Cyclic Quadrilateral (चक्रीय चतुर्भुज):-

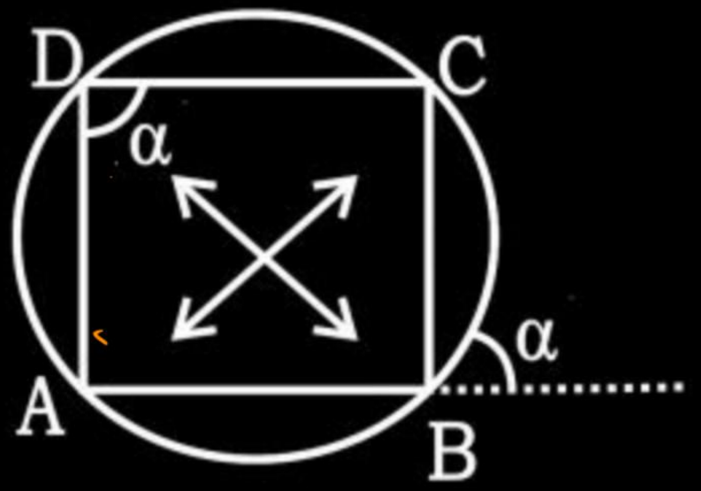
Sum of the opposite angles of the cyclic quadrilateral is 180°.

चक्रीय चतुर्भुज के सम्मुख कोणों का योग 180° होता ळें

$$\angle A + \angle C = \angle B + \angle D = 180^\circ$$

In a cyclic quad., the exterior angle is equal to the opposite interior angle. (a)

एक चक्रीय चतुर्भुज में, बाहरी कोण विपरीत आंतरिक कोण के बराबर होता है। (a)

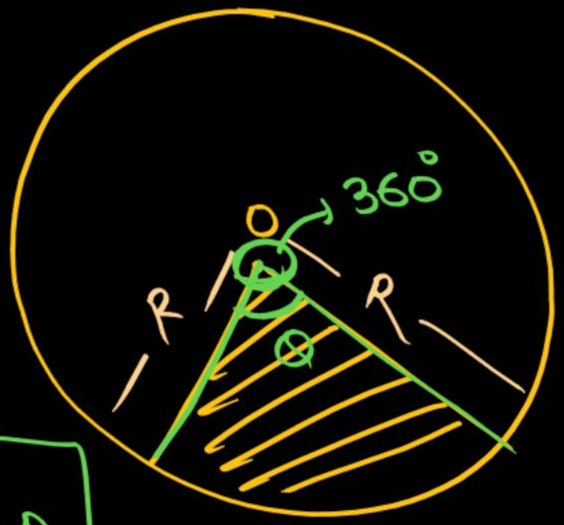


Sector → (ক্ষেত্রখণ্ড)

$360^\circ \xrightarrow{\text{Area}} \pi R^2$

$1^\circ \xrightarrow{A} \frac{\pi R^2}{360^\circ}$

$\theta^\circ = \frac{\pi R^2}{360^\circ} \times \theta$



$$\text{Area of Sector} = \frac{\pi R^2 \theta}{360^\circ}$$

35. **Three horses are tied with each corner of a triangular field with a rope of length 'R' . Find the area of the grass graze by the horses .**

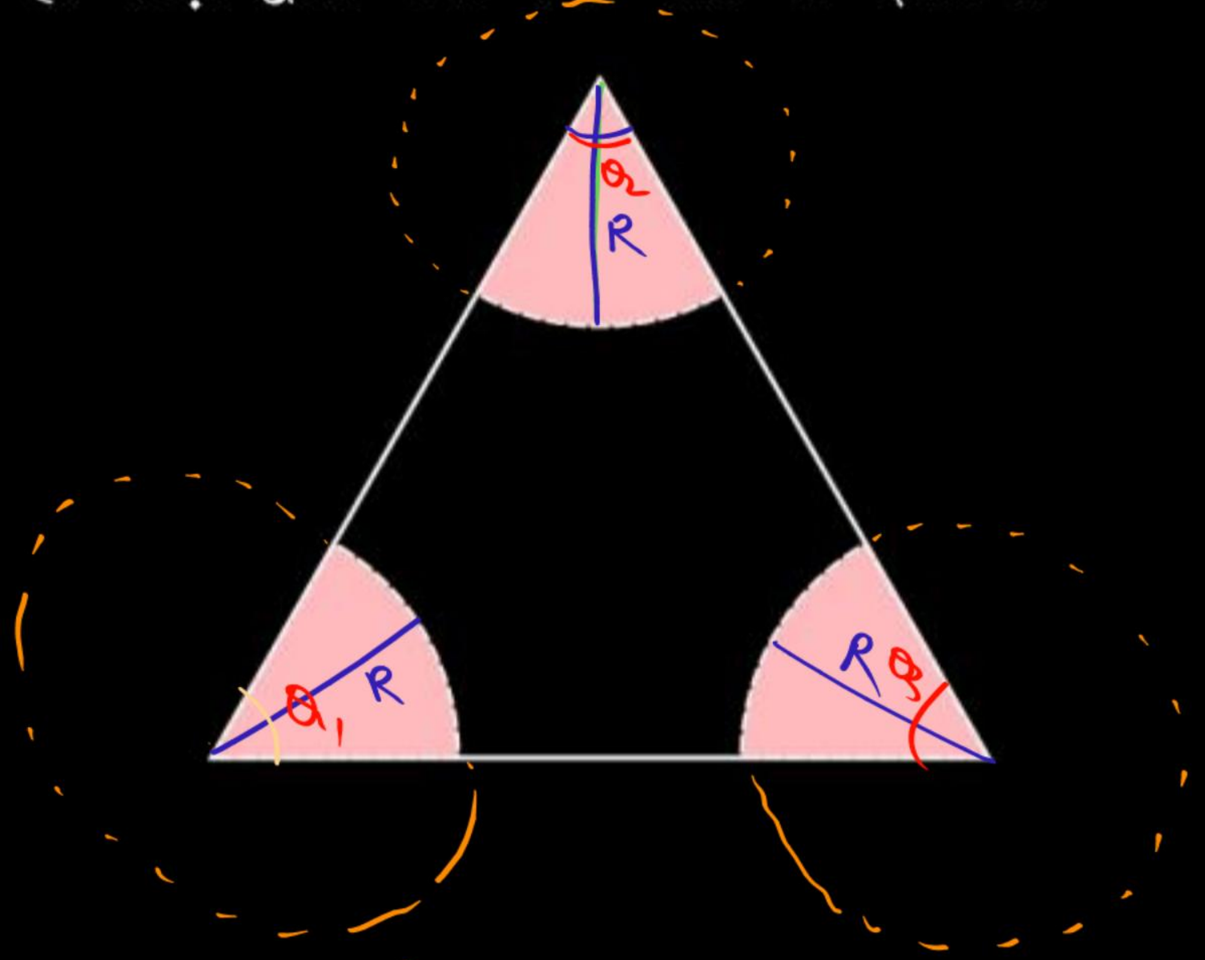
तीन घोड़े एक त्रिभुजाकार क्षेत्र के कोनों पर 'R' लम्बाई की रस्सी से बधे हुए है। घोड़ो द्वारा चरी गयो घास का क्षेत्रफल ज्ञात करें।

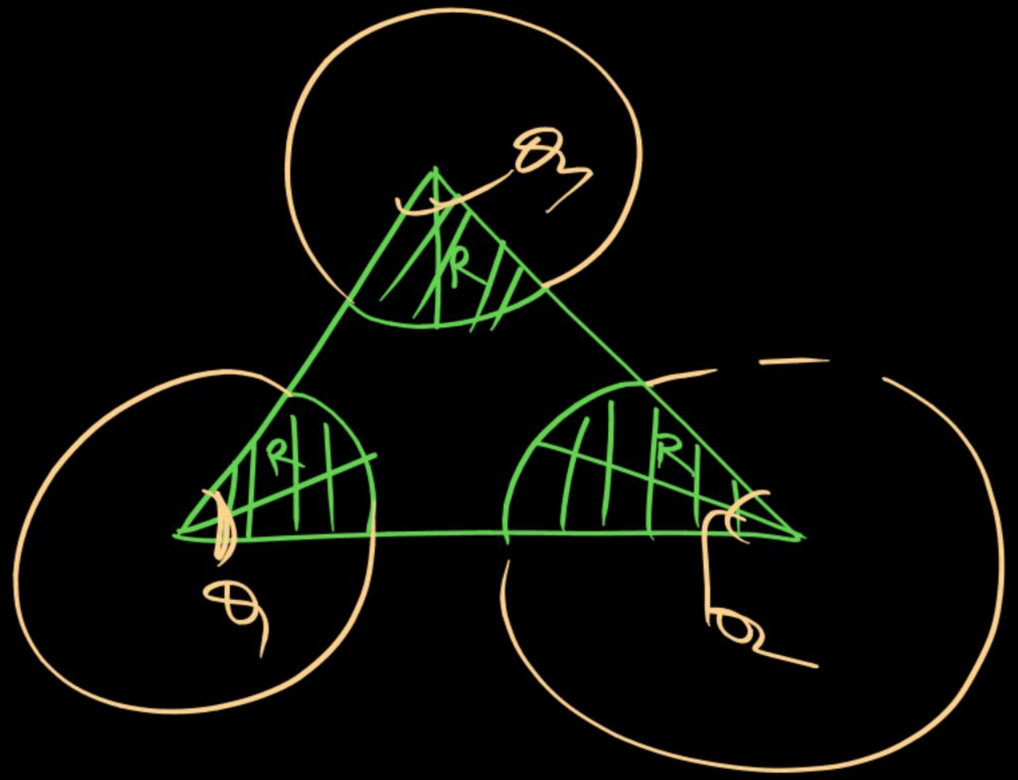
$$\frac{\pi r^2 \theta}{360}$$

$$\frac{\pi R^2 \theta_1}{360} + \frac{\pi R^2 \theta_2}{360} + \frac{\pi R^3 \theta_3}{360}$$

$$\frac{\pi R^2}{360}\left[\theta_1 + \theta_2 + \theta_3\right]$$

$$\frac{\pi R^2}{360} \times 180 = \frac{\pi R^2}{2}$$

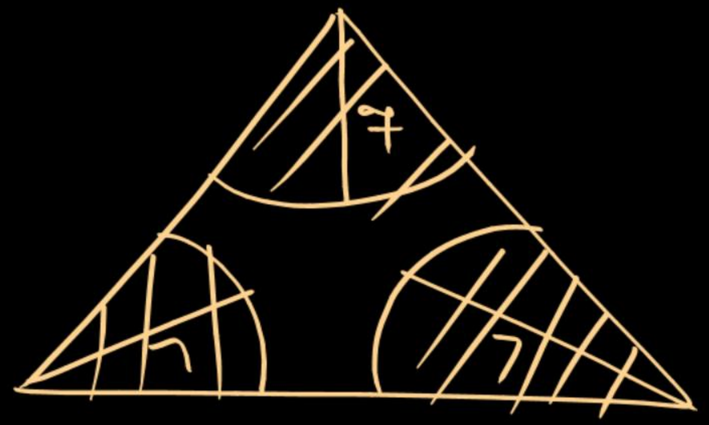




$$360 = \pi R^2$$

$$180 = \frac{\pi R^2}{2}$$

9g



$$\frac{\pi R^2}{2} = \frac{22}{7} \times \frac{7 \times 7}{2}$$

$$= 77 \text{ cm}^2$$

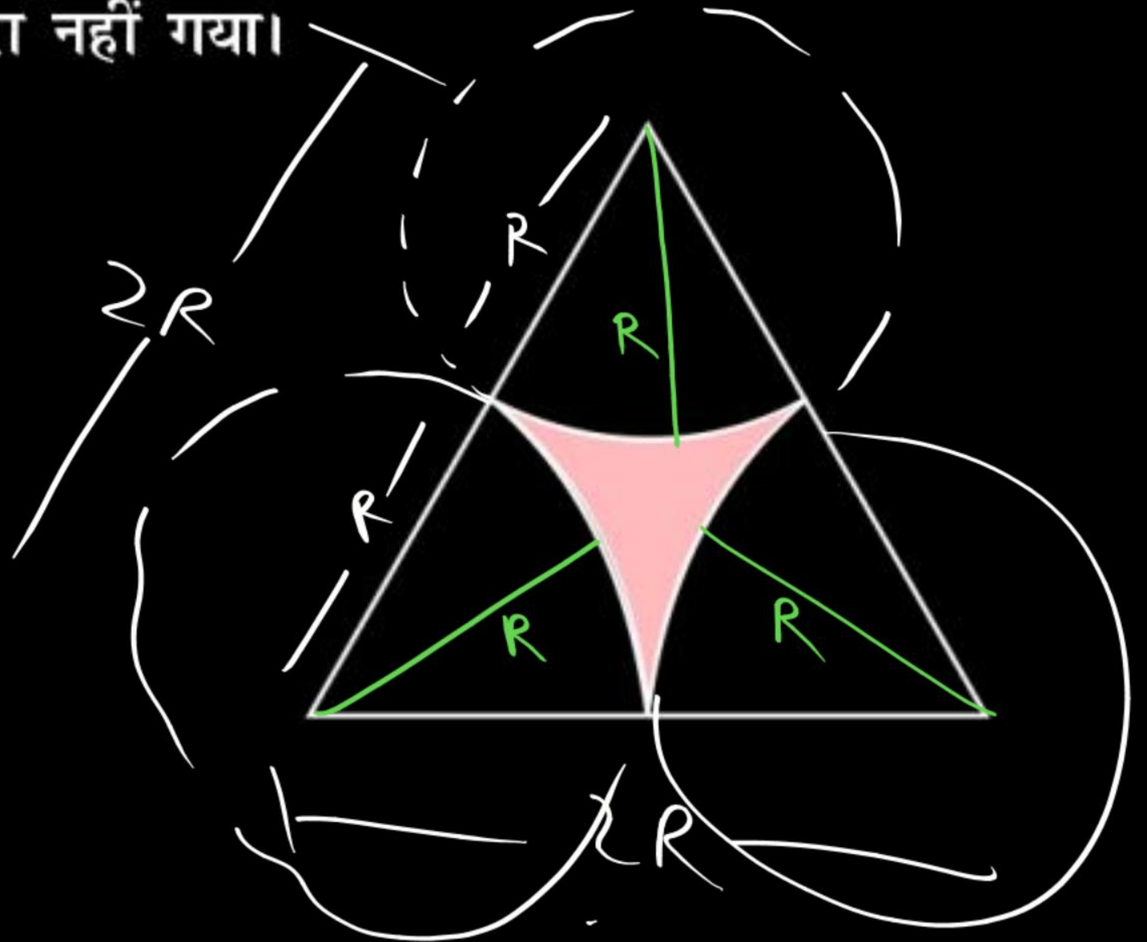
36. **If ABC is an equilateral triangular field. Three horses are tied at the three corners of the field. Find the area of field not grazed by the horses.**

यदि ABC एक समबाहु त्रिभुजाकार क्षेत्र है। तीन घोड़े क्षेत्र के तीनों कोनो पर बधे हुए है। उस क्षेत्र का क्षेत्रफल ज्ञात करों जो घोड़ो द्वारा चरा नहीं गया।

A of Δ - A of 3 sector

$$\frac{\sqrt{3}}{4} \times 4R^2 - \frac{\pi R^2}{2}$$

$$R^2\left(\sqrt{3} - \frac{\pi}{2}\right) cm^2$$



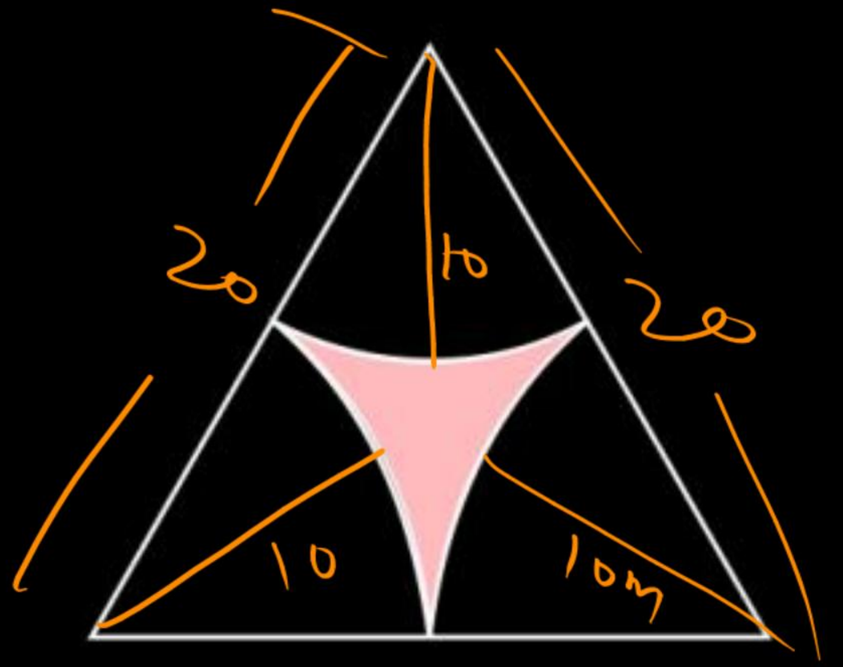
37. **Three horses are tied with each corner of a triangular field with a rope of length 10meter. Find the ungrazed area of the field.**

तीन घोड़े एक त्रिभुजाकार क्षेत्र के कोनों पर 10 मीटर लम्बाई की रस्सी से बधे हुए है। घोड़ों द्वारा न चरी गयो घास का क्षेत्रफल ज्ञात करें।

A of Δ - A of Sector

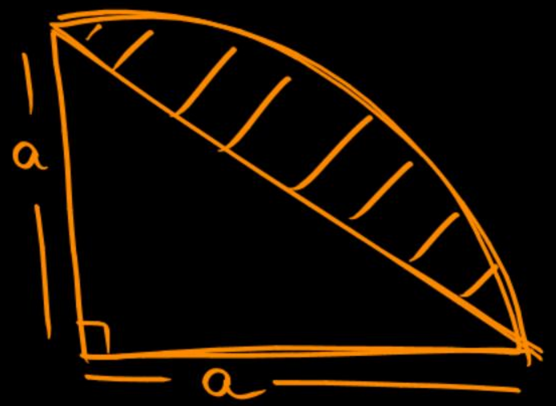
$\frac{\sqrt{3}}{4} \times 100 - \frac{\pi \times 100}{2}$

$50\left[2\sqrt{3} - \pi\right]_{cm^2}$



38. **AOB is a quadrant whose radius are 'a'. Then find the area of :**

AOB एक चतुर्थांश है जिसकी त्रिज्या 'a' है। तो इसका क्षेत्रफल ज्ञात कीजिए:



A of Quadrant − A of Δ

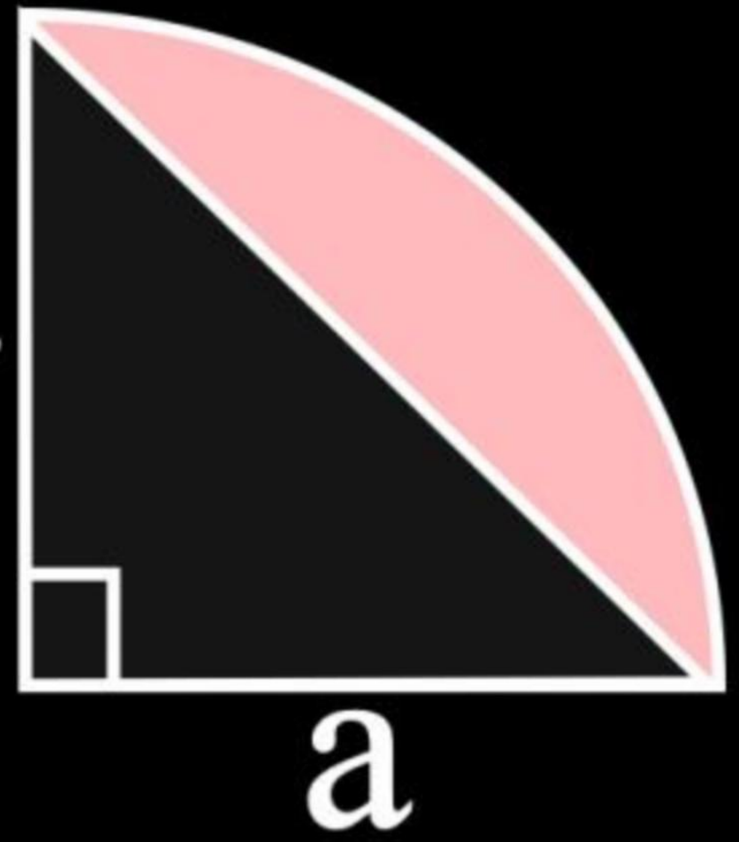
$\frac{\pi a^2}{4} - \frac{1}{2} \times a \times a$

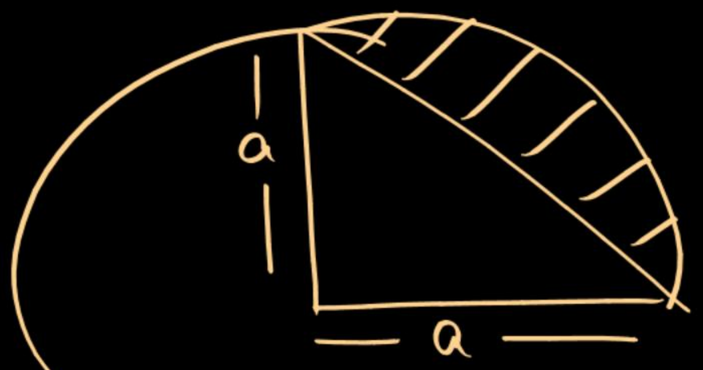
$\frac{22}{7} \times \frac{a^2}{4} - \frac{1}{2} a^2$

$a^2 \left[\frac{11}{14} - \frac{1}{2}\right]$

$a^2 \left[\frac{11-7}{14}\right]$

$a^2 \times \frac{4}{14} \Rightarrow \frac{2}{7} a^2$

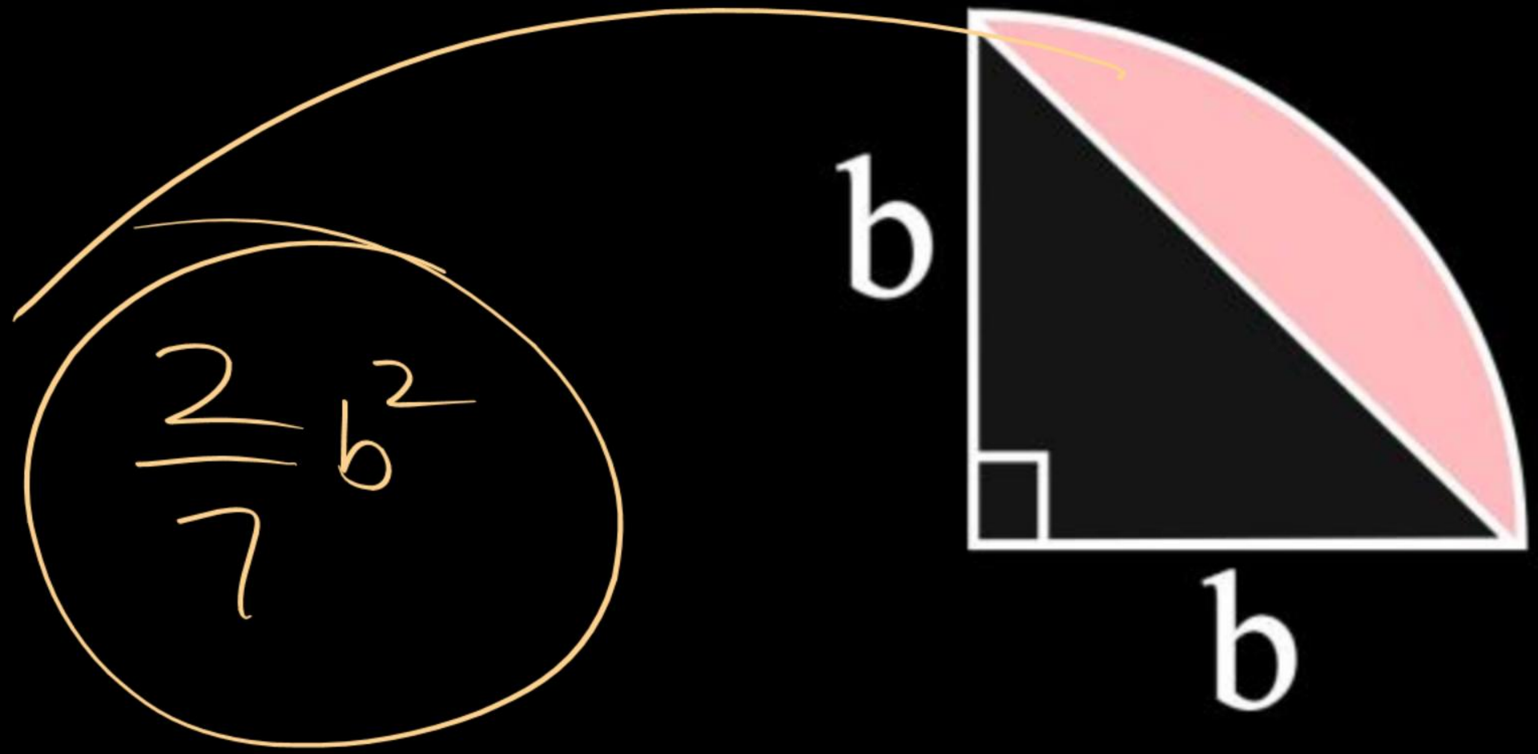


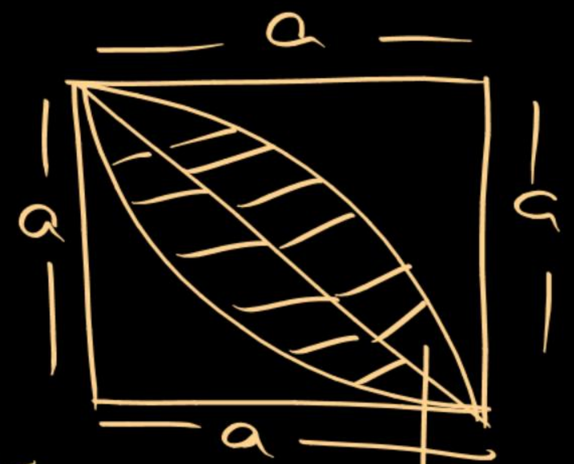


$$A = \frac{2}{7}a^2$$

39. Find the area of the shaded region:

छायांकित क्षेत्र का क्षेत्रफल ज्ञात कीजिए:

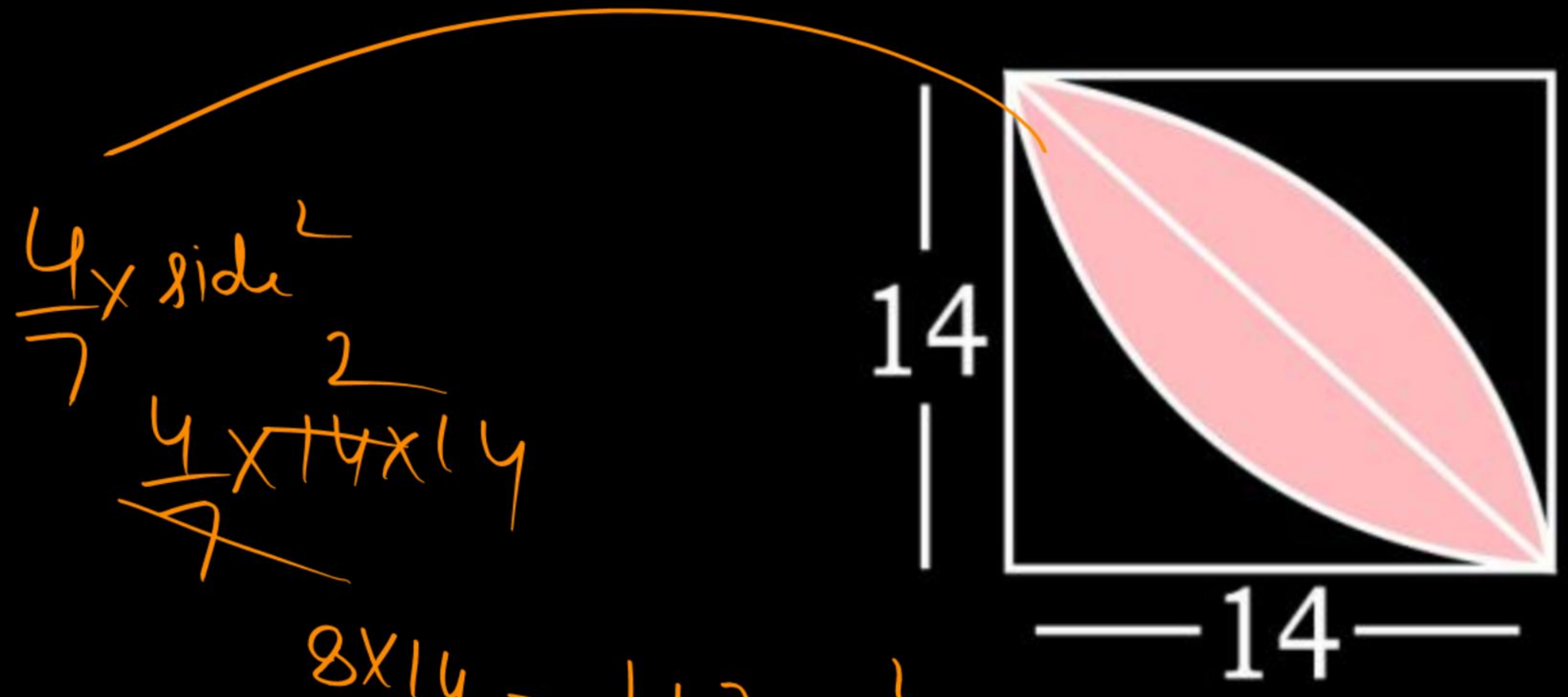




$$\frac{2a^2 \times 2}{7}$$

$$\frac{4}{7}a^2$$

40. Find the area of the shaded region:
छायांकित क्षेत्र का क्षेत्रफल ज्ञात कीजिए:

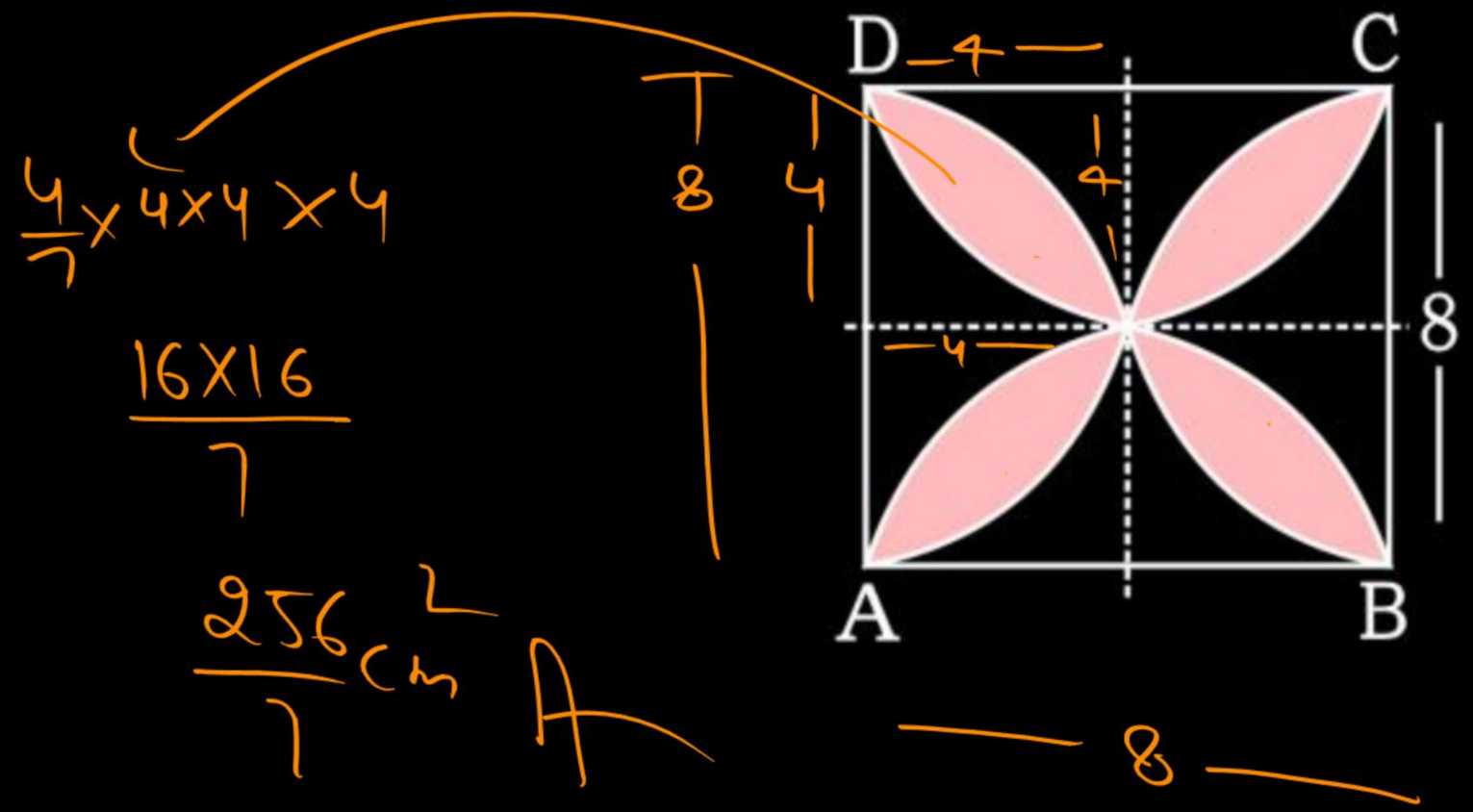


$\frac{4}{7} \times side^2$

$\frac{4}{7} \times 14 \times 14$

$8 \times 14 = 112 cm^2$

41. **Find the area of the shaded region:**
छायांकित क्षेत्र का क्षेत्रफल ज्ञात कीजिए:

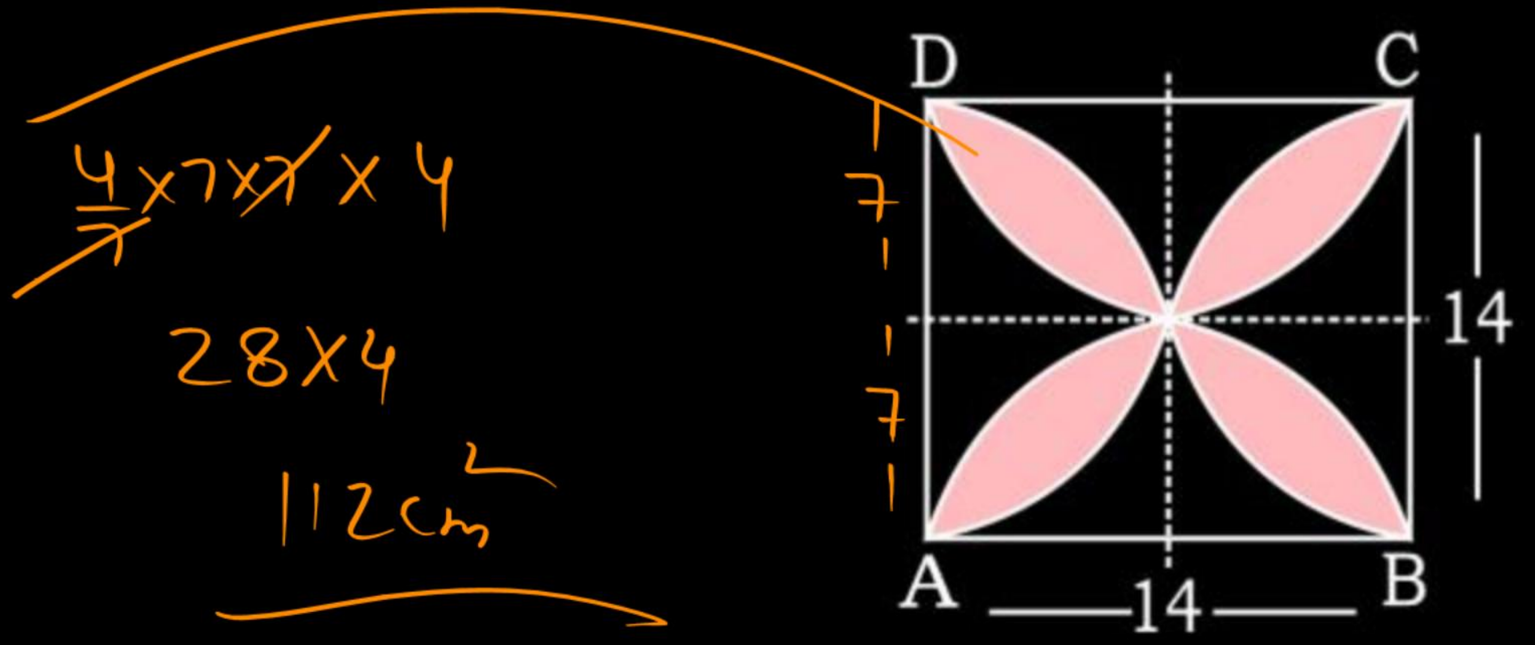


$\frac{4}{7} \times 4 \times 4 \times 4$

$\frac{16 \times 16}{7}$

$\frac{256}{7}\ cm^2$

42. Find the area of the shaded region:
छायांकित क्षेत्र का क्षेत्रफल ज्ञात कीजिए:



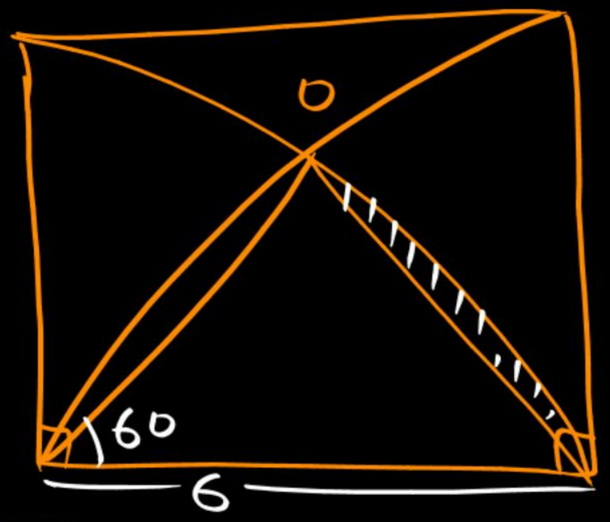
$4 \times 7 \times 7 \times 4$

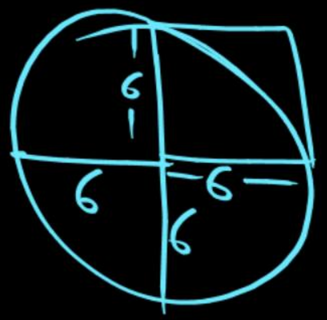
28×4

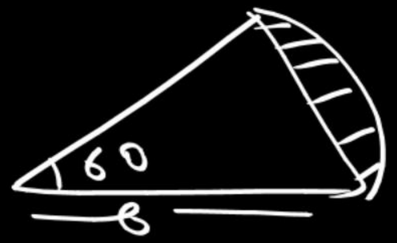
$112\ cm^2$

43. **ABCD is a square whose each side is of 6 cm and two quadrants are formed inside it and AOB is an equilateral triangle. Find the area of the shaded region.**

ABCD एक वर्ग है जिसकी प्रत्यक भुजा 6 सेमी की है और इसके अंदर दो ~~चतुर्भुज~~ बने हैं और **AOB** एक समबाहु त्रिभुज है। छायांकित भाग का क्षेत्रफल ज्ञात कीजिए।







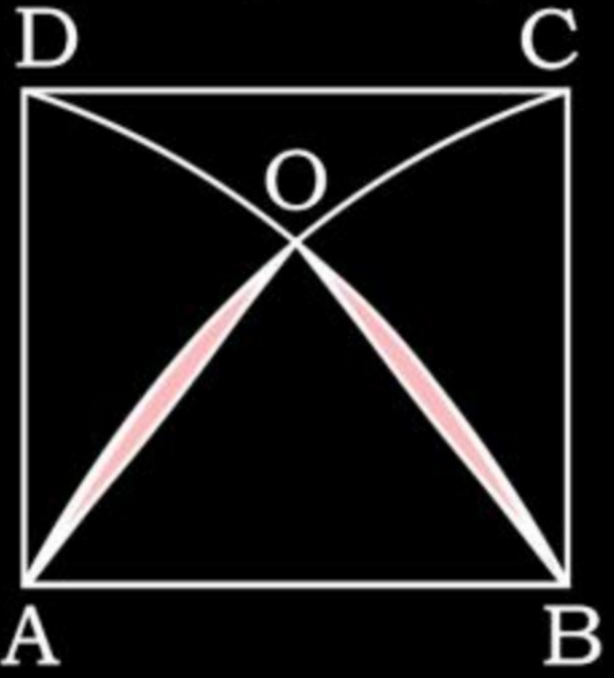
Ad Sector - Ad Δ

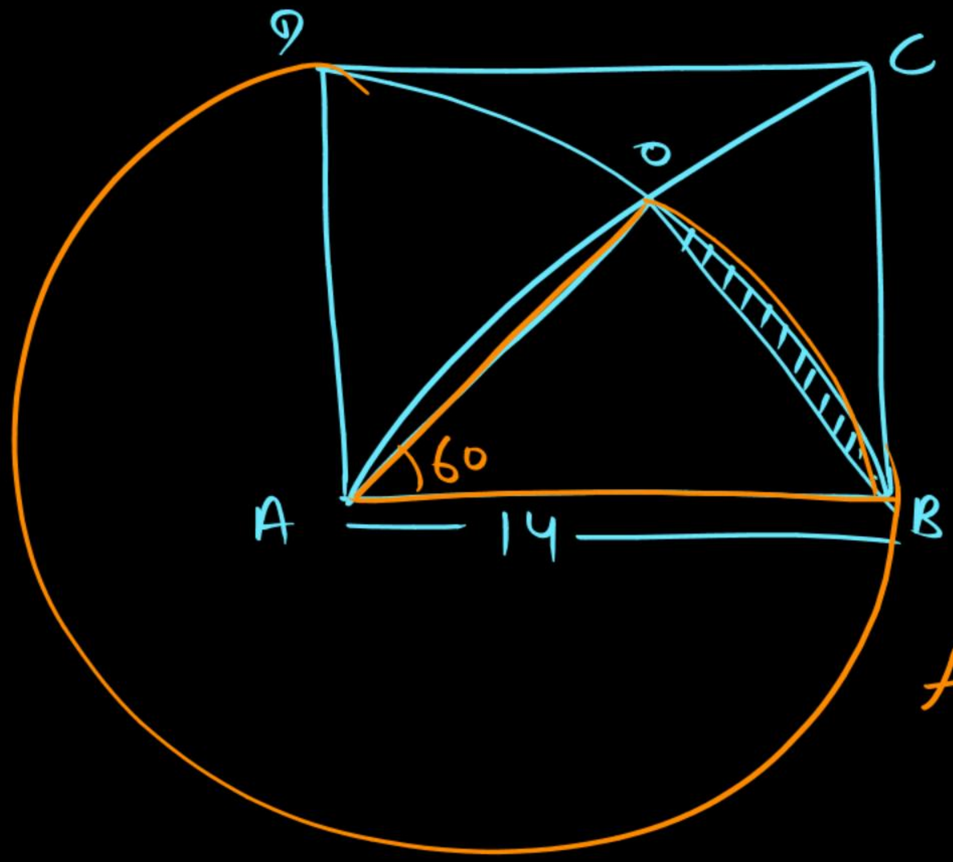
$\left(\frac{\pi R^2}{6} - \frac{\sqrt{3}}{4}\text{side}^2\right)$

$\frac{\pi \times 6 \times 6}{6} - \frac{\sqrt{3}}{4} \times 6 \times 6$

$(6\pi - 9\sqrt{3})$

T.A = $2(6\pi - 9\sqrt{3})$ sq. cm





$$\left(\frac{22\times14}{3}-45\sqrt{3}\right)cm^2$$

A

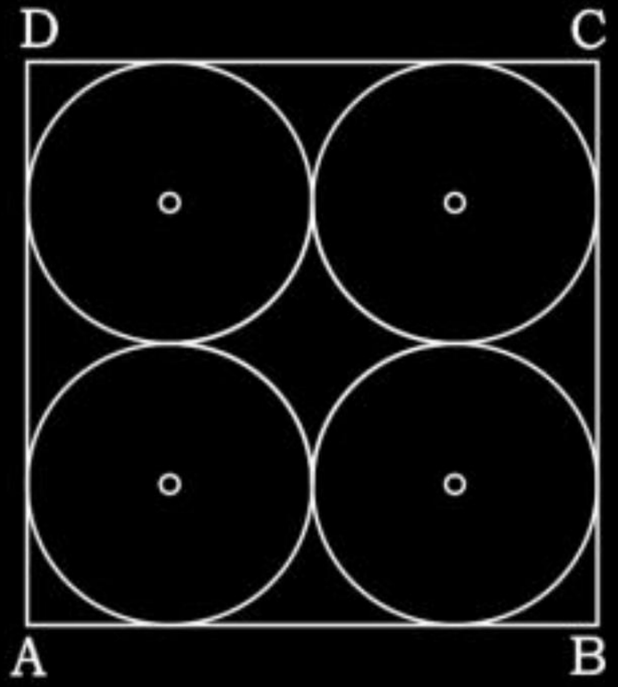
Ar sector − Ar Δ

$$\frac{\pi R^2}{6}-\frac{\sqrt{3}}{4}\times side^2$$

$$\frac{22}{7}\times\frac{14\times14}{63}-\frac{\sqrt{3}}{4}\times14\times14$$

44. **ABCD is a square. Four identical circles are drawn inside it, and a square is formed in between four circles. Find the area of square.**

ABCD एक वर्ग है। इसके अंदर चार समान वृत्त खींचे जाते हैं, और चार वृत्तों के बीच में एक वर्ग बनता है। वर्ग का क्षेत्रफल ज्ञात कीजिए।



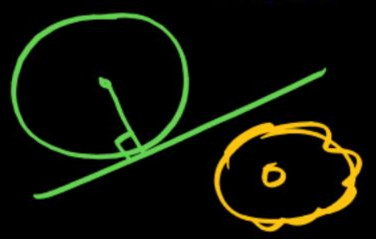
$360 \xrightarrow{C} 2\pi r$

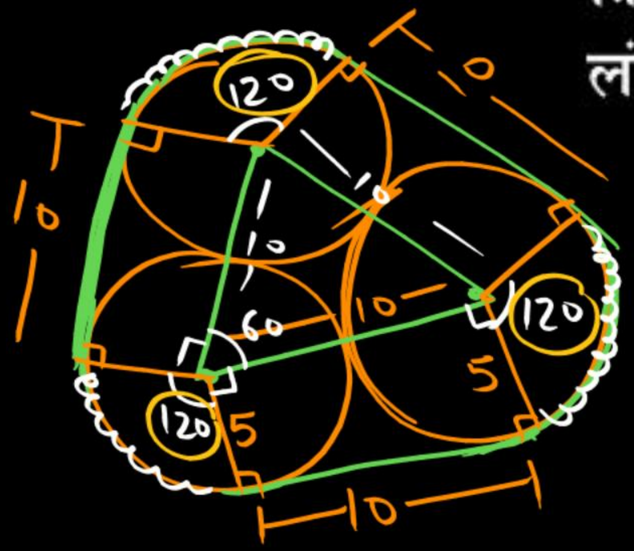
$1^\circ \longrightarrow \frac{2\pi r}{360}$

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

45. **Three circles touch each other externally each has radii 5 cm. All three are tied with a thread. Find the length of the thread.**

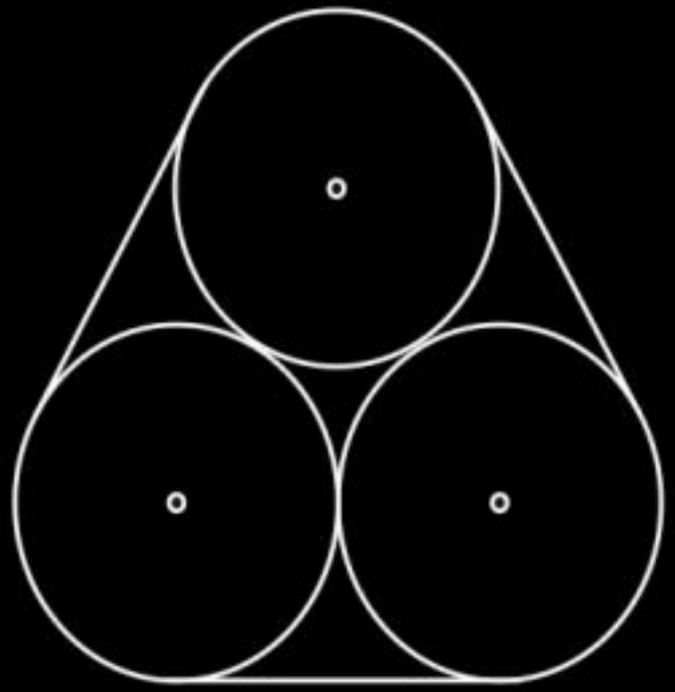
तीन वृत्त एक दूसरे को बाह्य रूप से स्पर्श करते हैं, प्रत्यक की त्रिज्या 5 सेमी है। तीनों को एक धागे से बांधा गया है। धागे की लंबाई ज्ञात कीजिए।





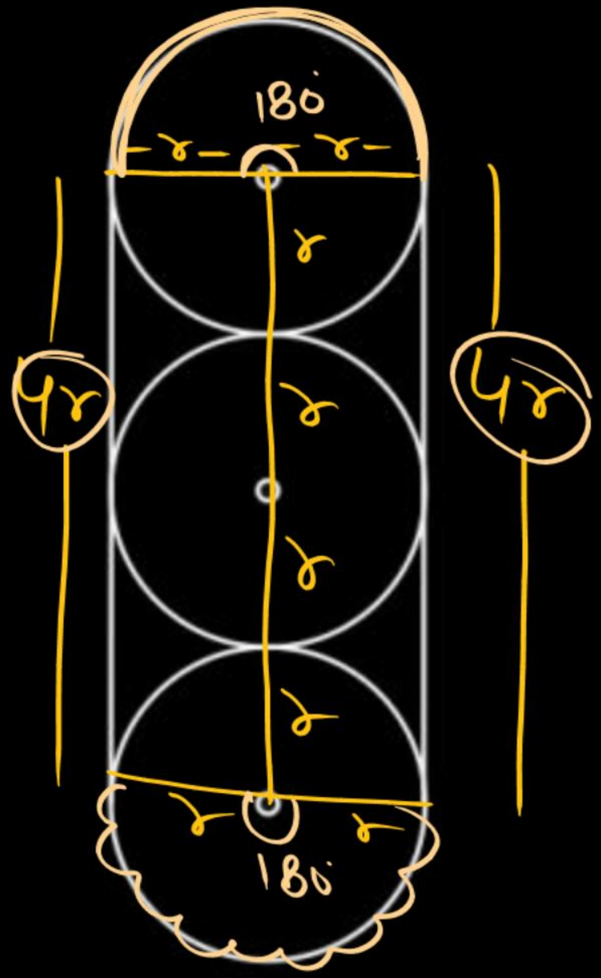
$30 + 2\pi r$

$(30 + 10\pi)$ ft

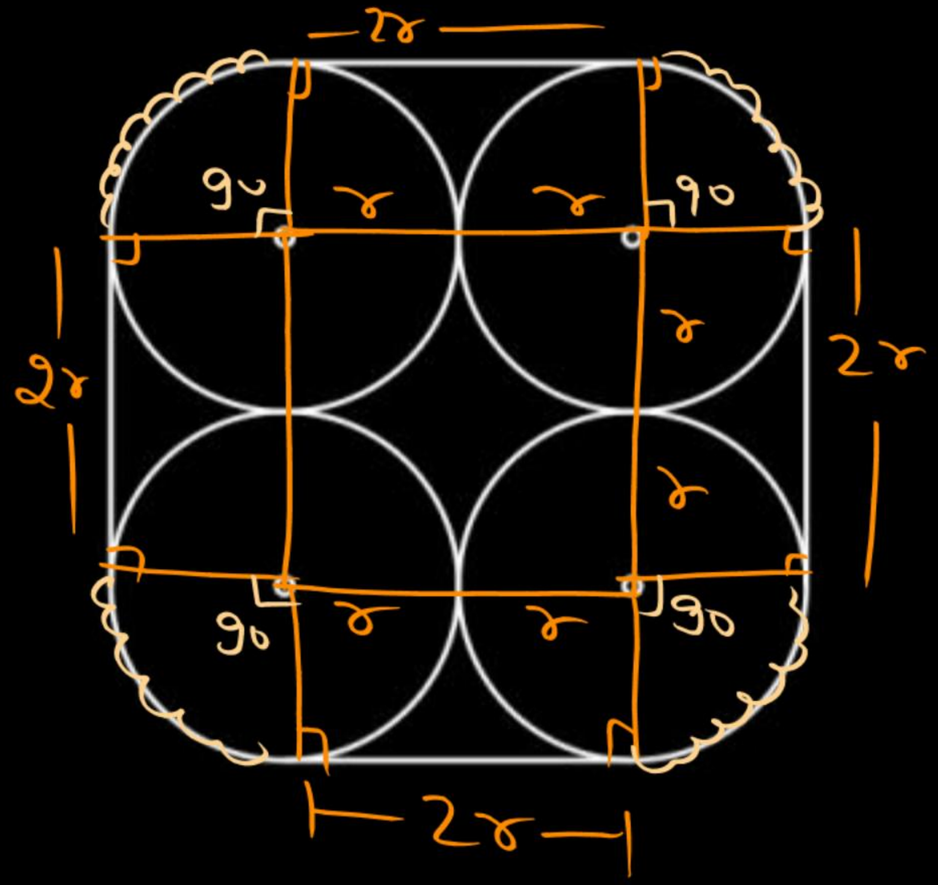


46. Find length of rope :

$8r + 2\pi r$

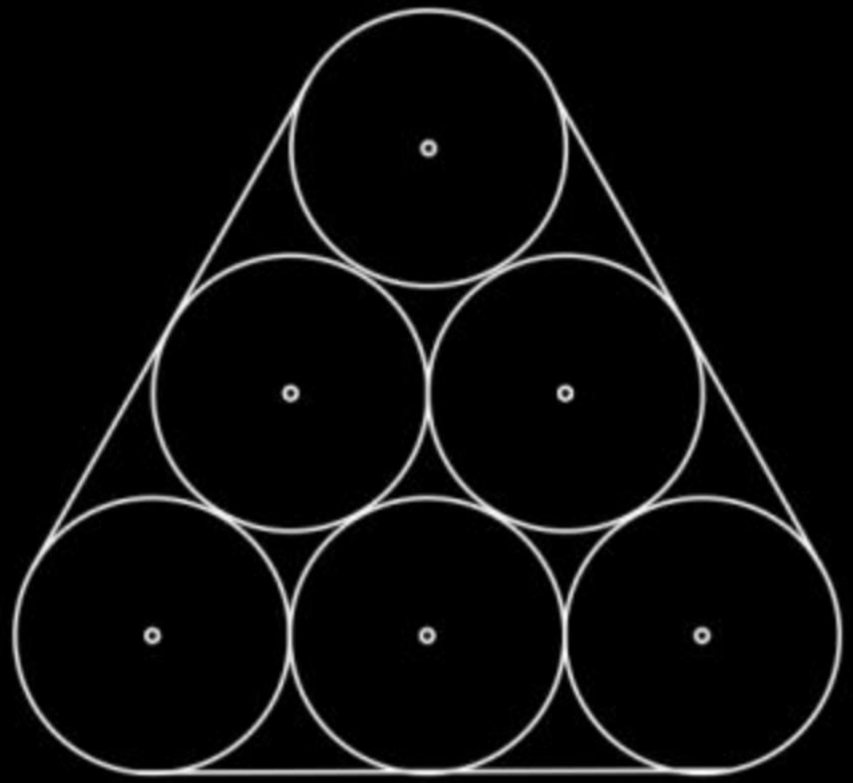


47. Find length of rope : (r)



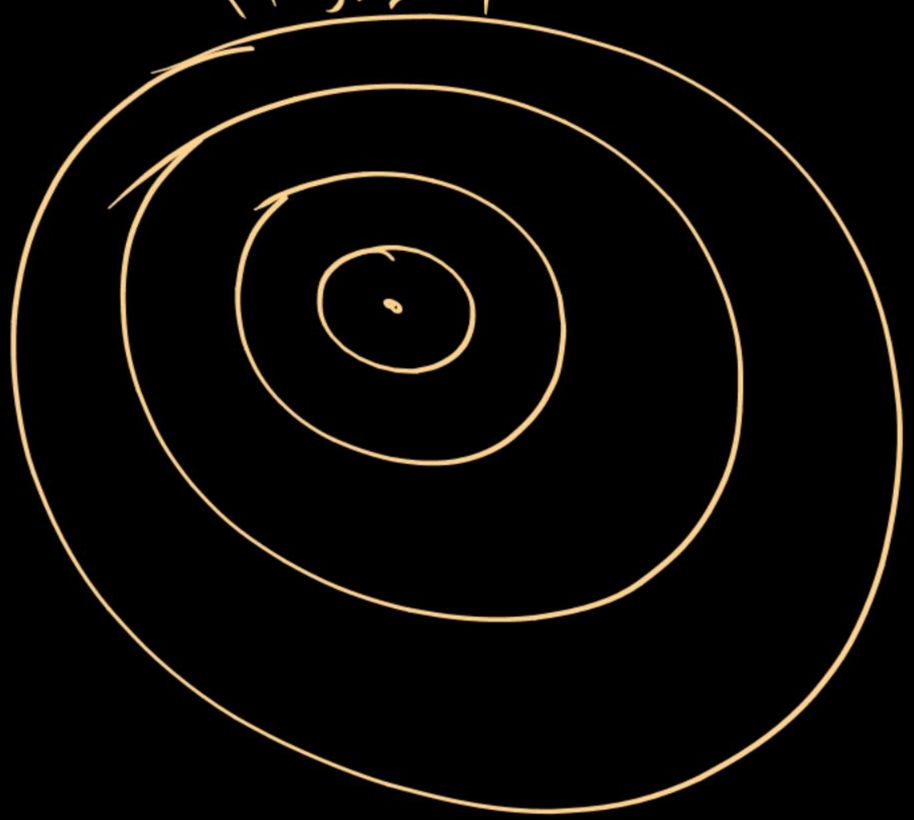
$8r + 2\pi r$

48. Find length of rope :



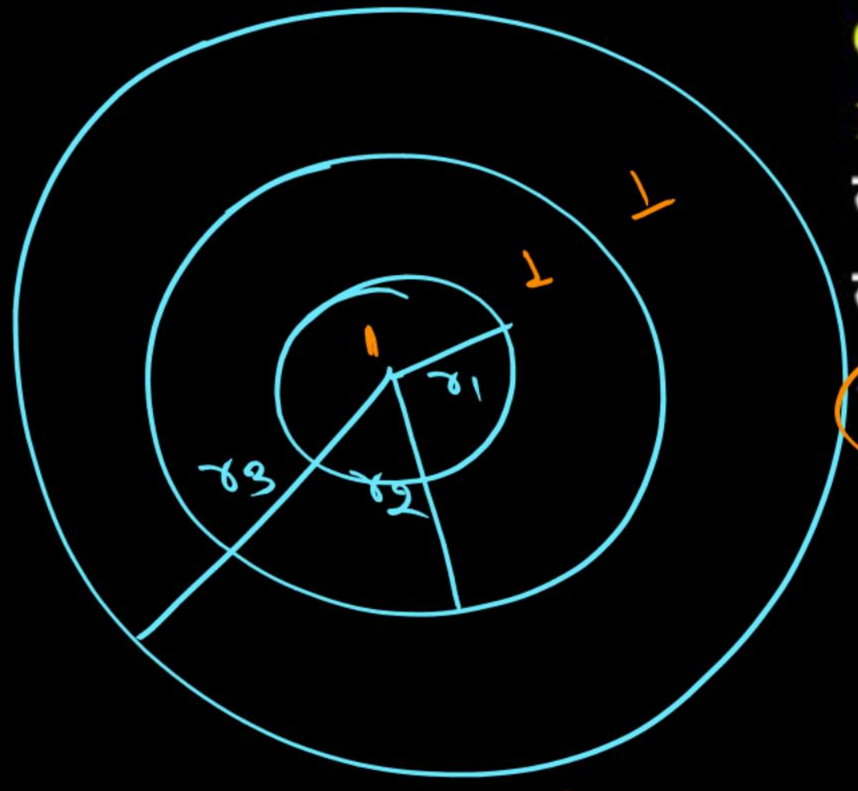
Concentric circle

संकेन्द्रीय



1. **Three concentric circles are drawn in such a way that they divides the area in three equal parts. Radius of bigger circle is $12\sqrt{6}$. Find the radius of the smaller circle.**

तीन संकेंद्रित वृत्त इस प्रकार खींचे जाते हैं कि वे क्षेत्रफल को तीन बराबर भागों में विभाजित करते हैं। बड़े वृत्त की त्रिज्या $12\sqrt{6}$ है। छोटे वृत्त की त्रिज्या ज्ञात कीजिए।



$A_1 = 1$
$A_2 = 2$
$A_3 = 3$

A of Smallest circle = $\frac{1}{3}$ A of Biggest circle

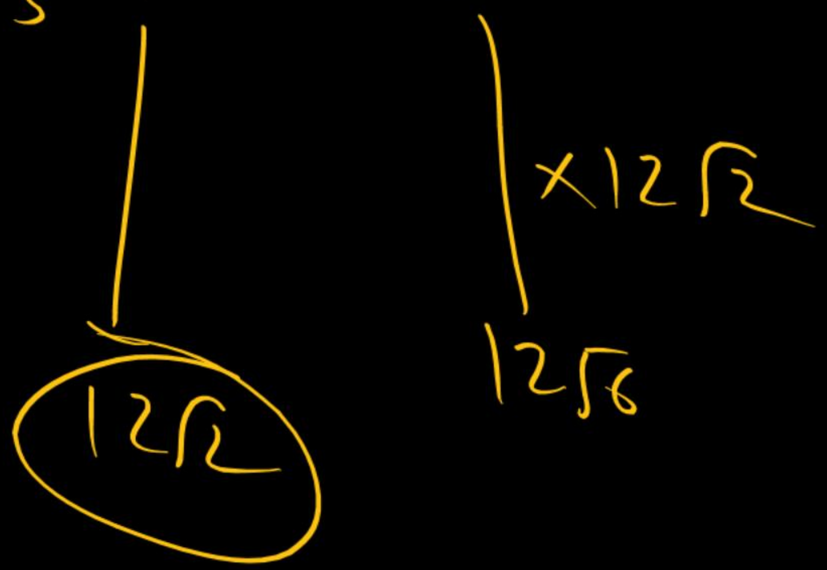
$\pi r_1^2 = \frac{1}{3}\pi r_3^2$

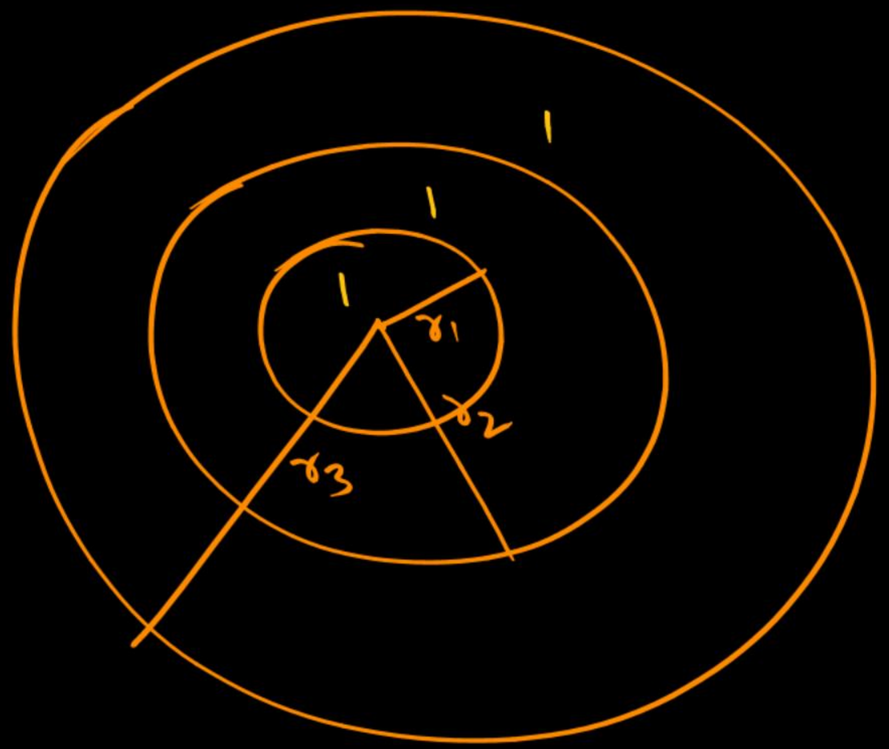
$r_1^2 = \frac{1}{3} \times 12 \times 12 \times 6$

$r_1 = 12\sqrt{2}$

$A_1 : A_2 : A_3 = 1 : 2 : 3$

$r_1 : r_2 : r_3 = 1 : \sqrt{2} : \sqrt{3}$





$$A_1 : A_2 : A_3 = 1 : 2 : 3$$

$$\pi r_1^2 : \pi r_2^2 : \pi r_3^2 = 1 : 2 : 3$$

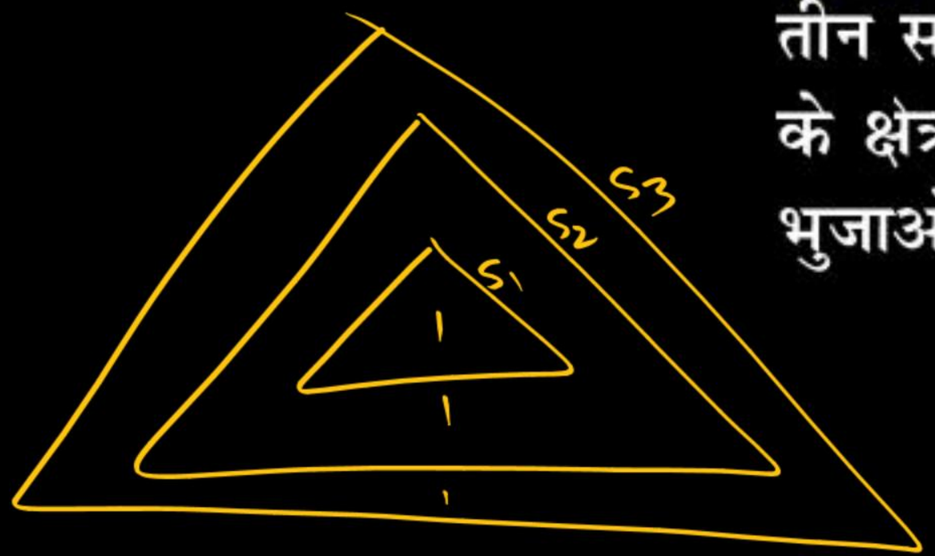
$$r_1 : r_2 : r_3 = 1 : \sqrt{2} : \sqrt{3}$$

$A_1 : A_2 : A_3 : A_4 = 1 : 2 : 3 : 4$

$r_1 : r_2 : r_3 : r_4 = 1 : \sqrt{2} : \sqrt{3} : 2$

2. **Three equilateral triangles are formed in such a way that they divides the area of biggest triangle in three equal parts. Find the ratio of their sides and areas.**

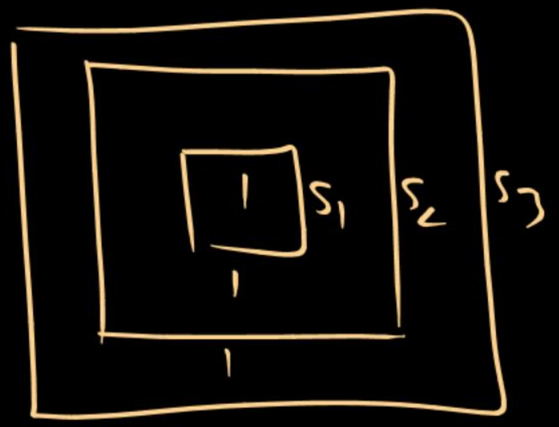
तीन समबाहु त्रिभुज इस प्रकार बनते हैं कि वे सबसे बड़े त्रिभुज के क्षेत्रफल को तीन बराबर भागों में विभाजित करते हैं। उनकी भुजाओं और क्षेत्रफलों का अनुपात ज्ञात कीजिए।



$$A_1 : A_2 : A_3 = 1 : 2 : 3$$

$$\frac{\sqrt{3}}{4}S_1^2 : \frac{\sqrt{3}}{4}S_2^2 : \frac{\sqrt{3}}{4}S_3^2 = 1 : 2 : 3$$

$$S_1 : S_2 : S_3 = 1 : \sqrt{2} : \sqrt{3}$$



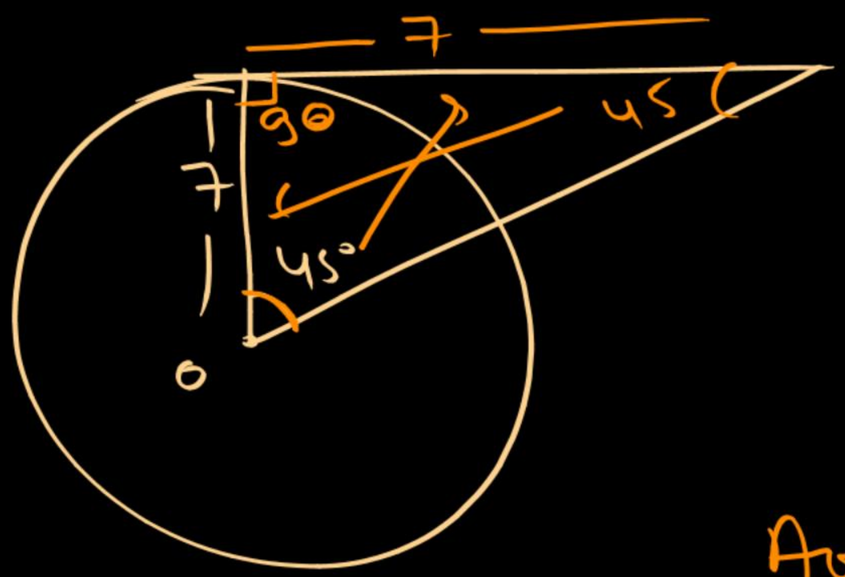
$$A_1 : A_2 : A_3 = 1 : 2 : 3$$

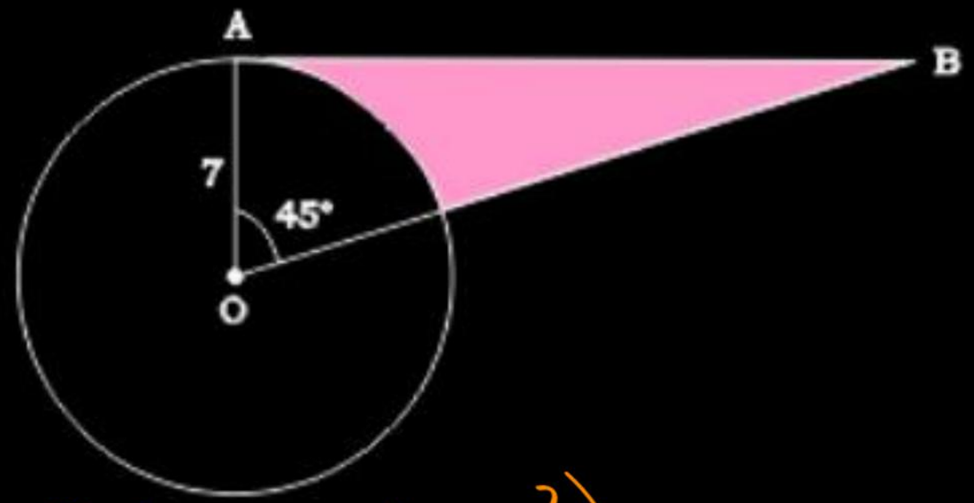
$$s_1^2 : s_2^2 : s_3^2 = 1 : 2 : 3$$

$$s_1 : s_2 : s_3 = 1 : \sqrt{2} : \sqrt{3}$$

3. **Find the area of the shaded region.**

छायांकित भाग का क्षेत्रफल ज्ञात कीजिए।



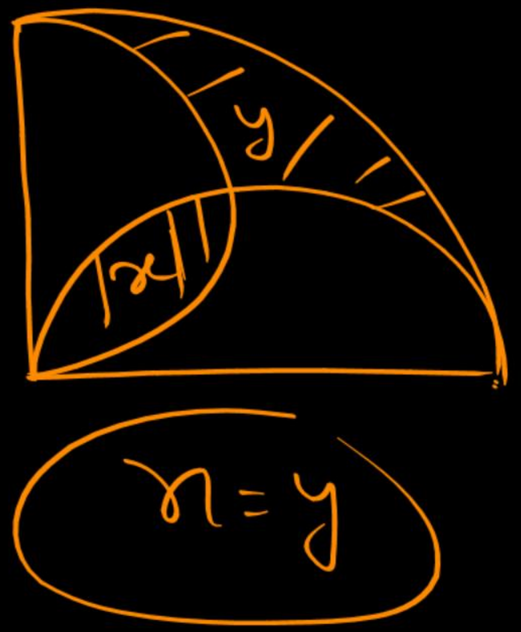


Adj $\triangle AOB$ − Adj Sector $\left(\frac{\theta}{360} \times \pi R^2\right)$

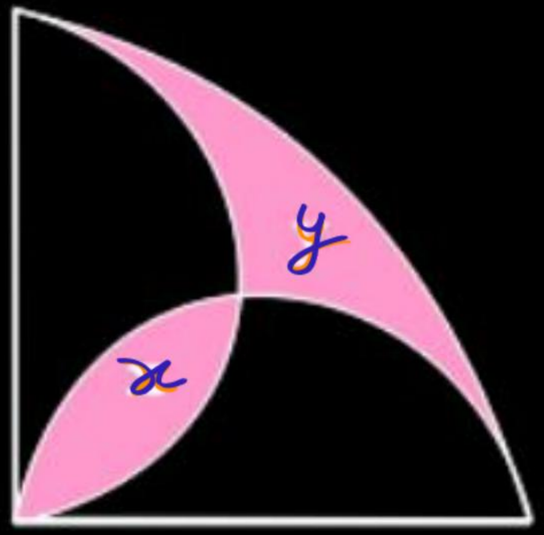
$\frac{1}{2} \times 7 \times 7 - \frac{22}{7} \times \frac{7 \times 7}{8}$

$\frac{49}{2} - \frac{77}{4} = \frac{98 - 77}{4} = \frac{21}{4} = 5.25$

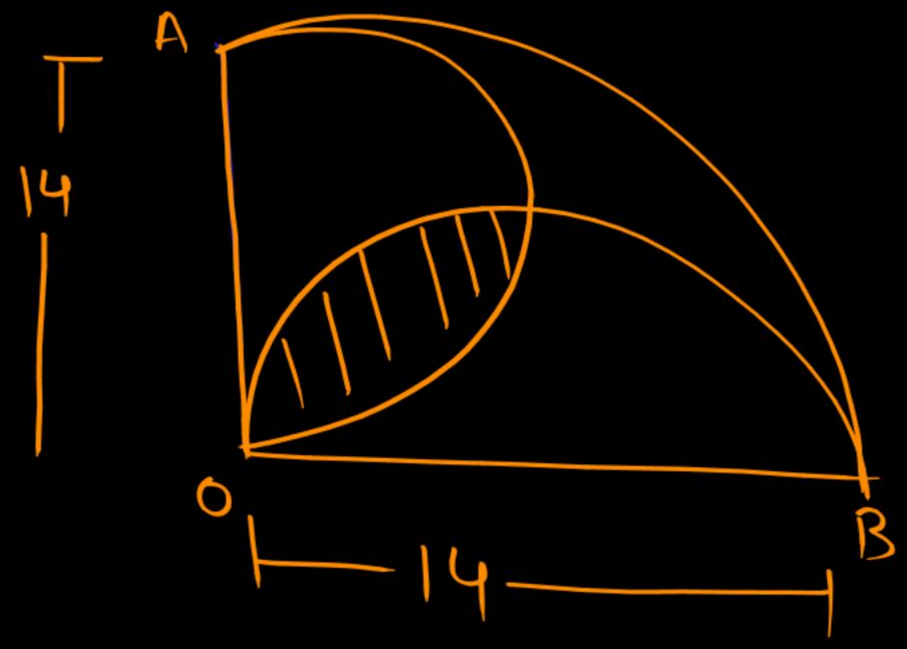
*

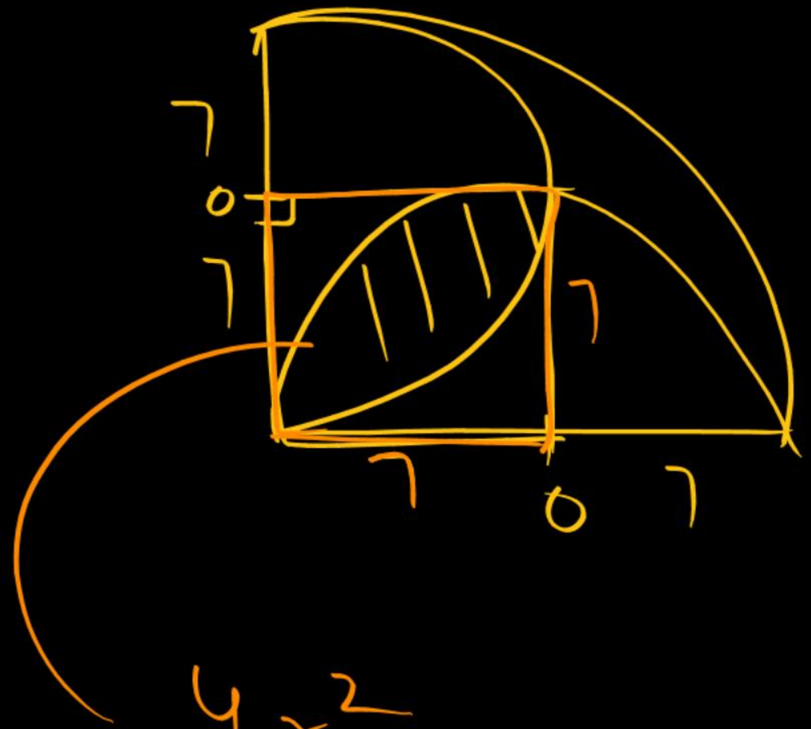


$x = y$



x = y

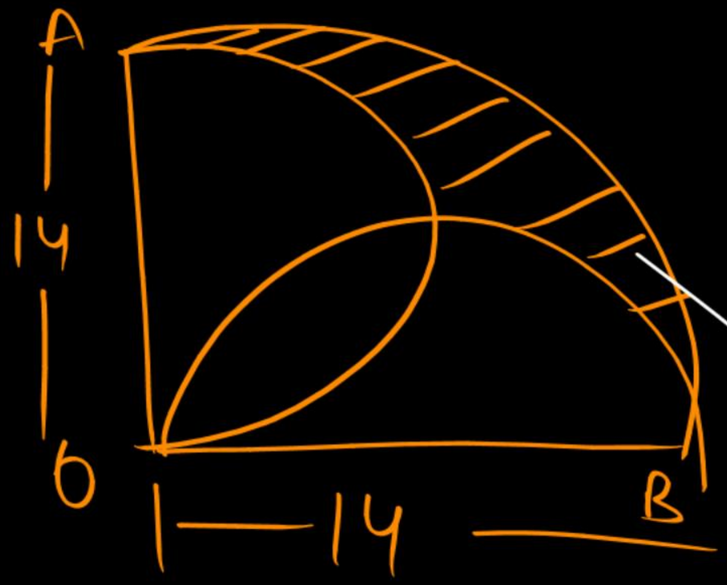




$\frac{4}{7}\pi^2$

$\frac{4}{7} \times 7 \times 7$

$28\,cm^2$

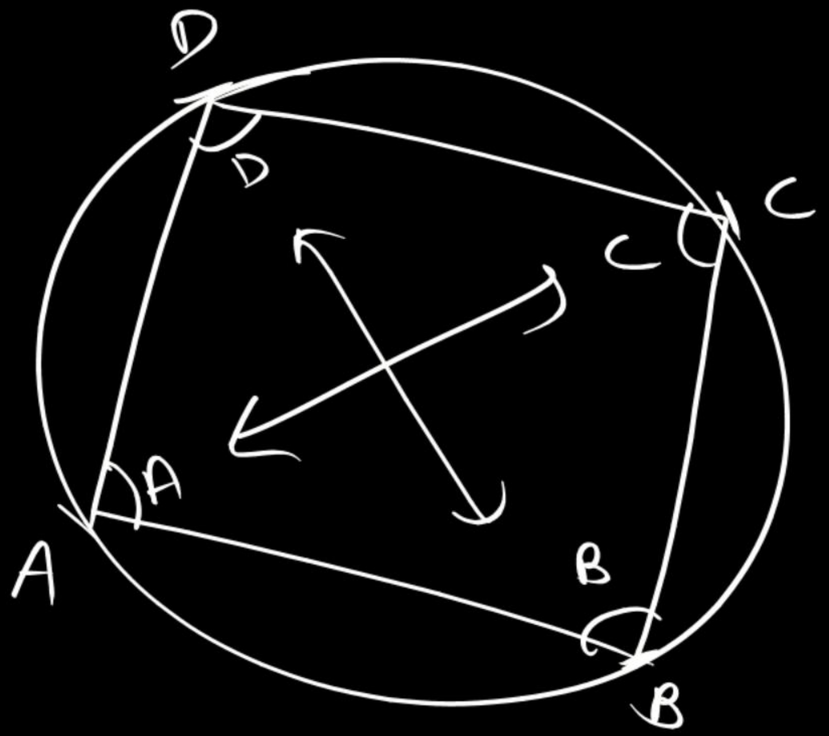


AOB is Quadrant
find Area of S.R

$\frac{4}{7} \times 7 \times 7$

28 cm²

28

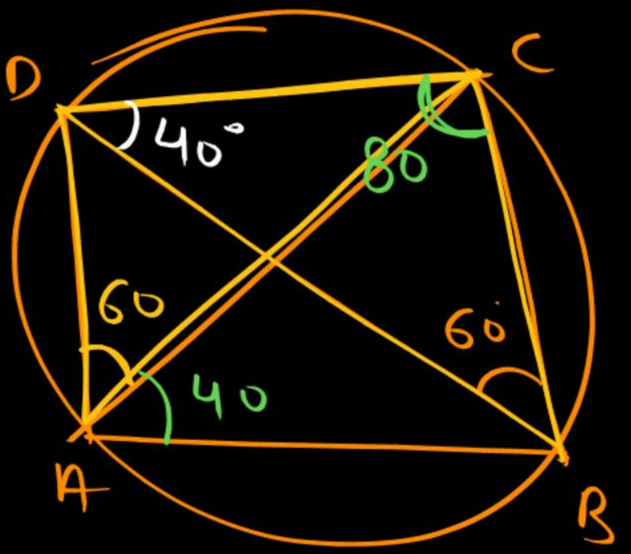


$\angle A + \angle C = 180$

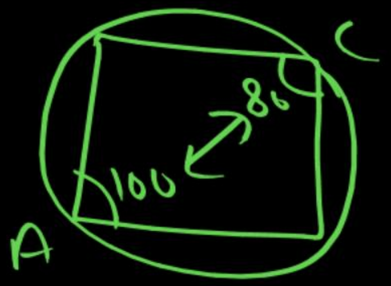
$\angle B + \angle D = 180$

10. In the given figure, ABCD is a cyclic quad. Whose diagonals intersects at P such that ∠DBC = 60°and ∠BAC = 40°. Then find ∠BCD and ∠CAD ?

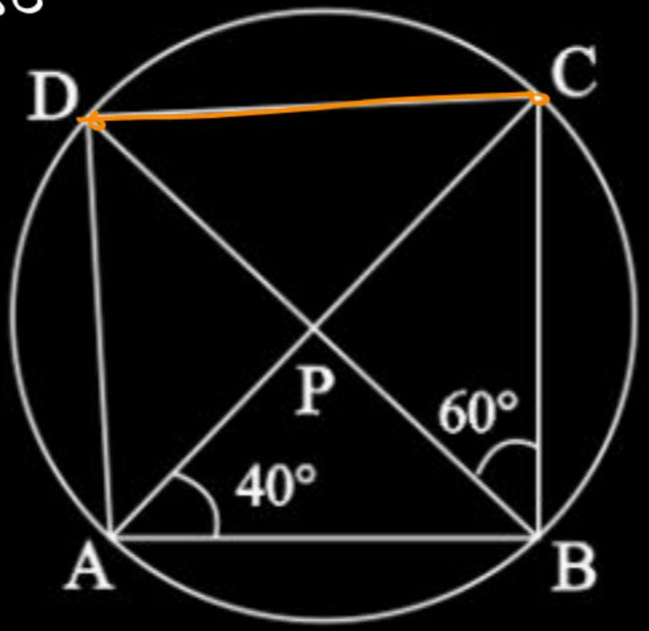
दिए गए चित्र में, ABCD एक चक्रीय चतुर्भुज है। जिसके विकर्ण P पर इस प्रकार प्रतिच्छेद करते हैं कि ∠DBC = 60° और ∠BAC = 40° है तो ∠BCD और ∠CAD ज्ञात कीजिए?



∠DBC = ∠CAD
Same base

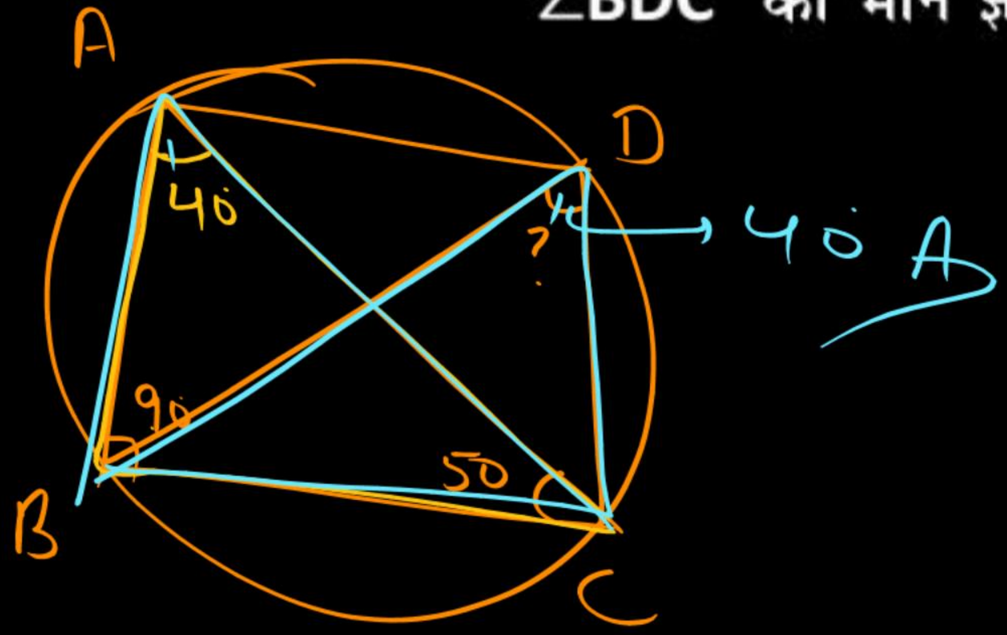


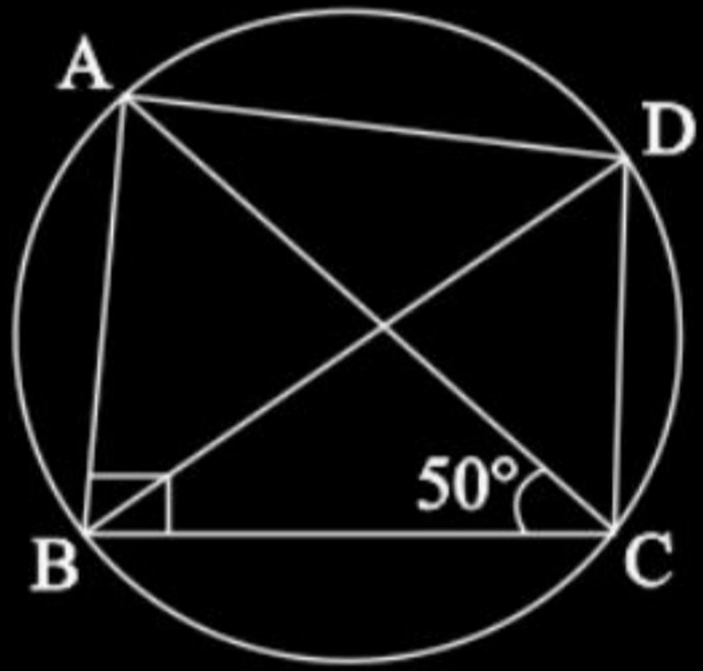
80 ∩ 60



12. In the figure, four points A, B, C, D is lie on a circle. If ∠ABC = 90° and ∠ACB = 50° , Then find ∠BDC ?

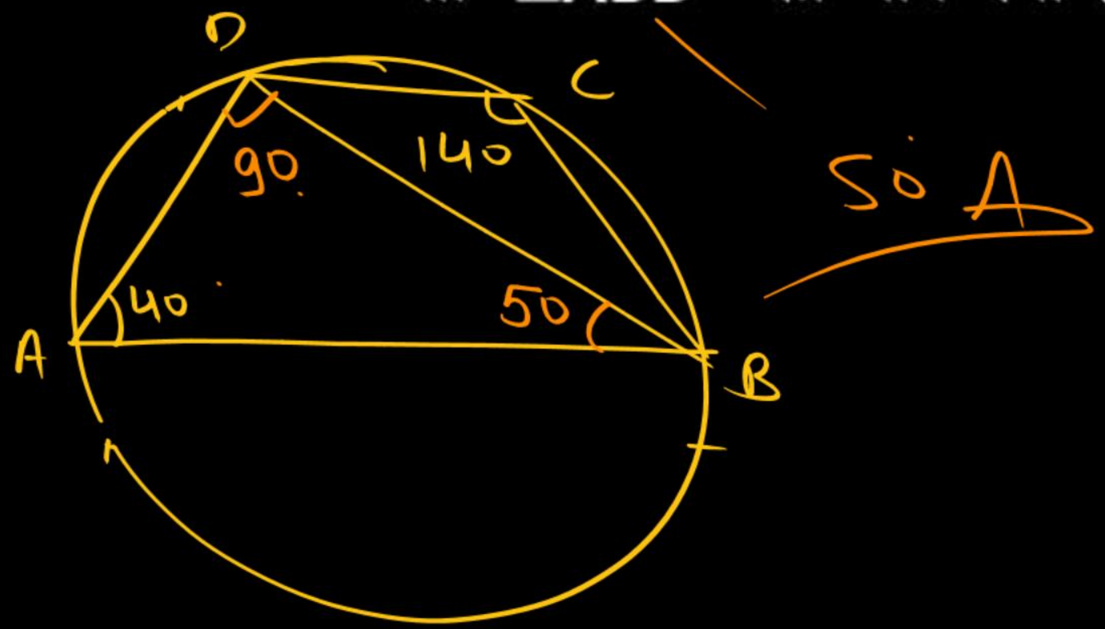
दिय गय चित्र में, चार बिंदु A, B, C, D एक वृत्त पर स्थित हैं। यदि ∠ABC = 90° और ∠ACB = 50° , तो ∠BDC का मान ज्ञात कीजिए?

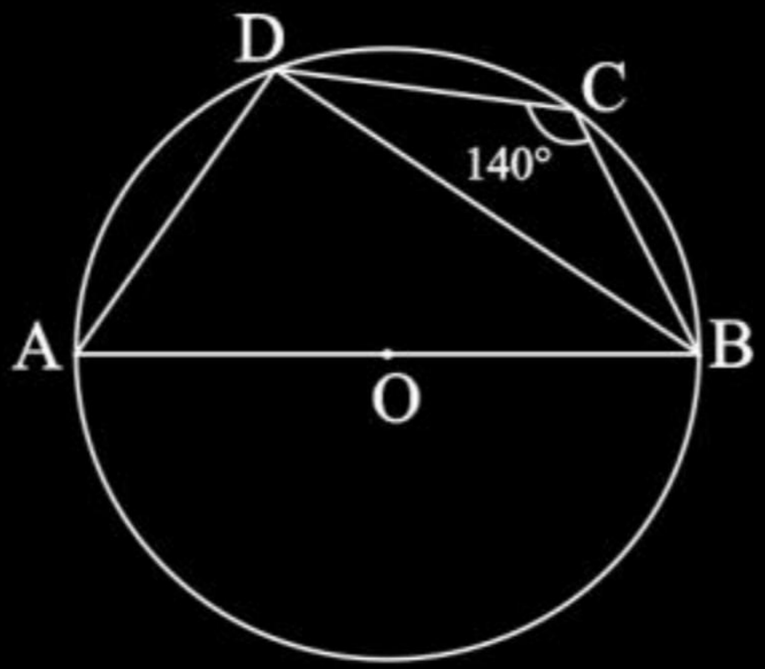




13. In the fallowing figure, AB is the diameter of the circle and $\angle BCD = 140°$, Then find $\angle ABD$?

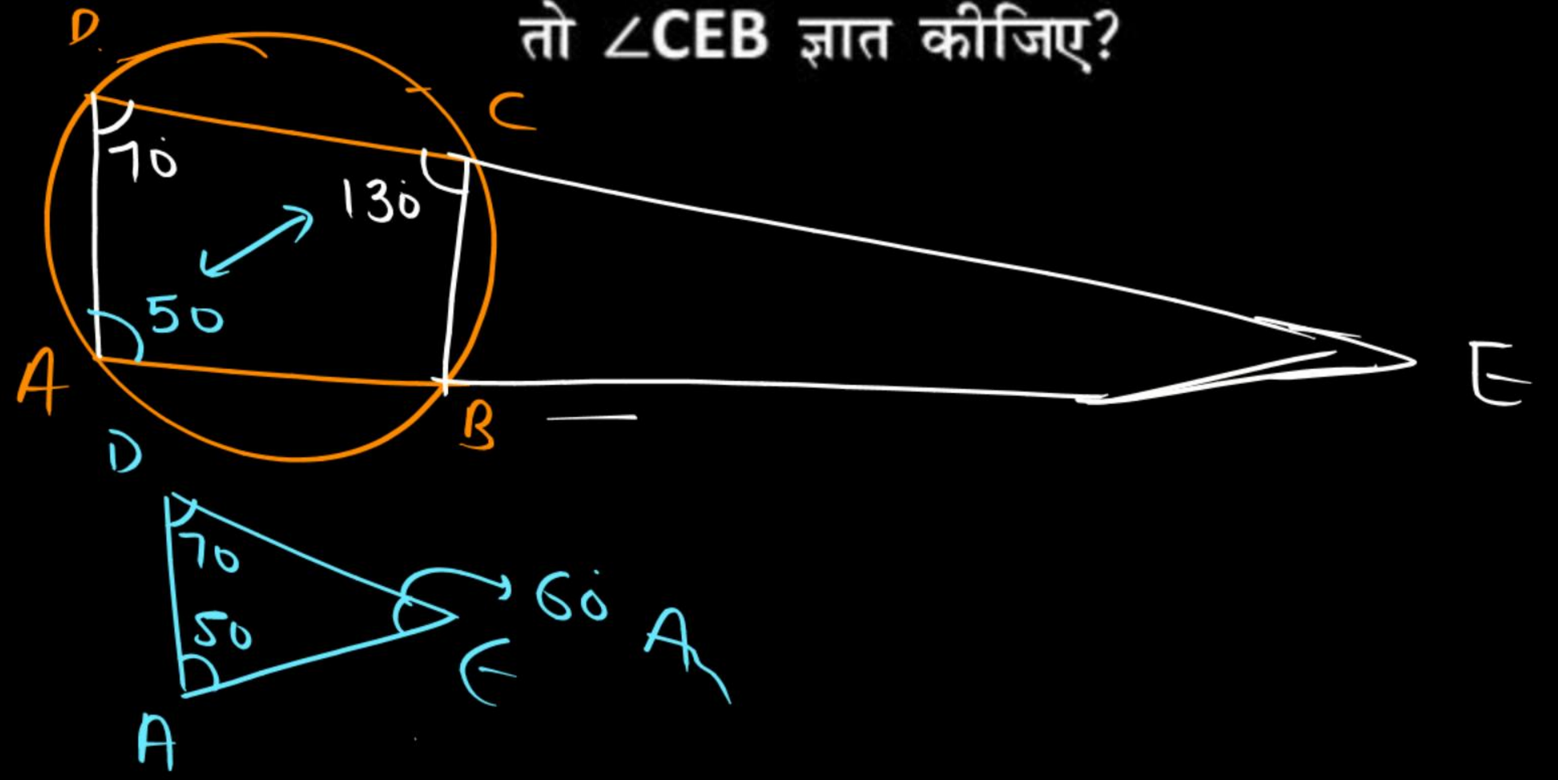
दिय गय चित्र में, AB वृत्त का व्यास और $\angle BCD = 140°$ है तो $\angle ABD$ का मान क्या होगा?

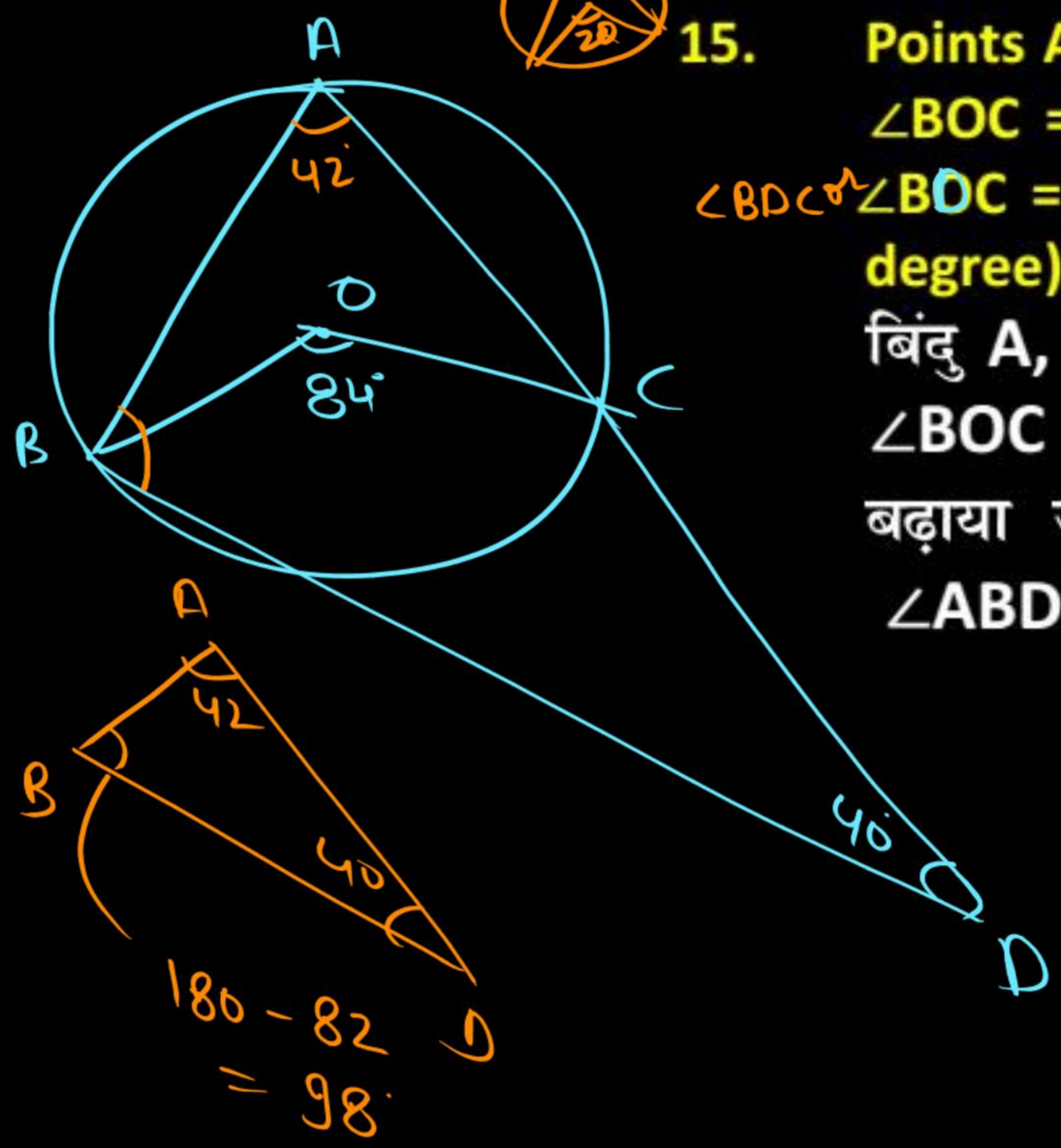




14. ABCD is a cyclic quadrilateral in which AB and DC meet at point E. Then $\angle CDA = 70°$, $\angle DCB = 130°$, then find the $\angle CEB$?

ABCD एक चक्रीय चतुर्भुज है जिसमें AB और DC बिंदु E पर मिलते हैं। फिर $\angle CDA = 70°$, $\angle DCB = 130°$, तो $\angle CEB$ ज्ञात कीजिए?





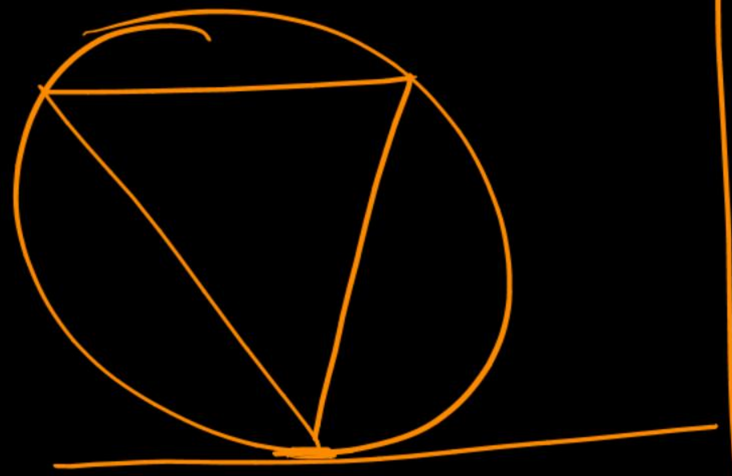
15. **Points A, B, C are on a circle with centre O such that ∠BOC = 84°. If AC is produced to a point D such that ∠BDC = 40°. Then find the measure of ∠ABD (in degree):**

बिंदु A, B, C केंद्र O वाले एक वृत्त पर इस प्रकार हैं कि ∠BOC = 84° है । यदि AC को बिंदु D तक इस प्रकार बढ़ाया जाता है कि ∠BDC = 40° हो जाता है। तो ∠ABD की माप (अंश में) ज्ञात कीजिए?

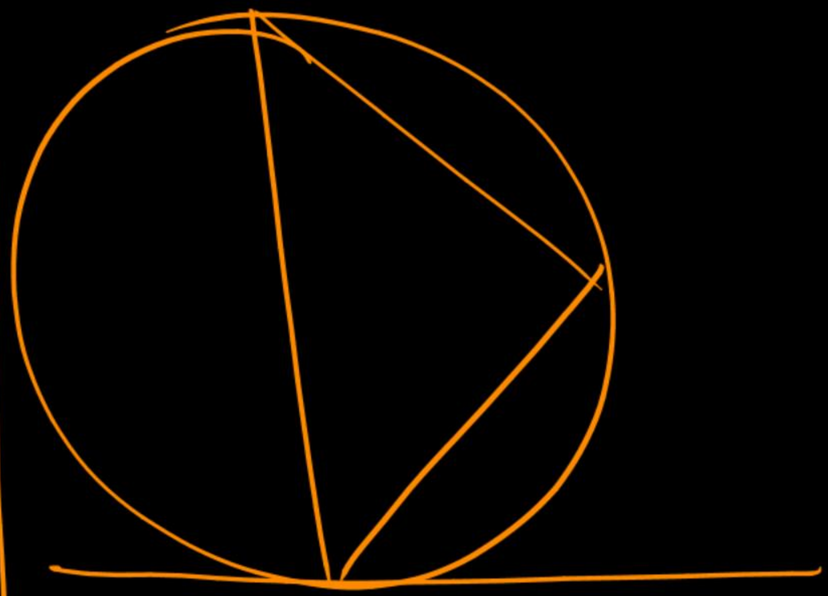
Alternate Segment Theorem

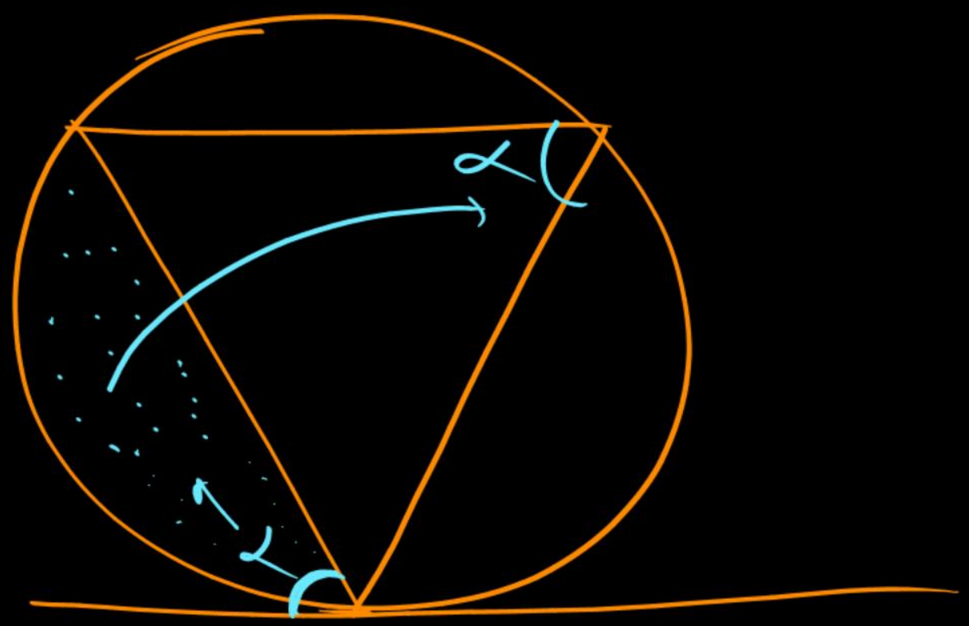
(Req) → a cyclic △

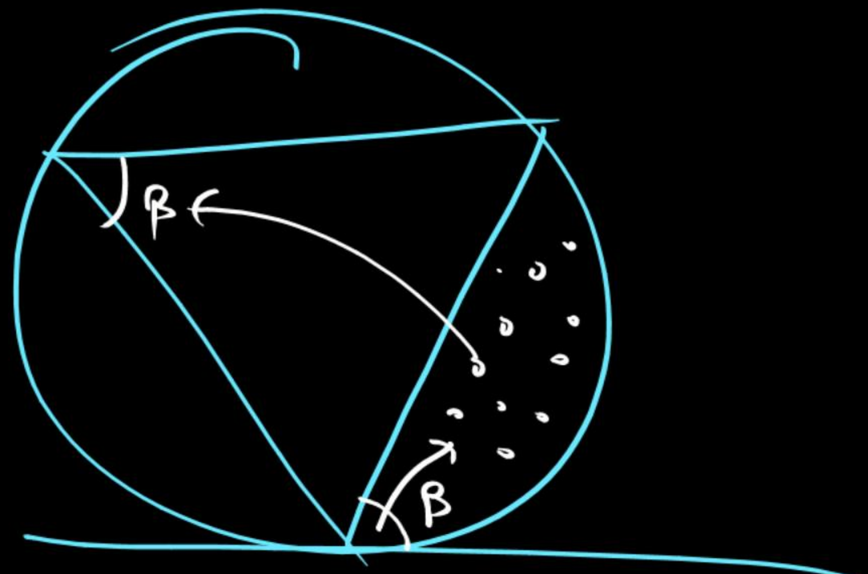
→ a tangent

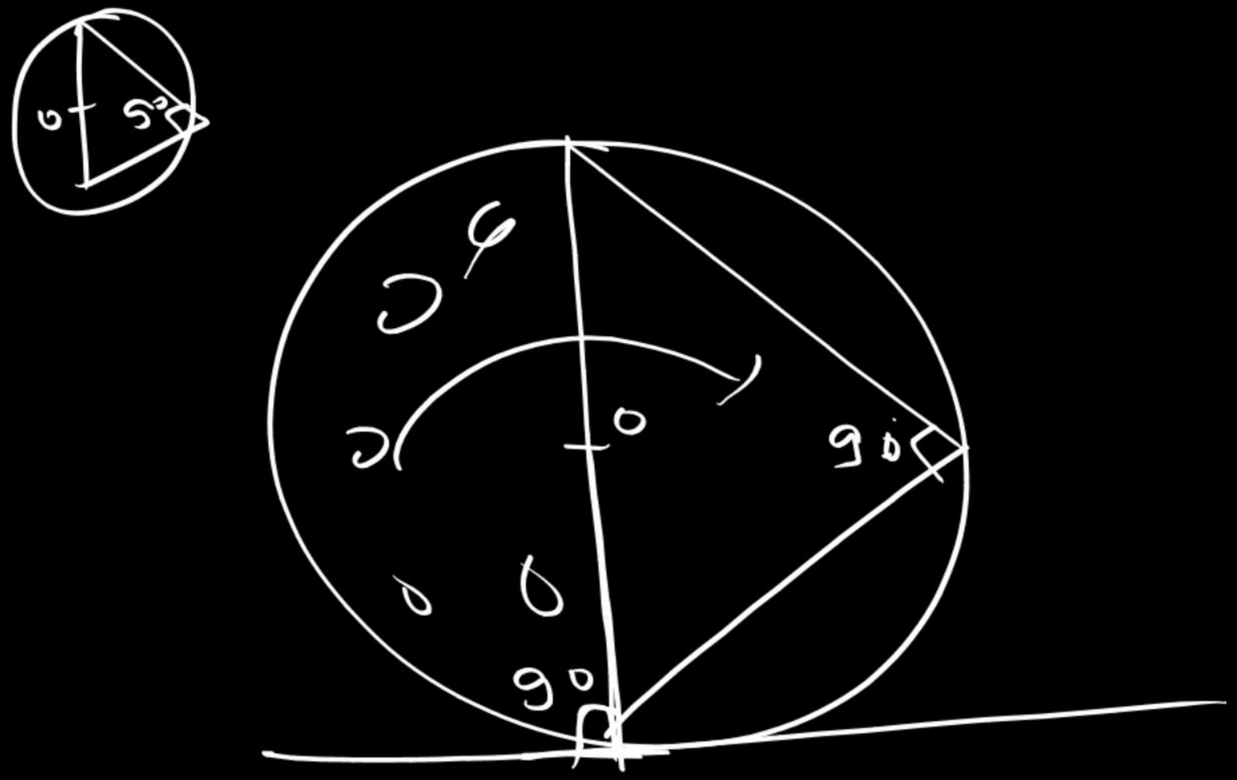


Semicircle

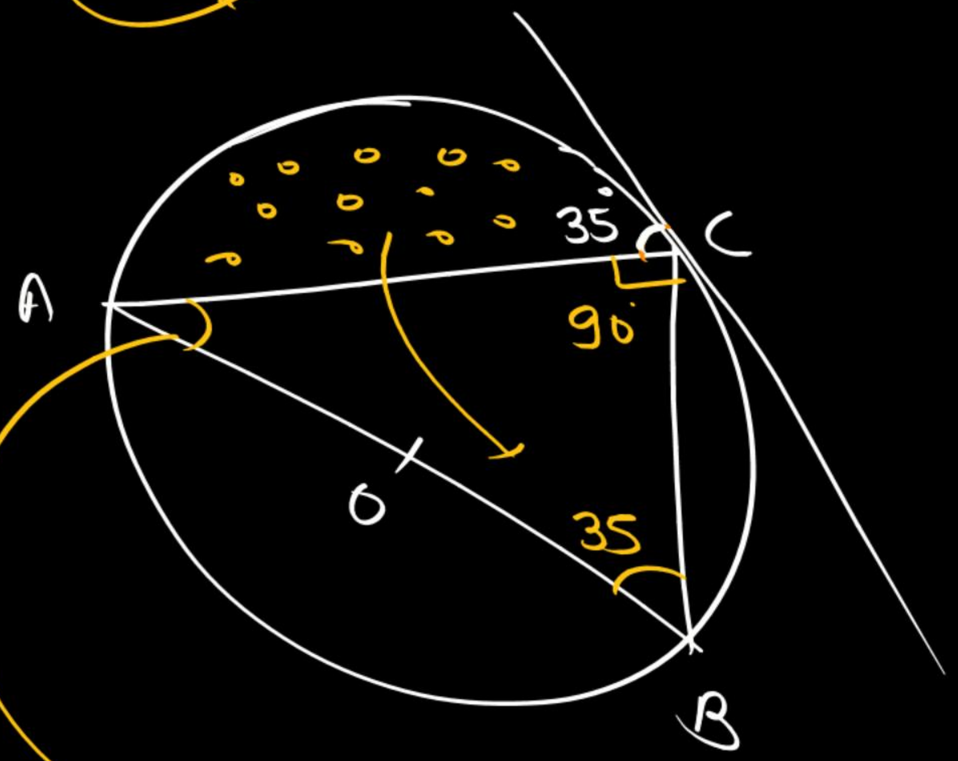


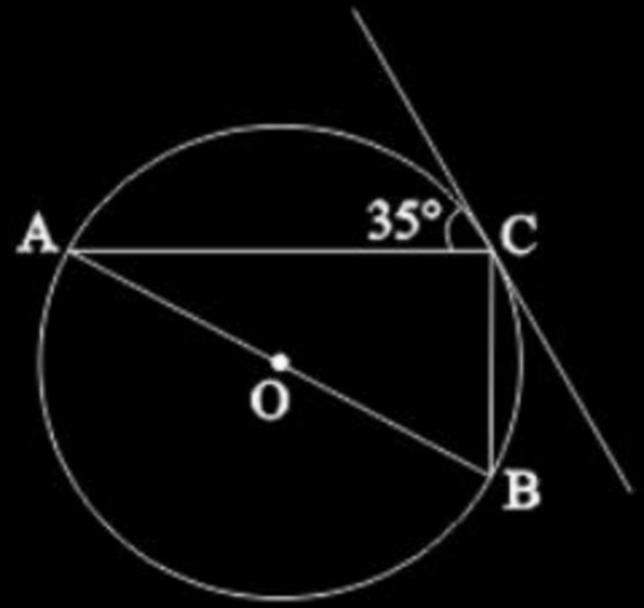

α


β
β


O
90°
90°

16. Find ∠CAB = ?





$180 - (90 + 35)$

$180 - 125 = 55$ A

17. If $\angle RPQ = 40°$, $\angle RPS = 50°$. Then find $\angle SRP$?