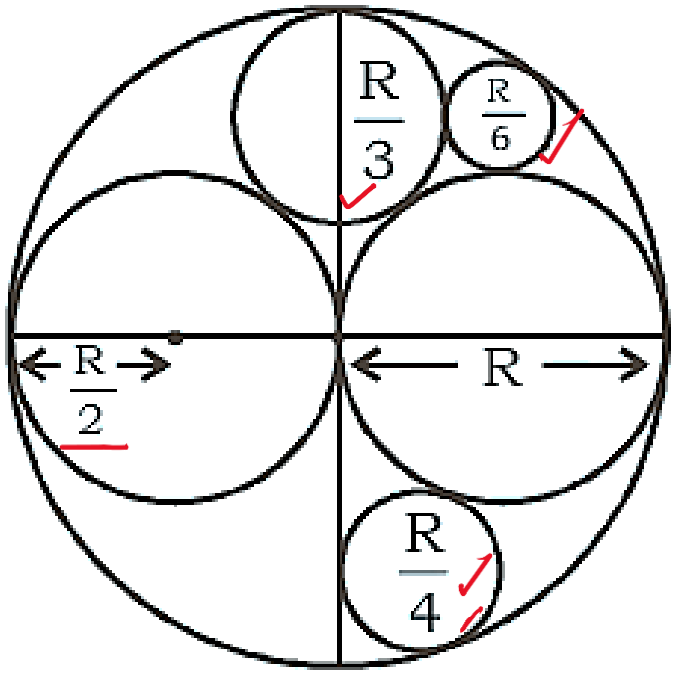
Let the radius of smaller circle be x.

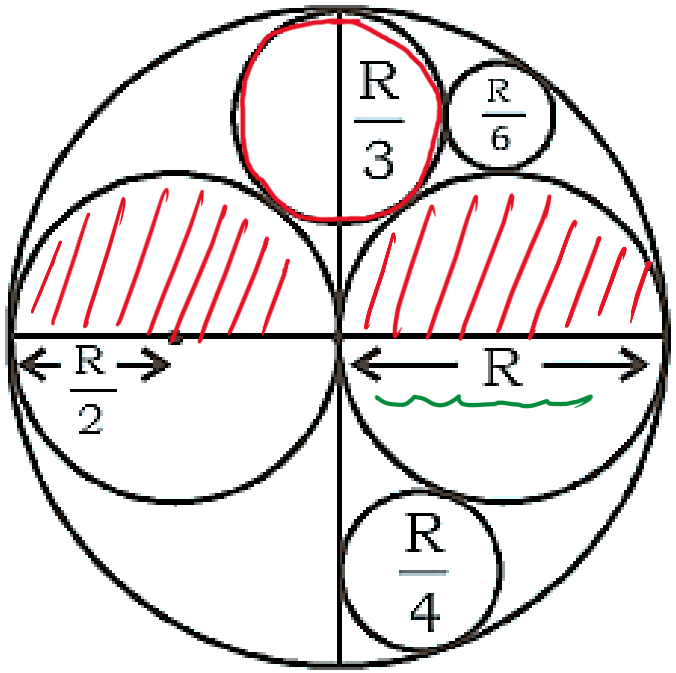
circumradius for equilateral triangle $= x + r$

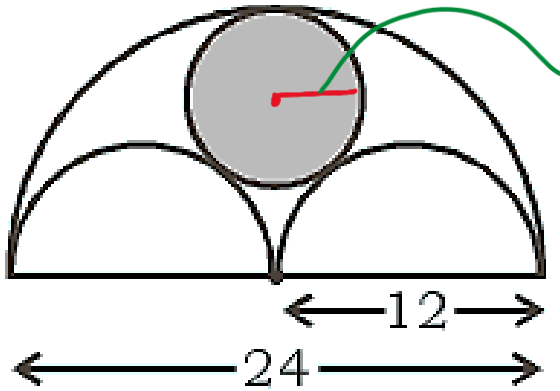
$$\frac{2r}{\sqrt{3}} = x + r$$

$$x = \frac{2r}{\sqrt{3}} - r$$

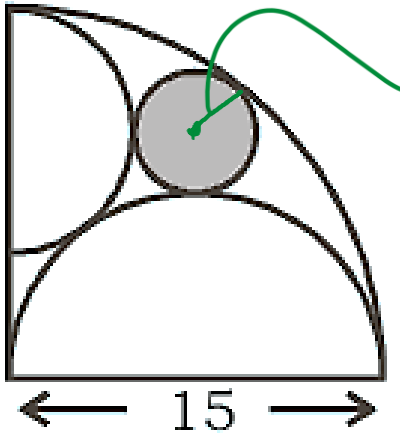
Let R be radius of circle around all 3 circles $\longrightarrow \left(R = \frac{2r}{\sqrt{3}} + r\right)$


R/3
R/6
R/2
R
R/4

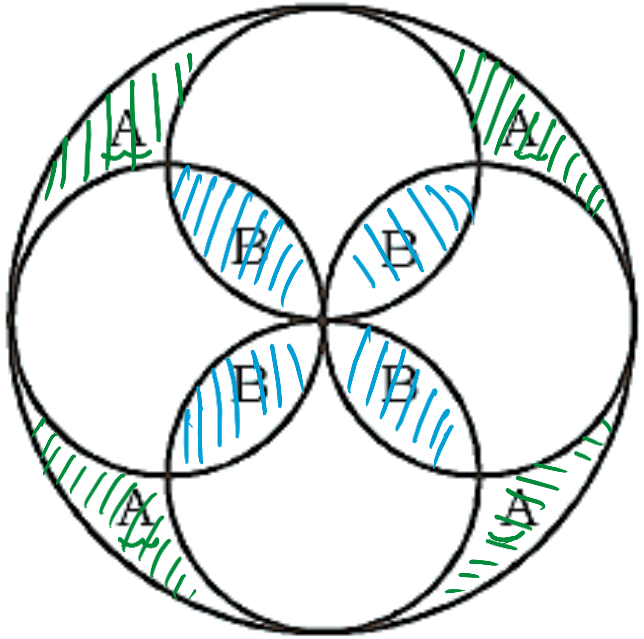




$\frac{R}{3} = \frac{12}{3} = 4$



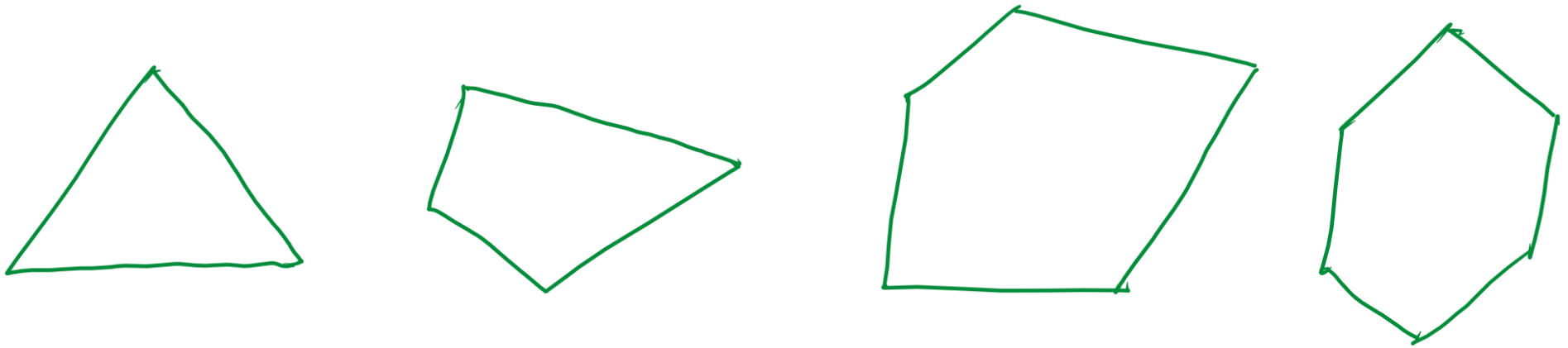
$\frac{R}{6} = \frac{15}{6} = \frac{5}{2} = 2.5$



Area A = Area B

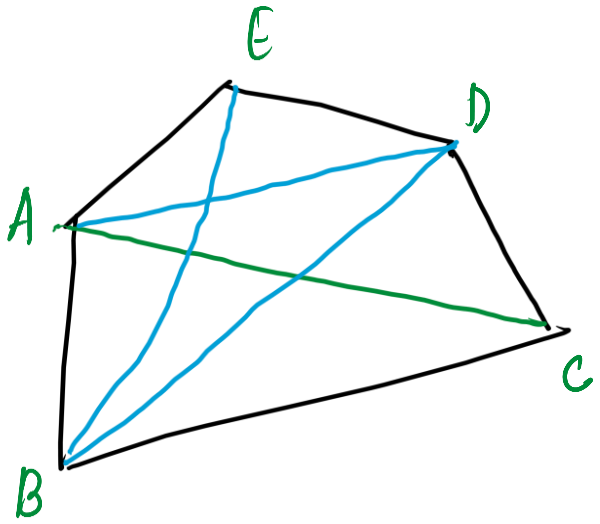
POLYGONS

→ closed figure with straight sides



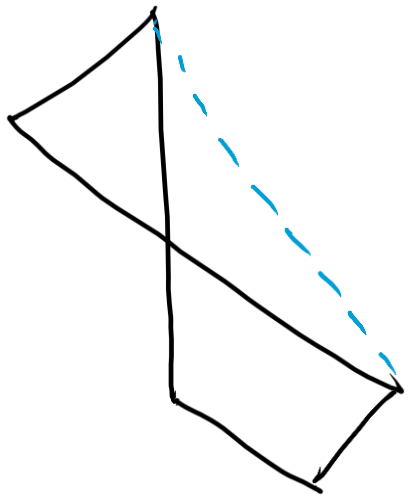
Sides	Name
3	Triangle
4	Quadrilateral
5	pentagon
6	Hexagon ✓
7	Heptagon
8	Octagon ✓

CONVEX AND CONCAVE POLYGONS



AC, BD, BE are diagonals

If diagonals are inside the polygon ⟶ convex



Diagonals are outside

↓

Concave polygons

REGULAR POLYGON

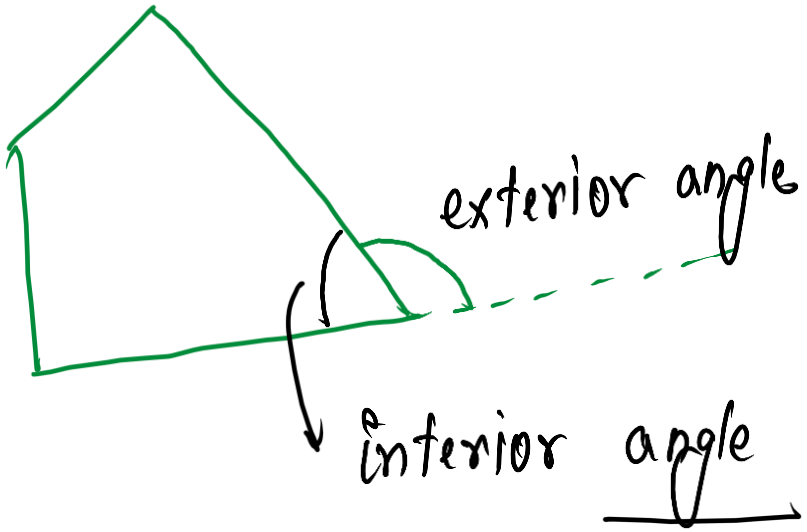
→ all sides are equal

→ all angles are equal

PROPERTIES

* If number of sides is n,

sum of interior angles of n-sided polygon $= (n-2) \times 180^\circ$



interior angle + exterior angle $= 180^\circ$

$$\text{one interior angle} = \frac{(n-2) \times 180^\circ}{n}$$

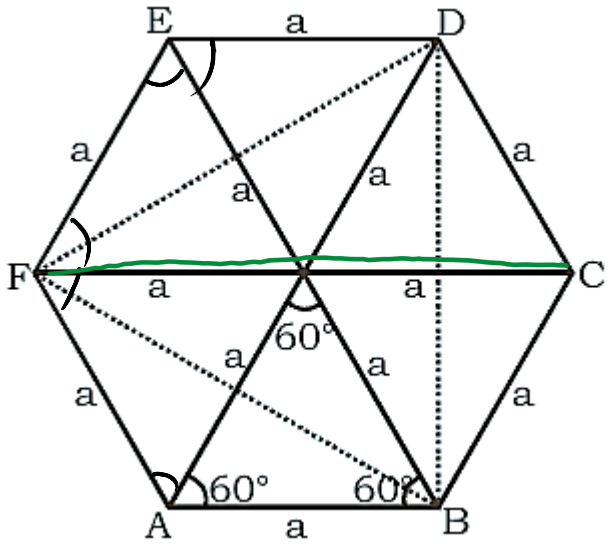
* sum of exterior angles of polygon = 360°

Measure of each exterior angle $= \frac{360^\circ}{n}$ → number of sides

$$\text{Number of sides of polygon} = \frac{360^\circ}{\text{Measure of one exterior angle}}$$

number of diagonals $= \frac{n(n-3)}{2}$ (n – number of sides)

REGULAR HEXAGON



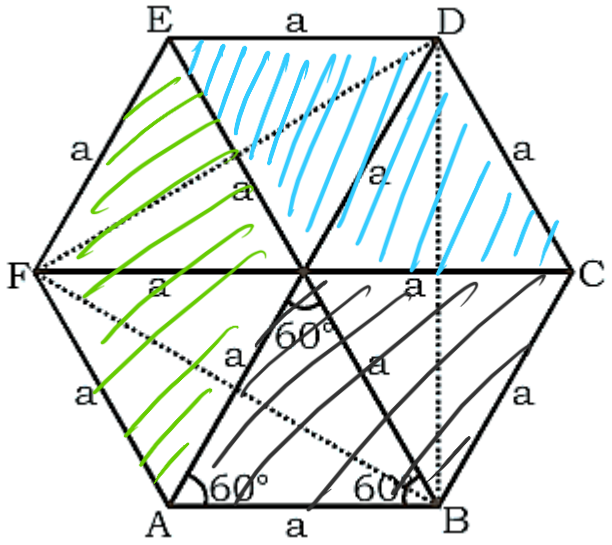
→ Making all diagonals

Longer: BE, AD, BC (2a)

shorter: FD, BD, DB ($\sqrt{3}a$)

→ Each interior angle $= \frac{(6-2)\times 180^\circ}{6} = \frac{720^\circ}{6} = 120^\circ$

→ Each exterior angle $= \frac{360^\circ}{6} = 60^\circ$ (180° − interior angle)



→ 6 equilateral triangles.

→ 3 rhombus

Area of regular hexagon

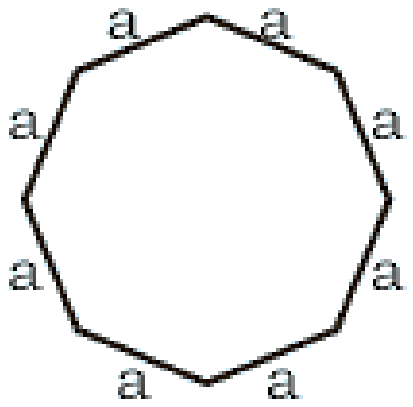
6 x area of 1 equilateral triangle 'a'.

$$6 \times \frac{\sqrt{3}}{4} a^2 = \frac{3\sqrt{3}}{2} a^2$$

Perimeter = 6a

→ number of diagonals $= \frac{6 \times 3}{2} = 9$

REGULAR OCTAGON



8 sides, perimeter = 8a

interior angle (I) = $\frac{(8-2)\times 180^\circ}{8} = \frac{1080^\circ}{8}$

$I = 135^\circ$

exterior angle (E) = $180^\circ - 135^\circ = 45^\circ$

no. of diagonals = $\frac{8\times(8-3)}{2} = \frac{8\times 5}{2} = 20$

PYQ – 2024 – I

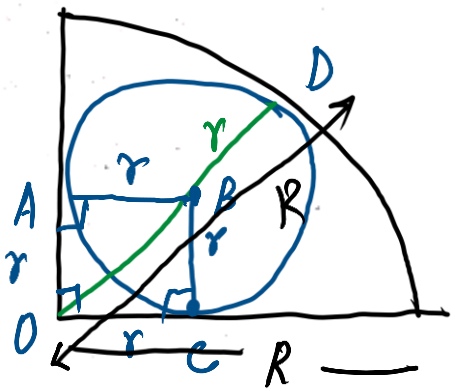
In a quarter circle of radius R, a circle of radius r is inscribed. What is the ratio of R to r ?

(a) $(\sqrt{2}+1):1$

(b) $(\sqrt{3}+1):1$

(c) $3:2$

(d) $5:4$



OABC is a square.

$OB = \sqrt{r^2+r^2} = \sqrt{2r^2} = \sqrt{2}r$

$OD = \sqrt{2}r + r$

$\sqrt{2}r + r = R$

$\frac{R}{r} = \frac{\sqrt{2}+1}{1} \Rightarrow \sqrt{2}+1 : 1$

PYQ – 2024 – I

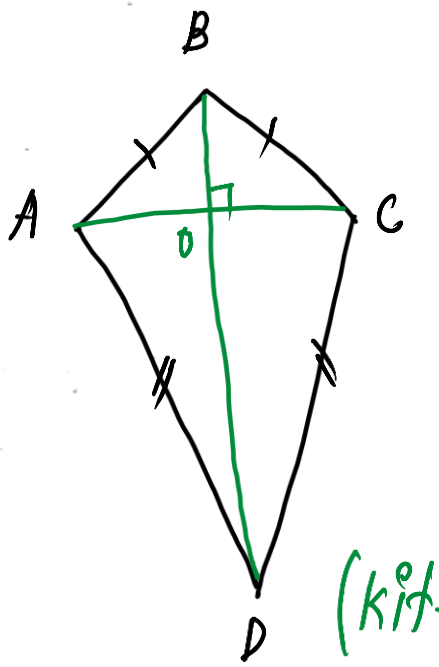
In a quadrilateral ABCD, AB = BC and CD = DA; AC and BD are diagonals such that AC = 6 cm and BD = 12 cm. What is the area of the quadrilateral ?

(a) 24 square cm

(b) 30 square cm

(c) 36 square cm ✓

(d) 40 square cm



(kite)

$OA = OC \mid OB \neq OD$

$\frac{1}{2} \times d_1 \times d_2$

$= \frac{1}{2} \times 6 \times 12 = 36\ cm^2$

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