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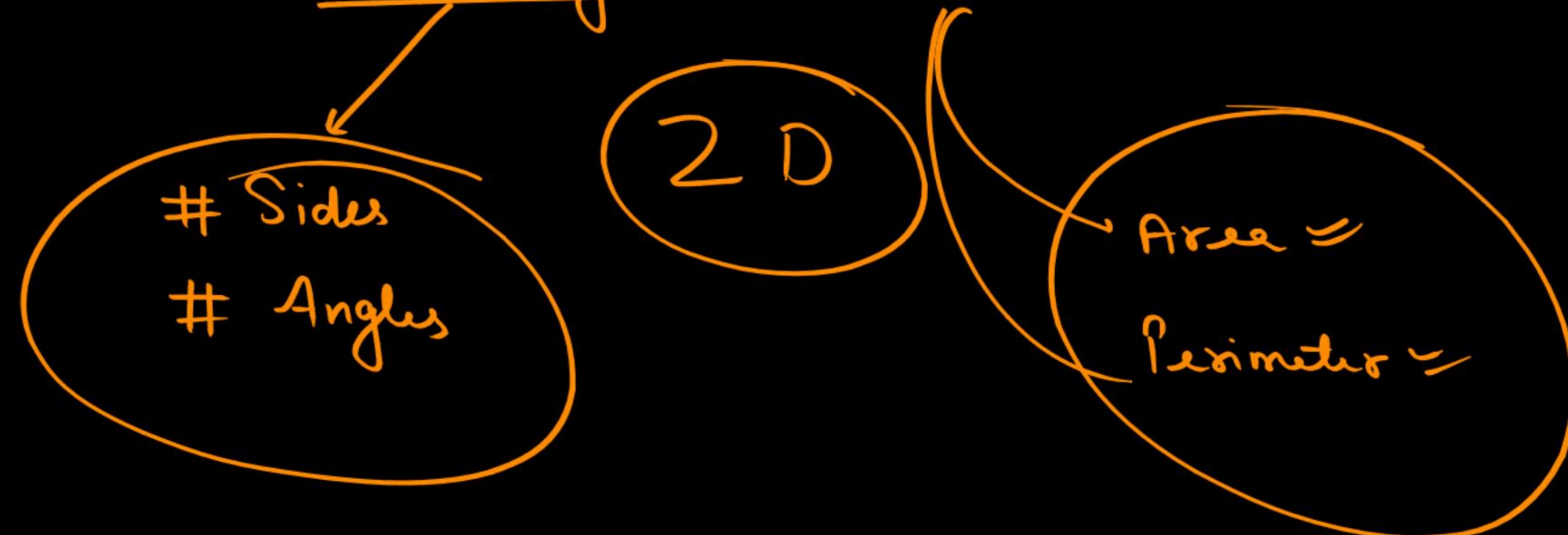
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Geometry & Mensuration



Geometry Triangle

&

Men

օօ (Տաղավար)

sides

Angles

Triangle:

Classification of triangle:

On the basis of sides,

Scalene triangle(विषमबाहु त्रिभुज): A triangle in which all sides are unequal are called scalene triangle.

एक त्रिभुज जिसकी सभी भुजाएँ असमान्य होती है विषम बाहु त्रिभुज कहलाता है।

Isosceles triangle(समद्विबाहु त्रिभुज): A triangle in which two sides of triangle are equal.

एक त्रिभुज जिसकी दो भुजाएँ समान होती है।

Equilateral triangle(समबाहु त्रिभुज): A triangle in which all the three sides of triangle are equal.

एक त्रिभुज जिसकी तीनों भुजाएँ समान होती है।

- ० त्रिकोण
अधिकोण
समकोण

On the basis of angles: (Based on 90°)

Acute angled triangle \Rightarrow less than 90°



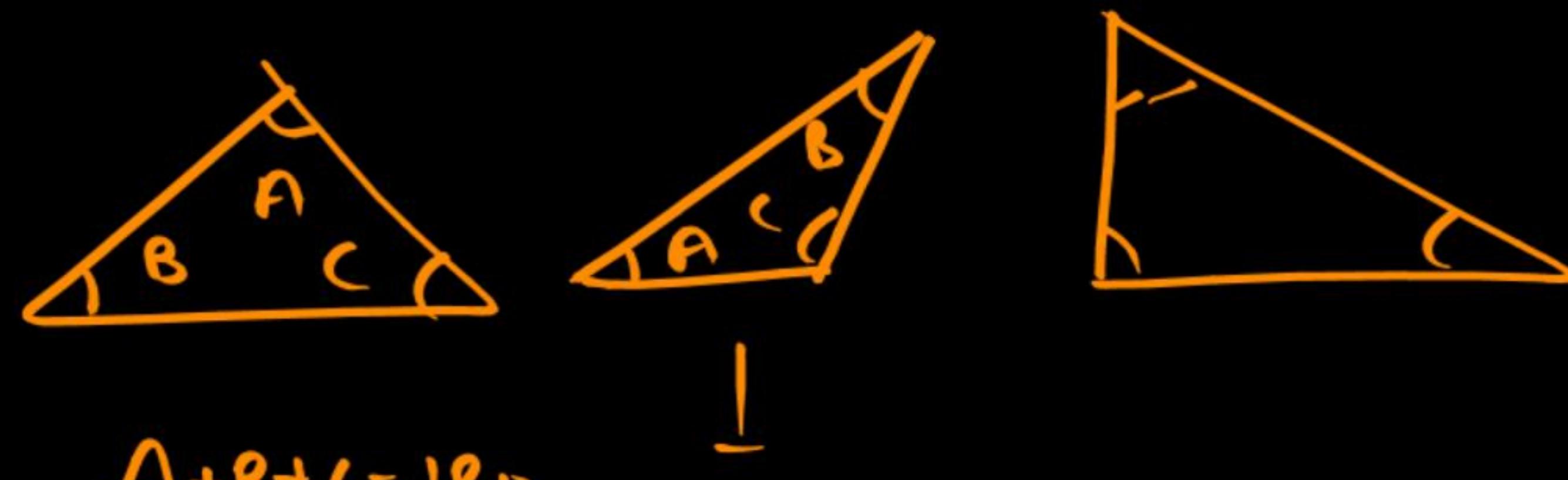
Obtuse angled triangle \Rightarrow one greater than 90°



Right angled triangle \Rightarrow one angle equals to 90°

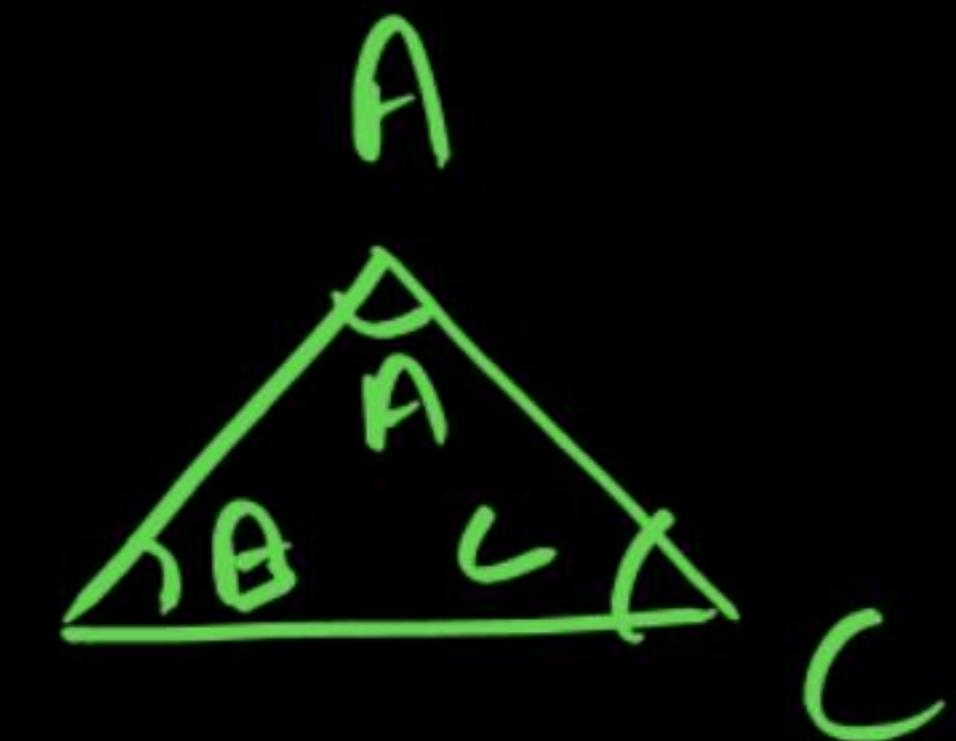


Sum of all interior angles = 180°

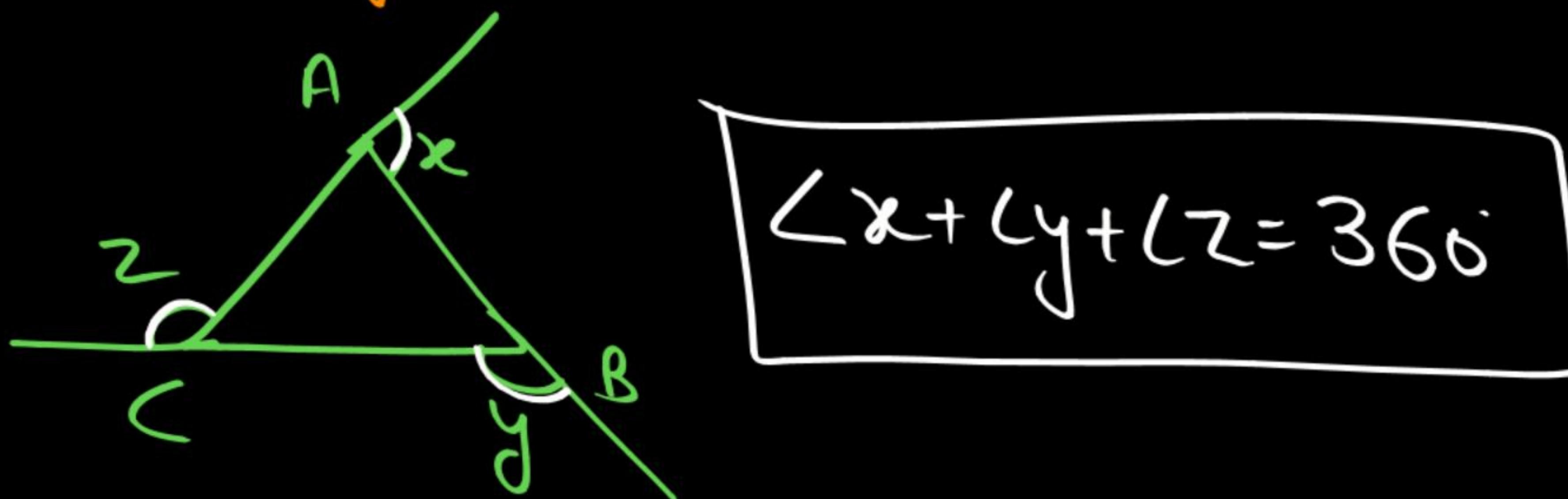


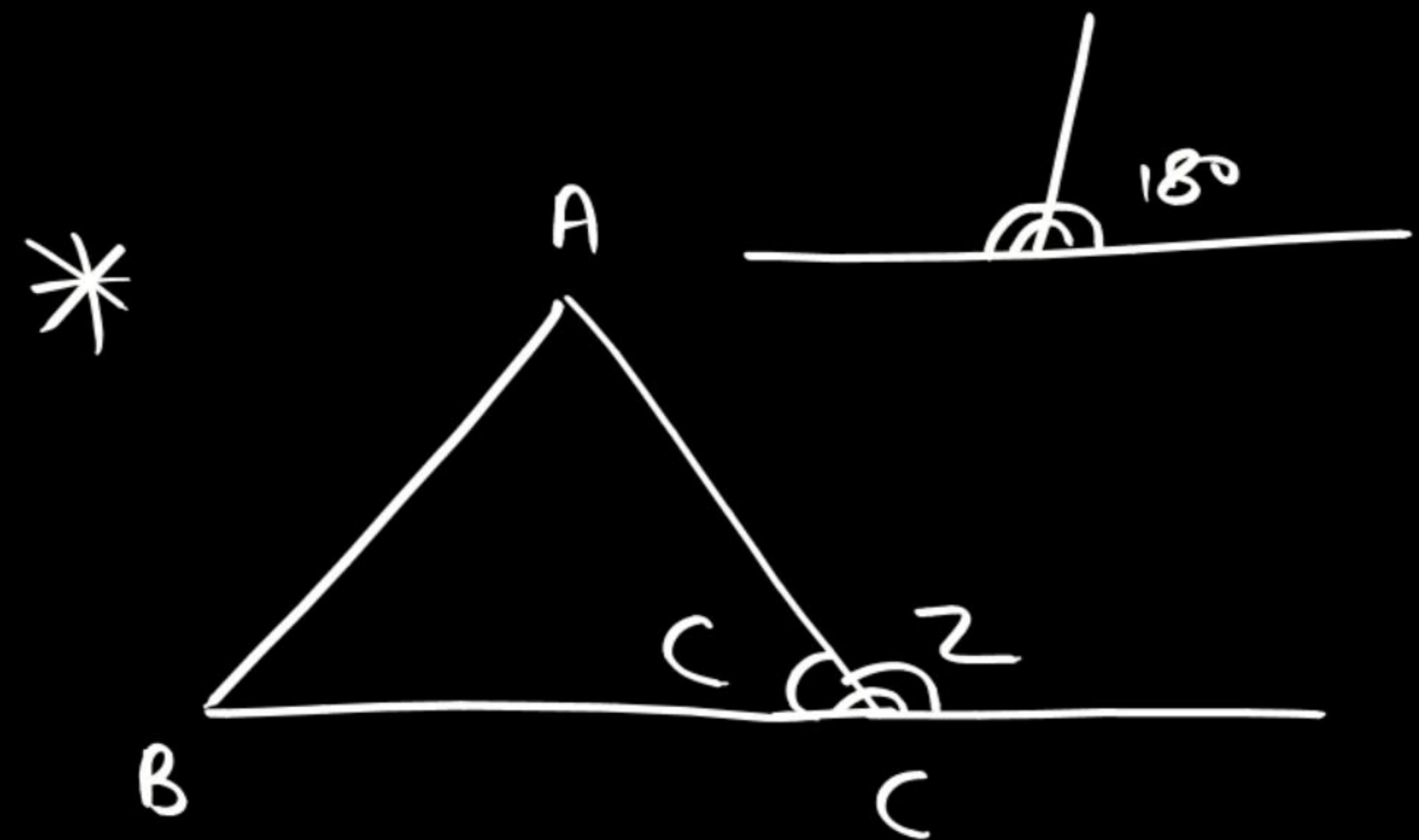
$$\angle A + \angle B + \angle C = 180^\circ$$

① Sum of all int. angle = 180°



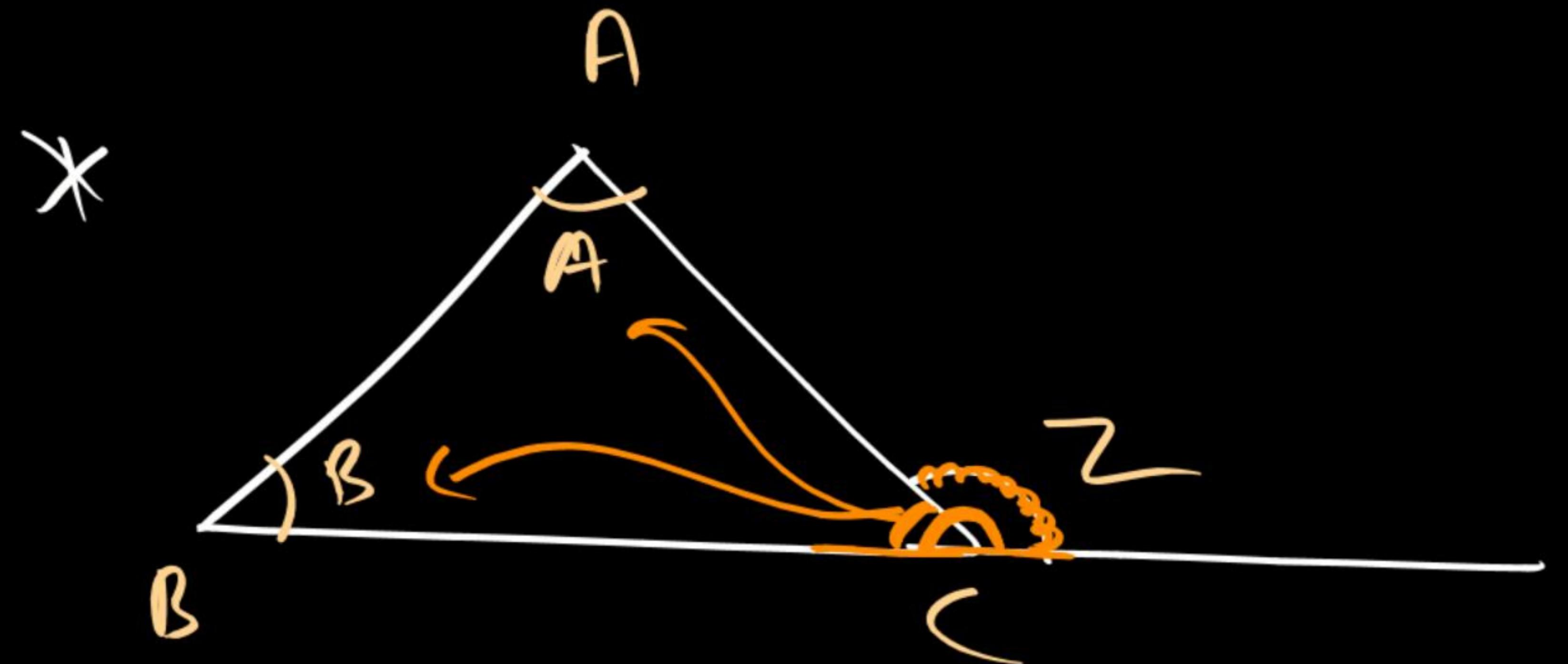
② Sum of all ext. angle = 360°



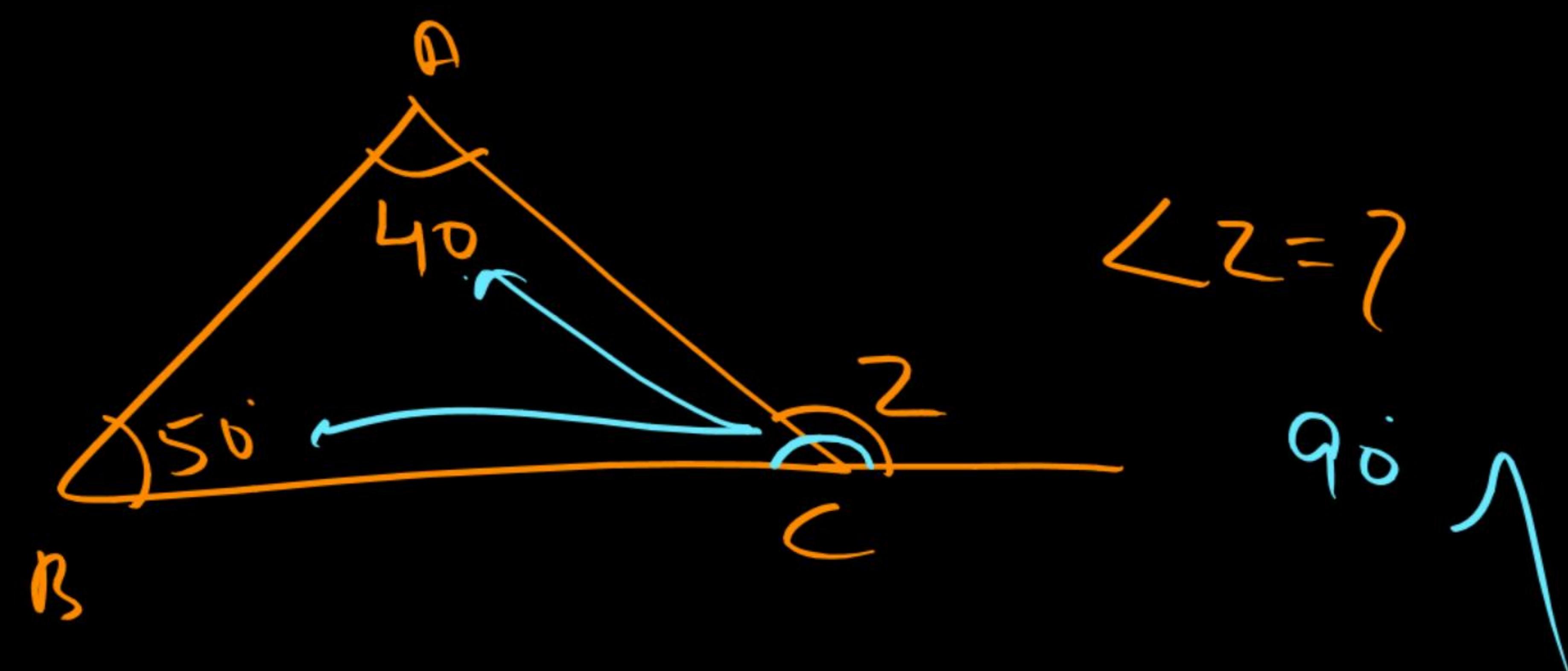


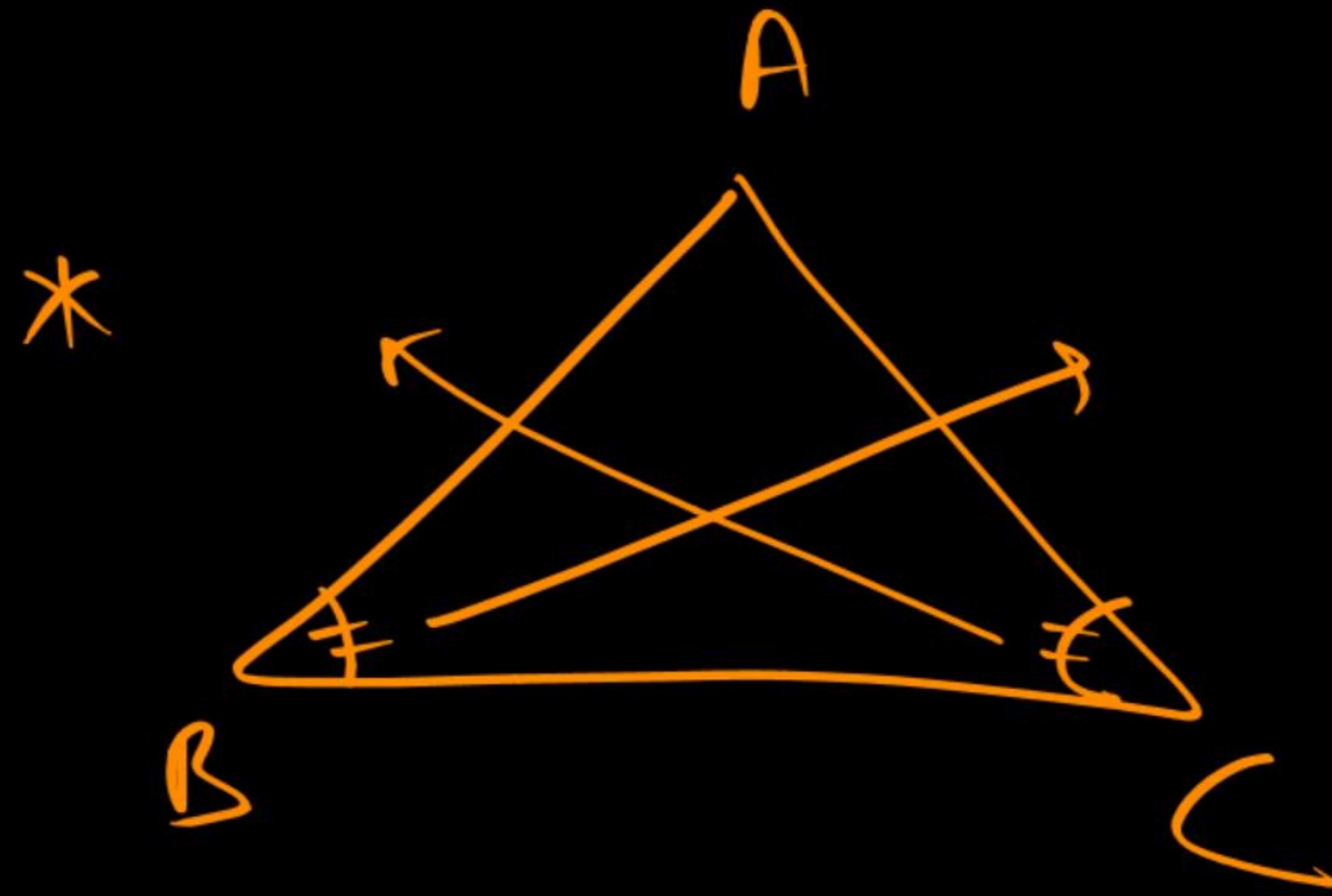
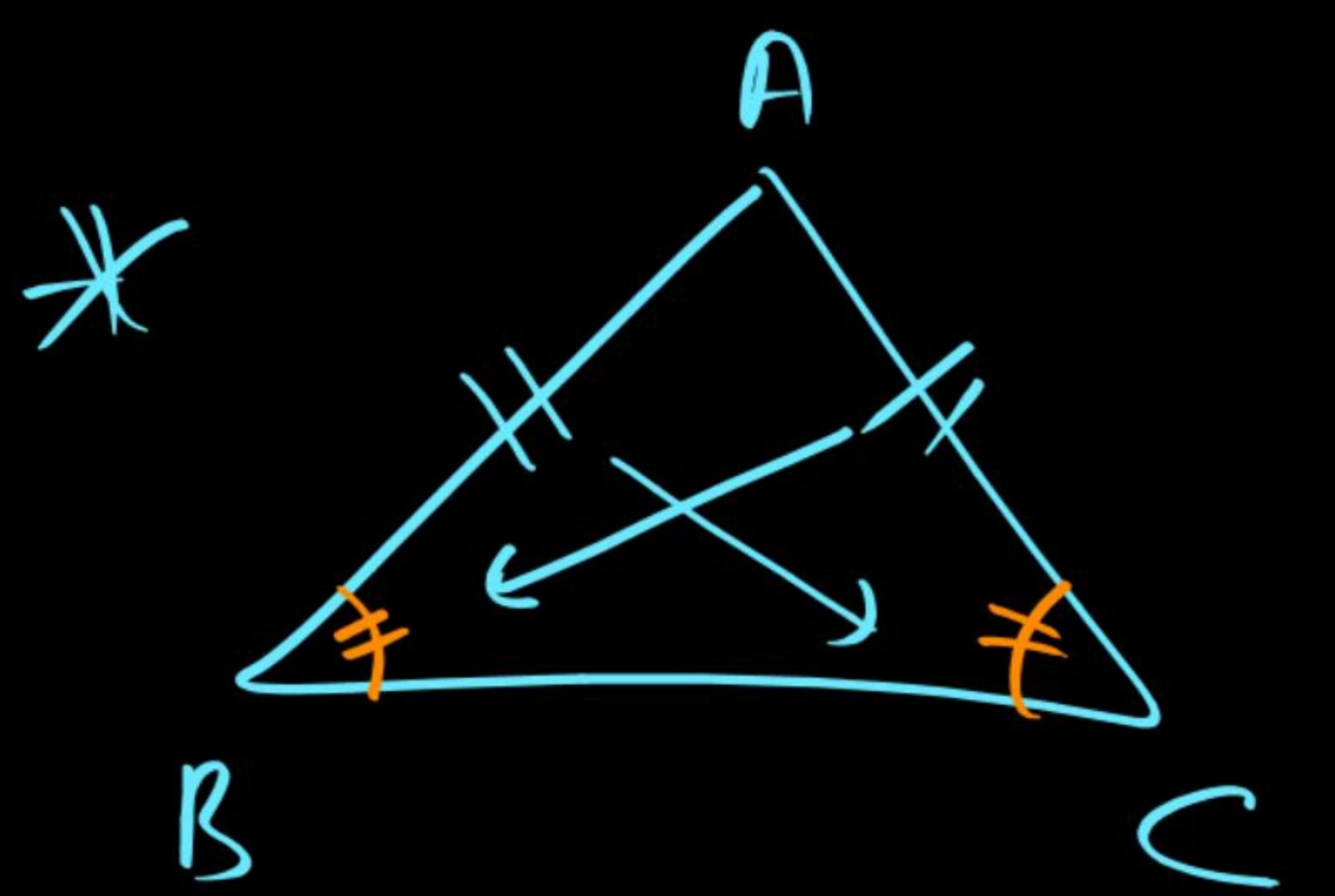
$$\angle I + \angle E = 180$$

$$\angle C + \angle Z = 180$$



$$\angle Z = \angle A + \angle B$$



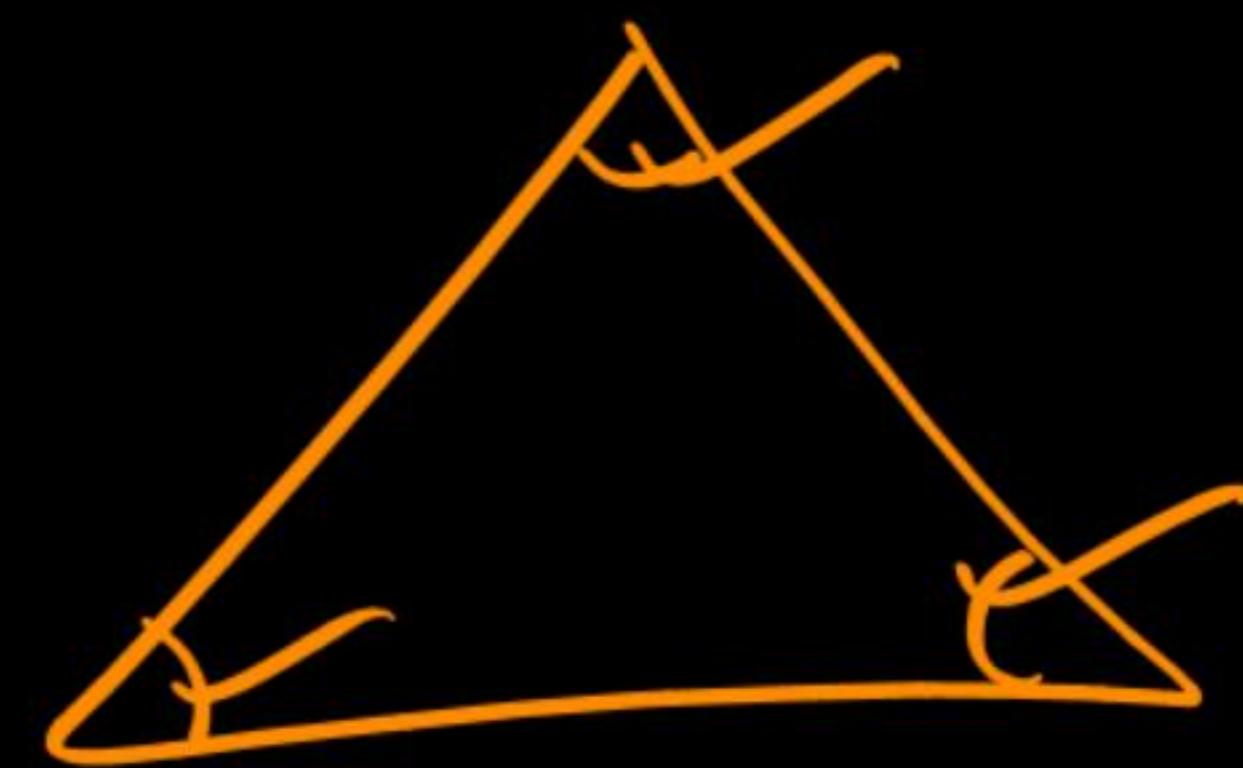


if $AB = AC$

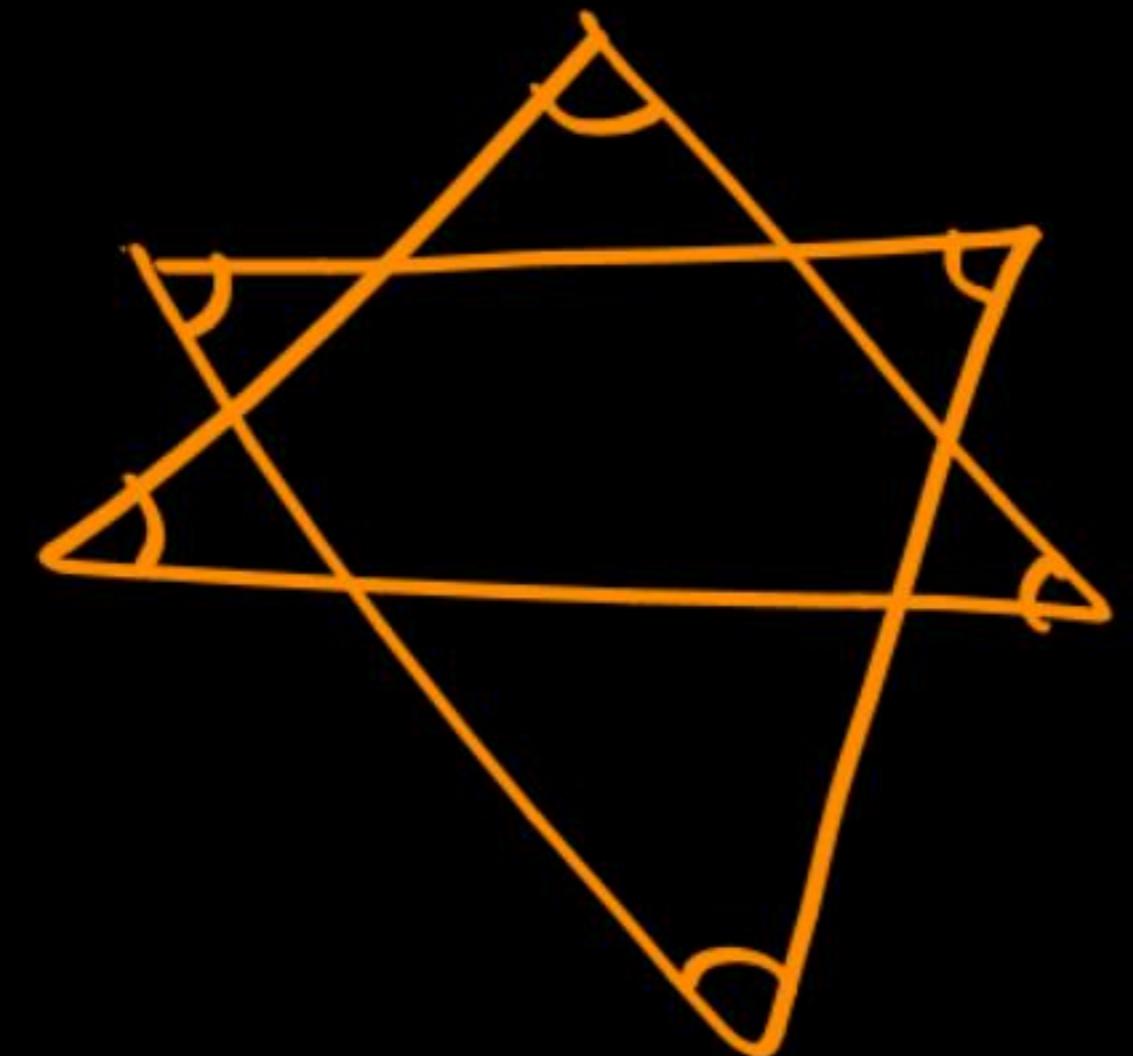
then $\angle B = \angle C$

$\angle B = \angle C$
then

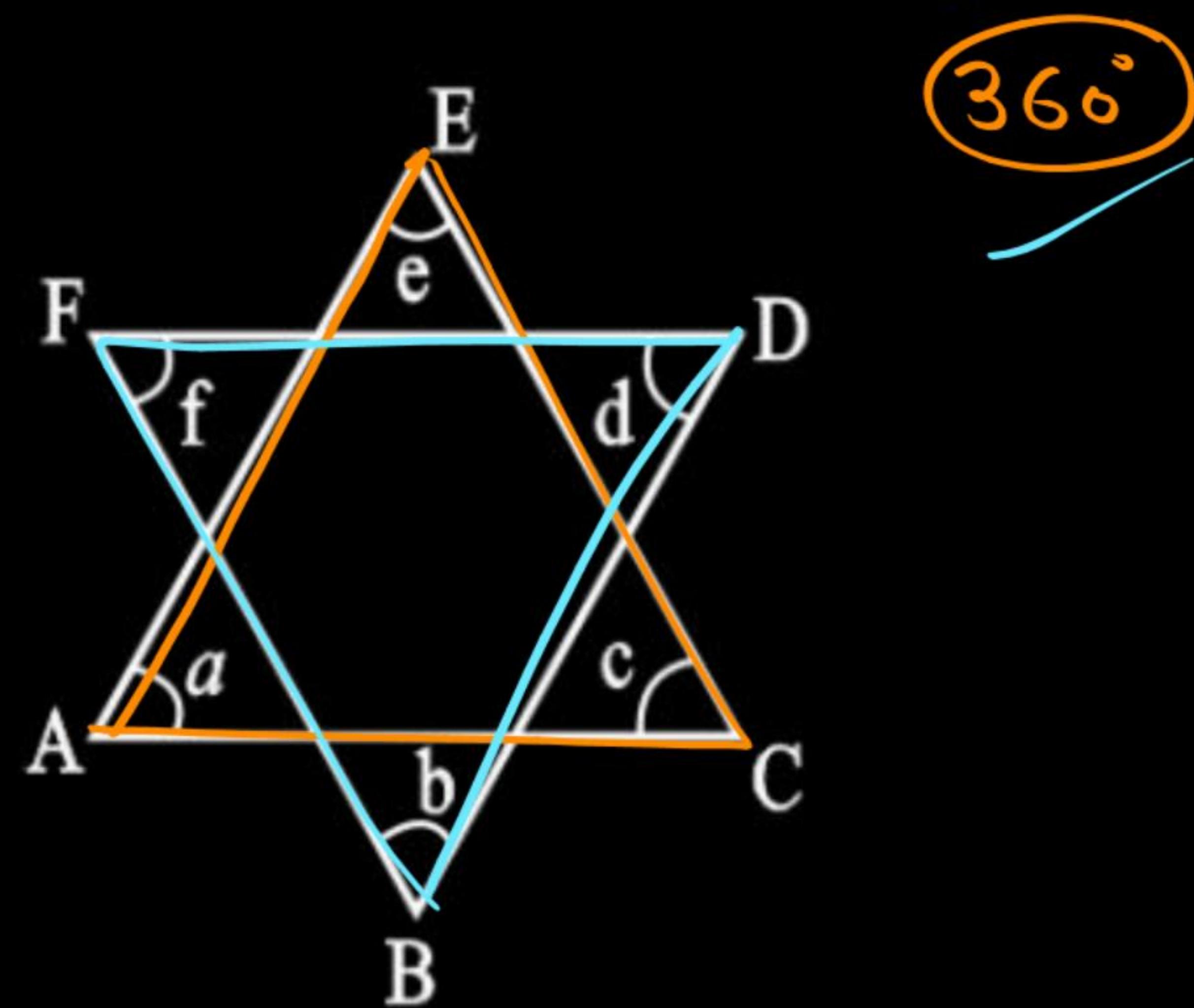
$AC = AB$ ✓



180°

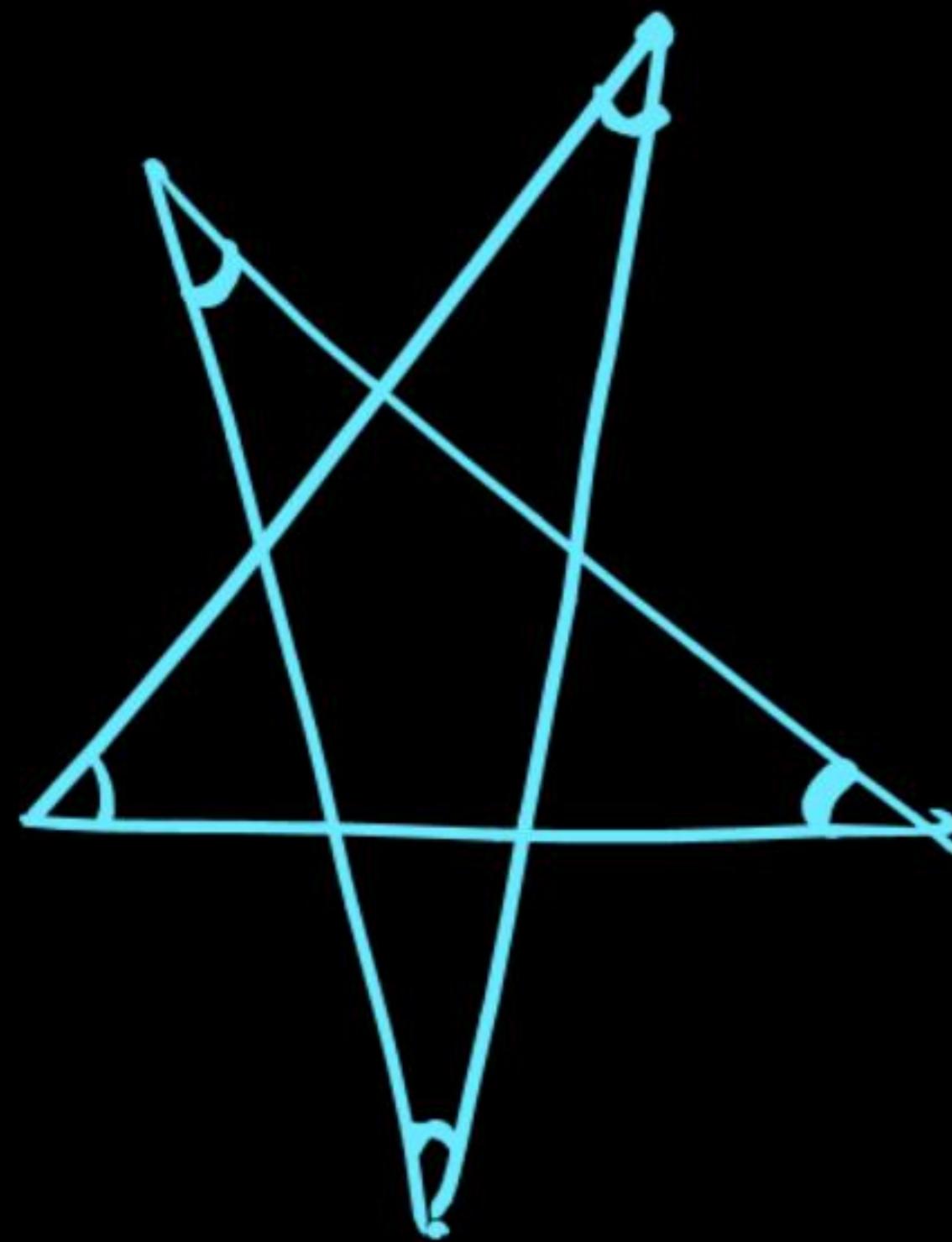


1. $\angle a + \angle b + \angle c + \angle d + \angle e + \angle f = ?$

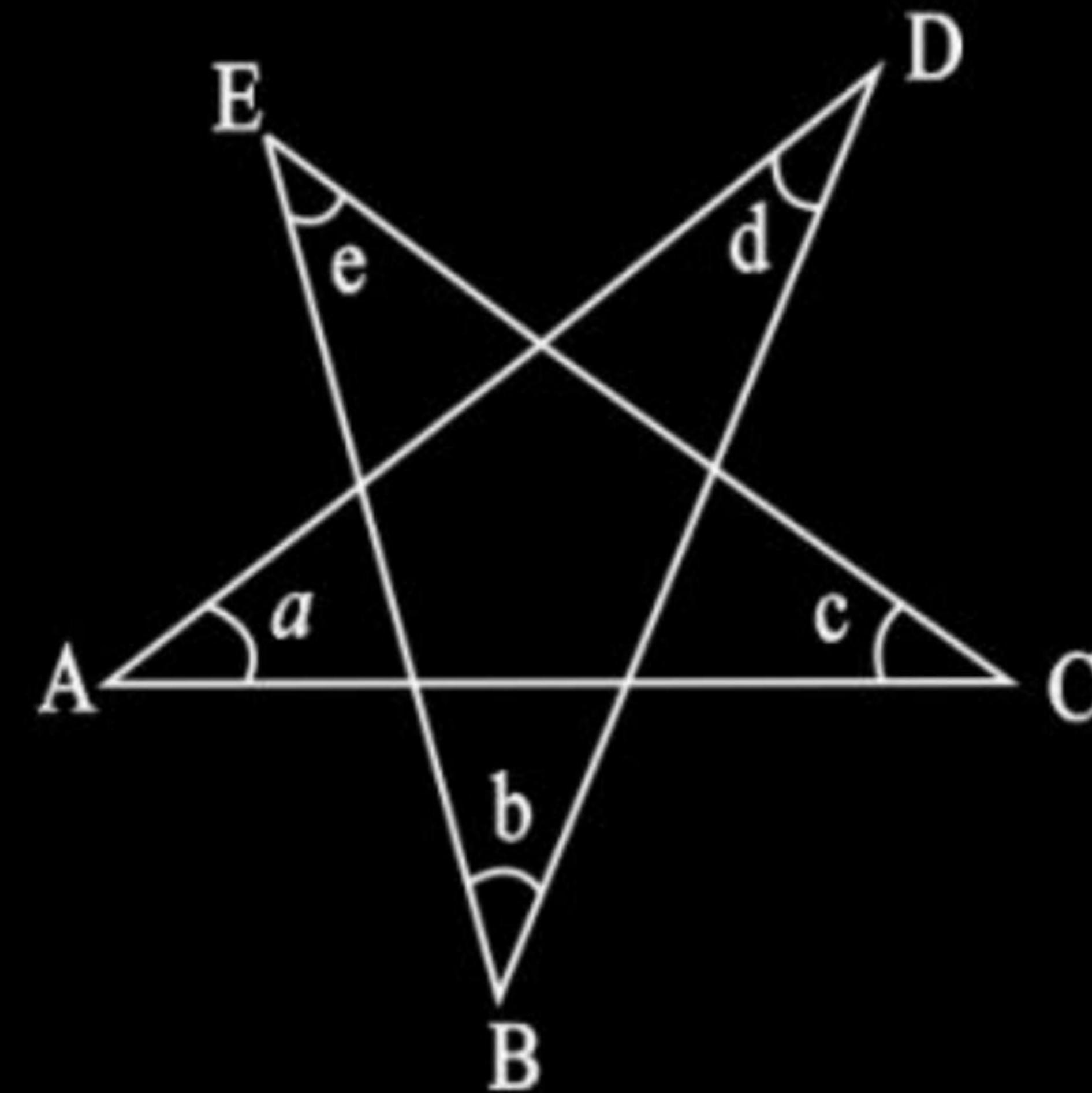


$$\begin{aligned}a + c + e &= 180^\circ \\b + d + f &= 180^\circ\end{aligned}$$

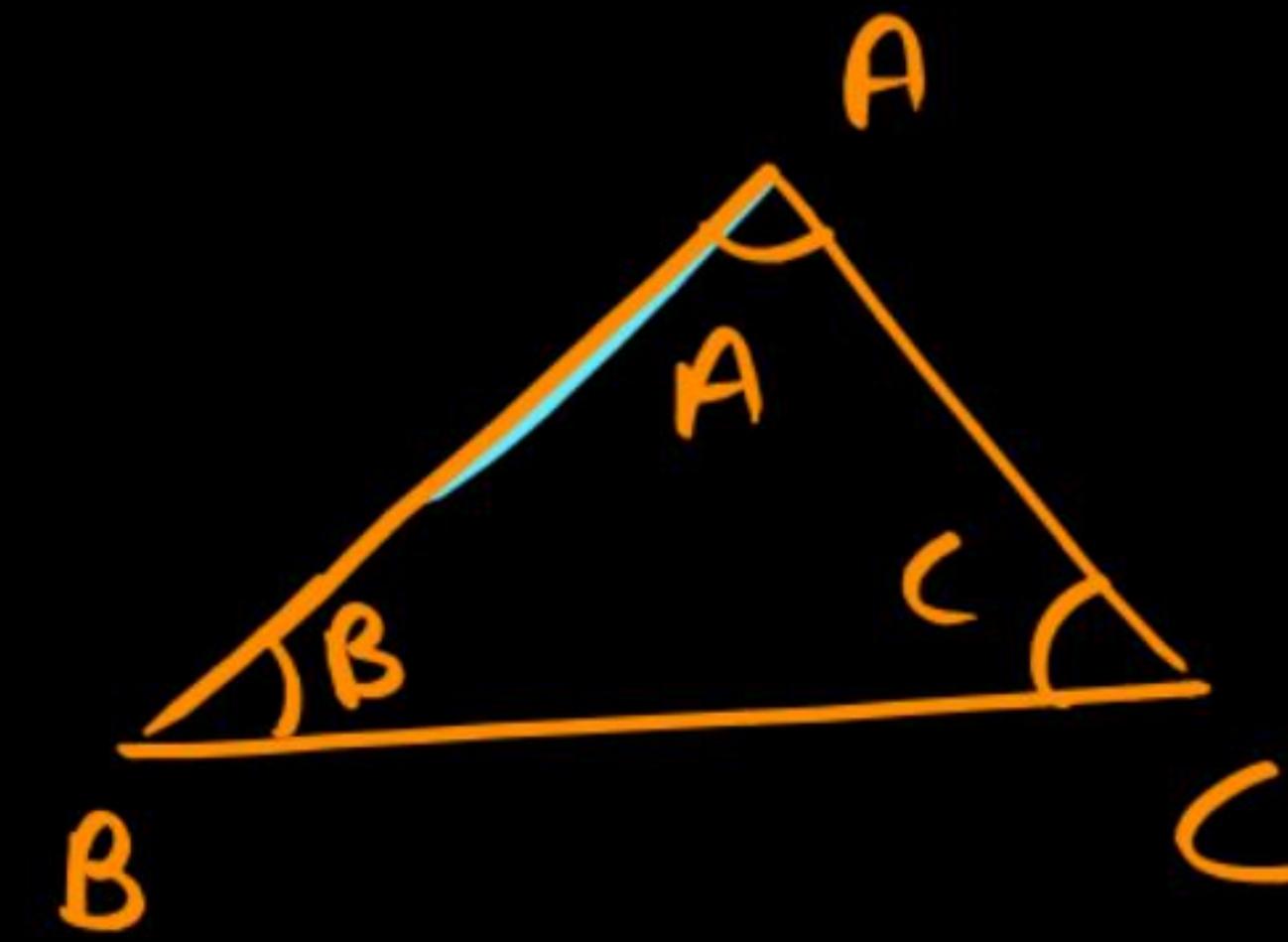
2. $\angle a + \angle b + \angle c + \angle d + \angle e = ?$



↙
180°

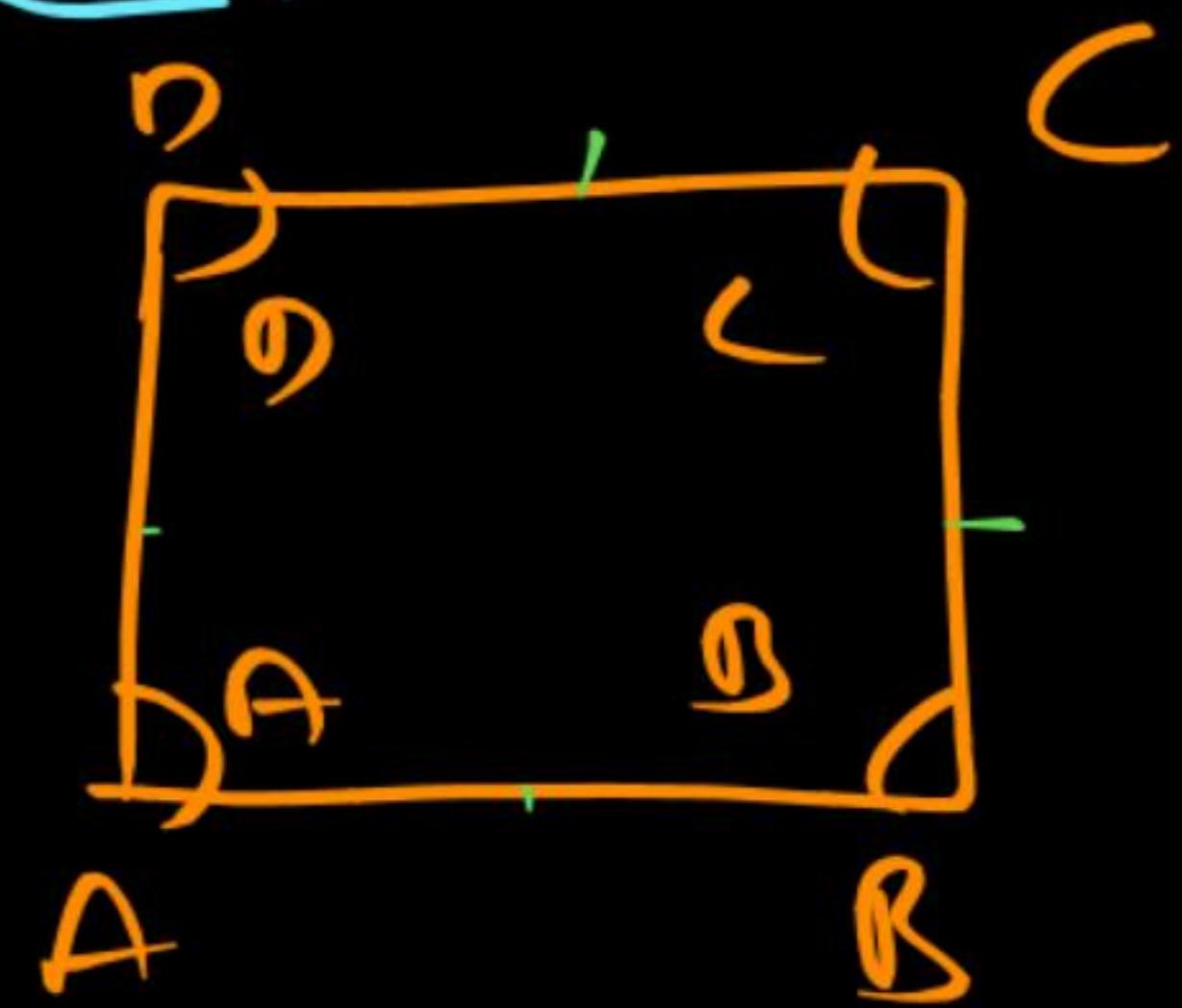


Internal Angle Sum $\rightarrow (n-2)180^\circ$



$$(3-2)180^\circ$$

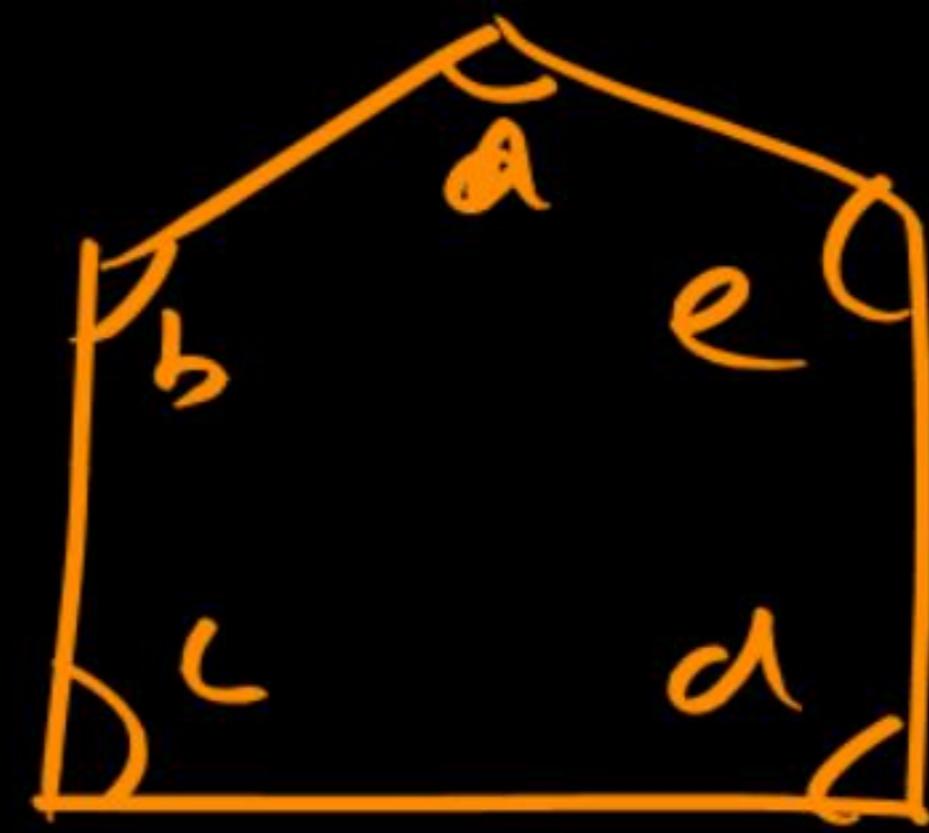
$$180^\circ$$



$$(n-2)180^\circ$$

$$2 \times 180^\circ$$

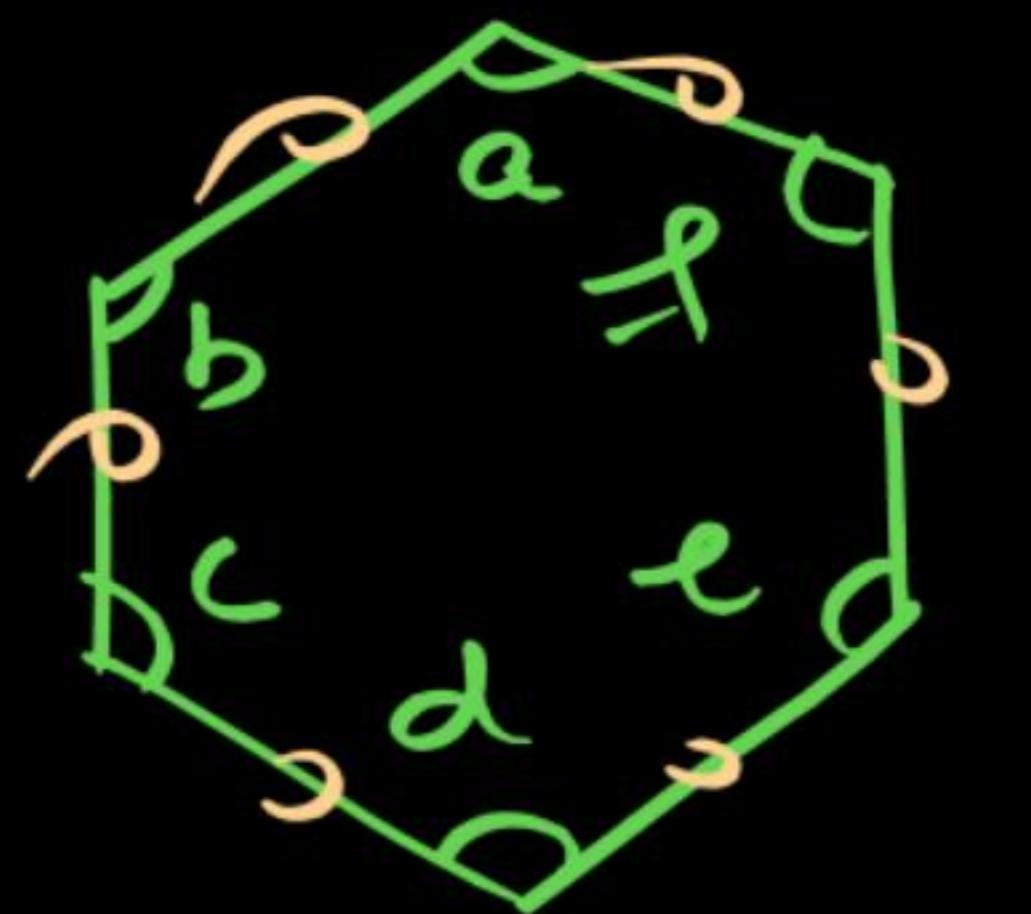
$$360^\circ$$



$$(n-2)180^\circ$$

$$(5-2) \times 180^\circ$$

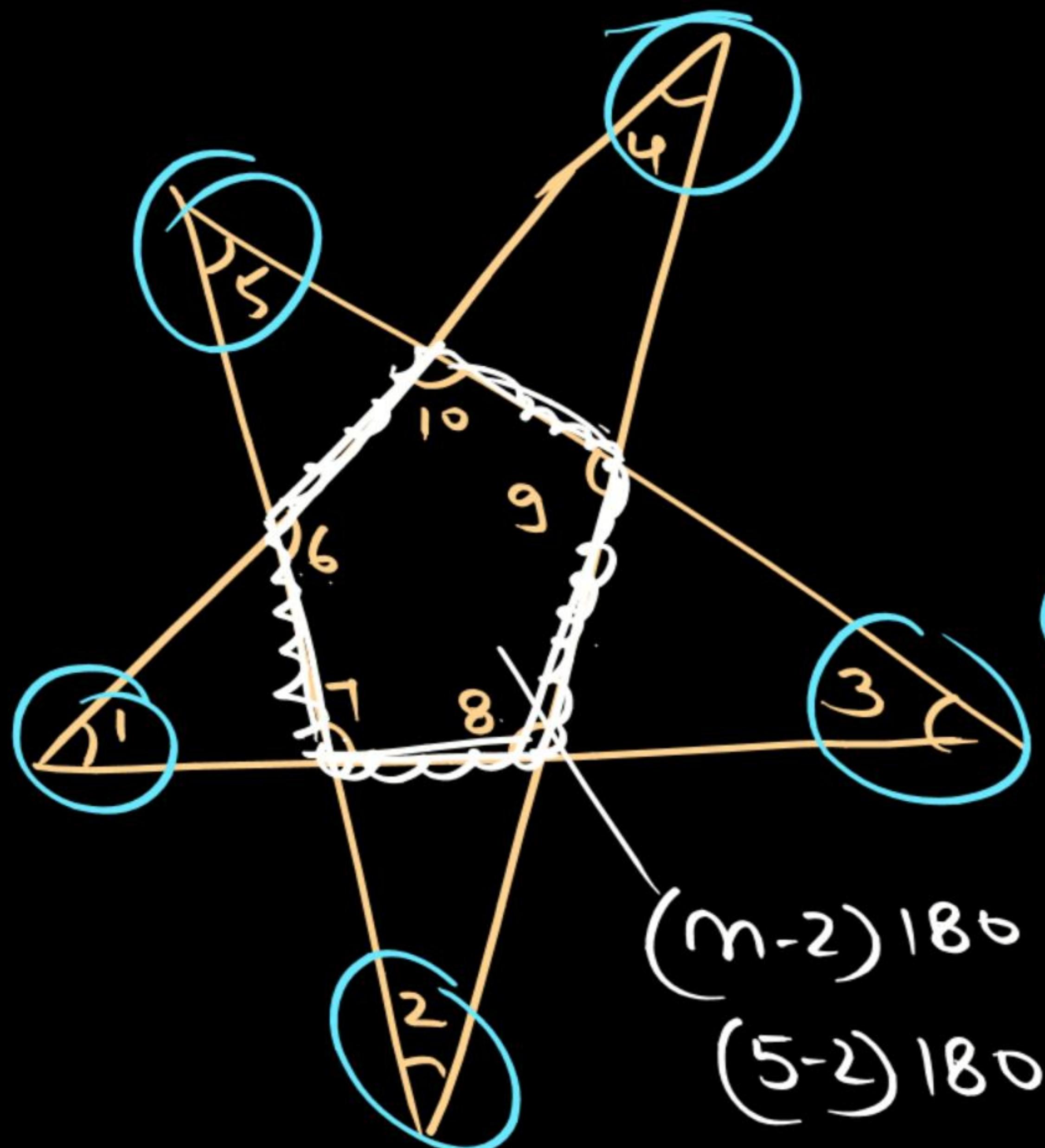
$$540^\circ$$



$$(n-2) \cdot 180$$

$$4 \times 180$$

$$\textcircled{720}$$



$$\angle 1 + \angle 2 + \angle 3 + \dots - \angle 10 = ?$$

$$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 + \angle 9 + \angle 10$$

$$180 + 540$$

$$720^\circ \text{ Ans}$$

$$(m-2)180$$

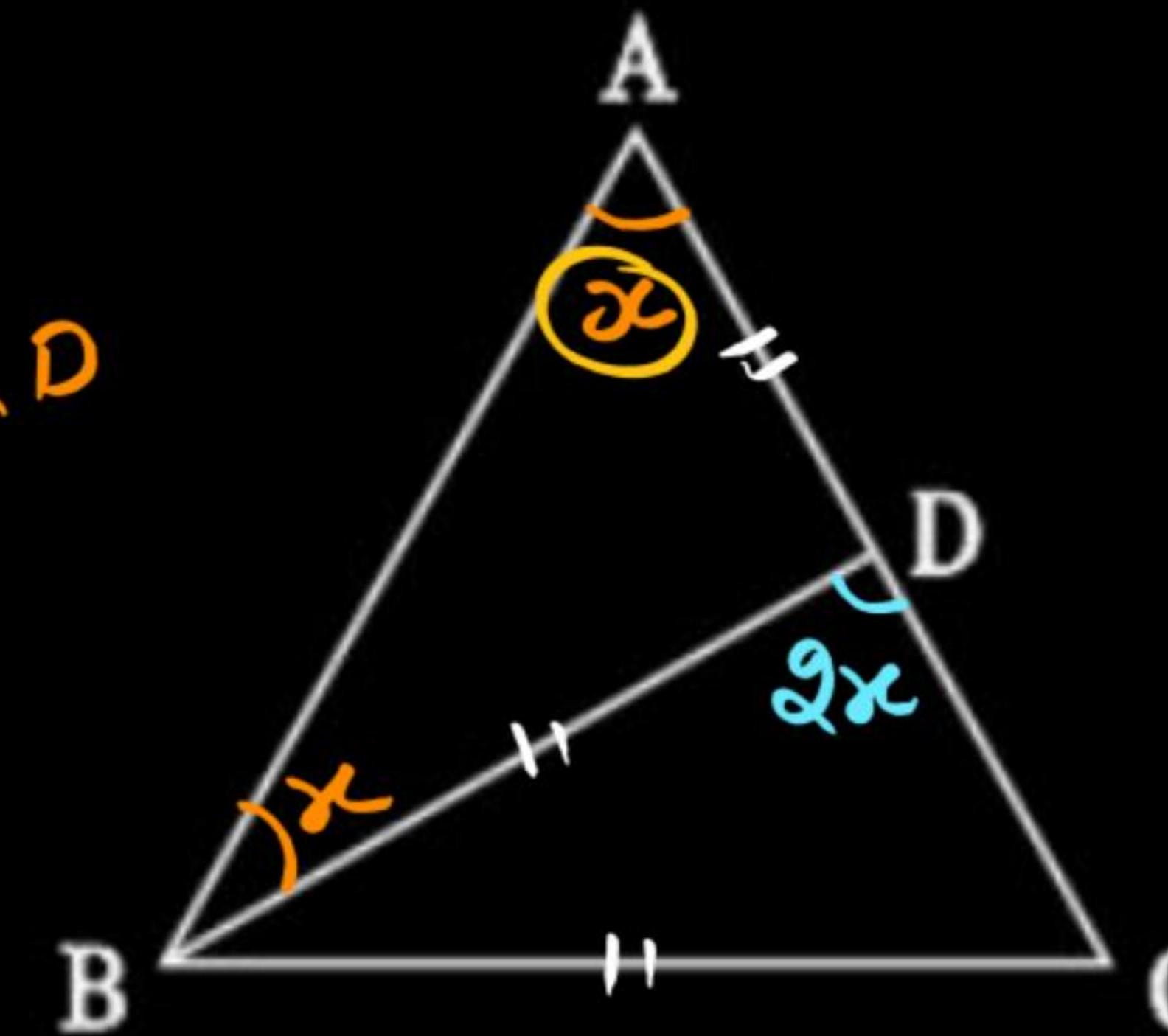
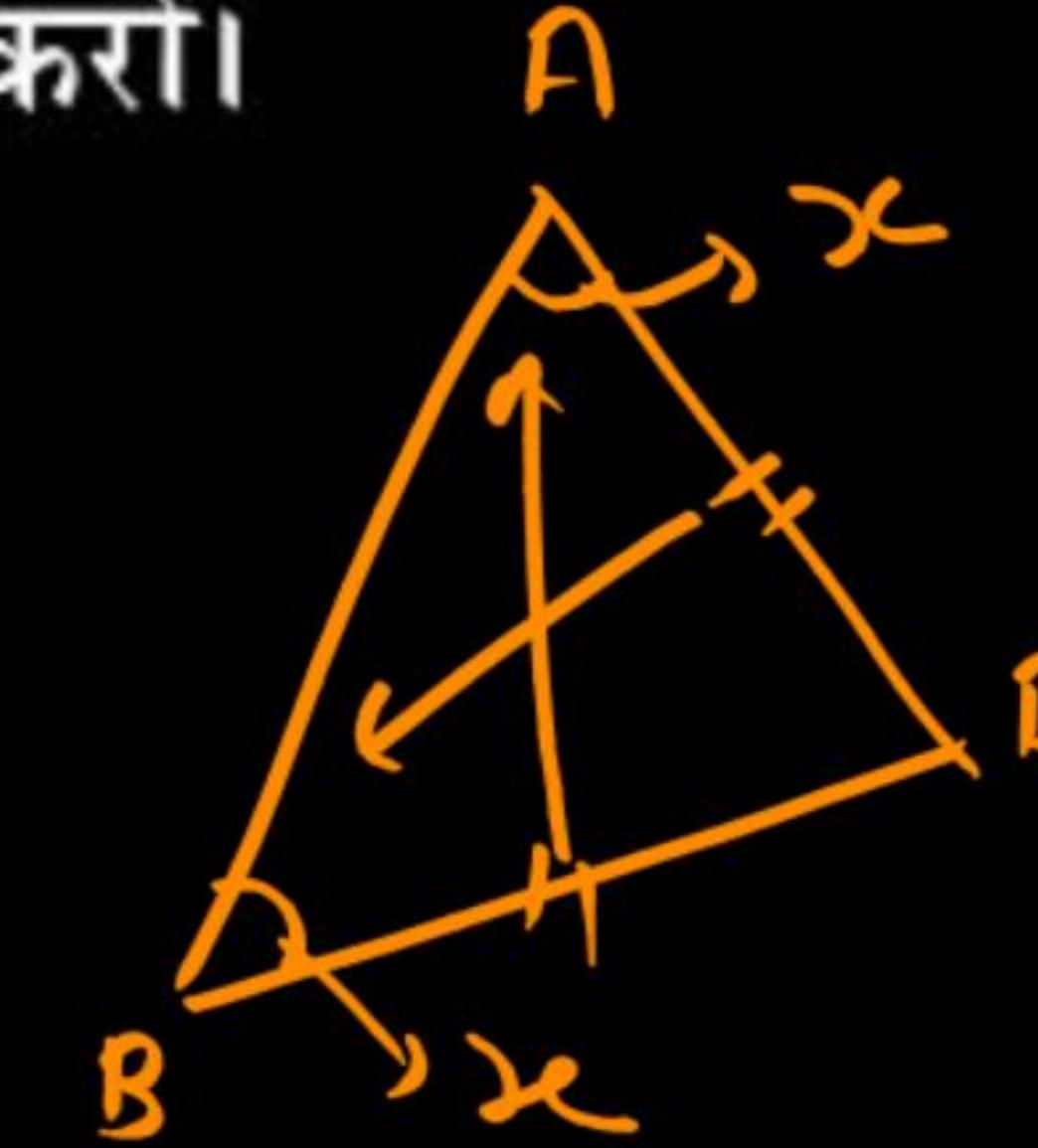
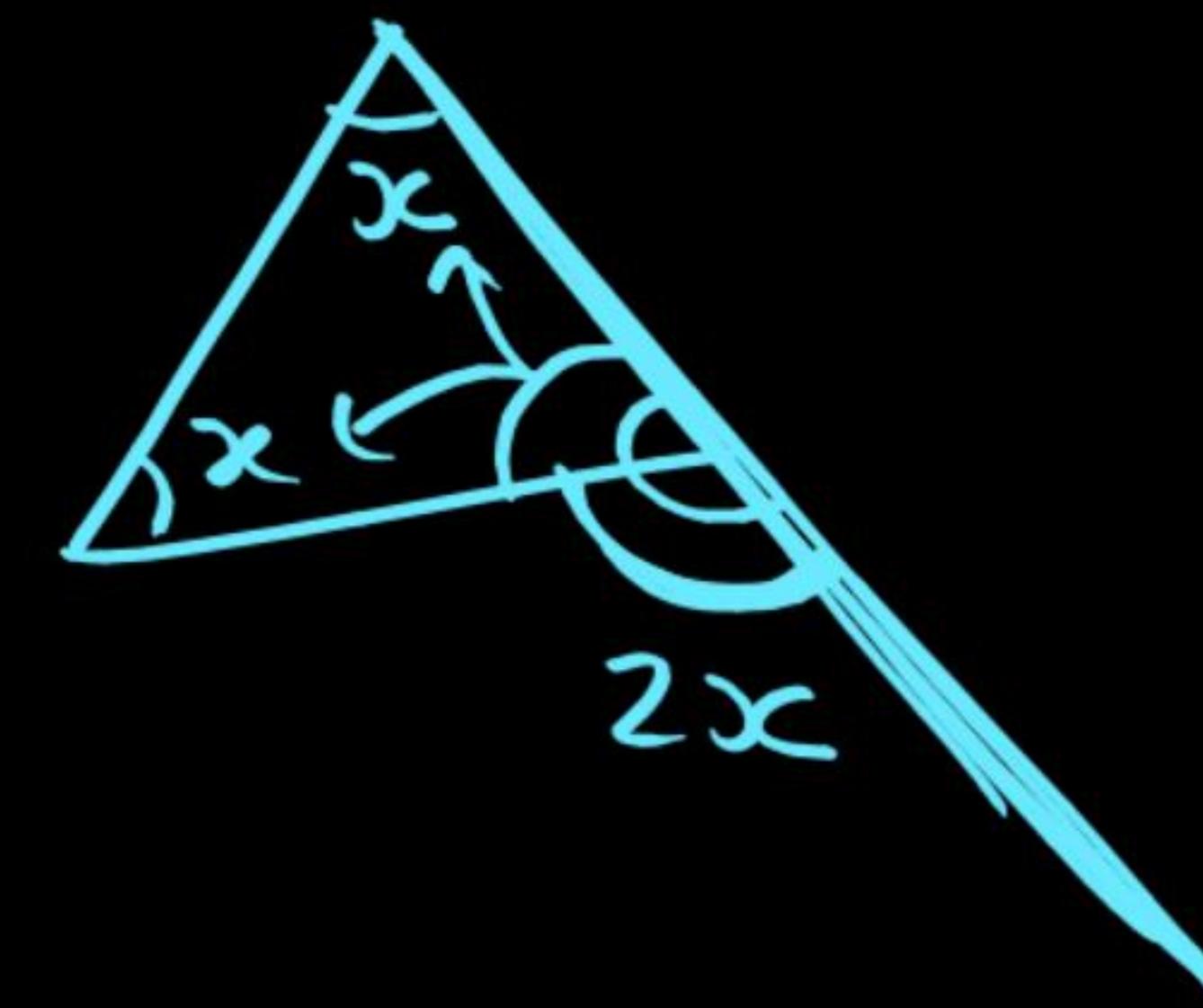
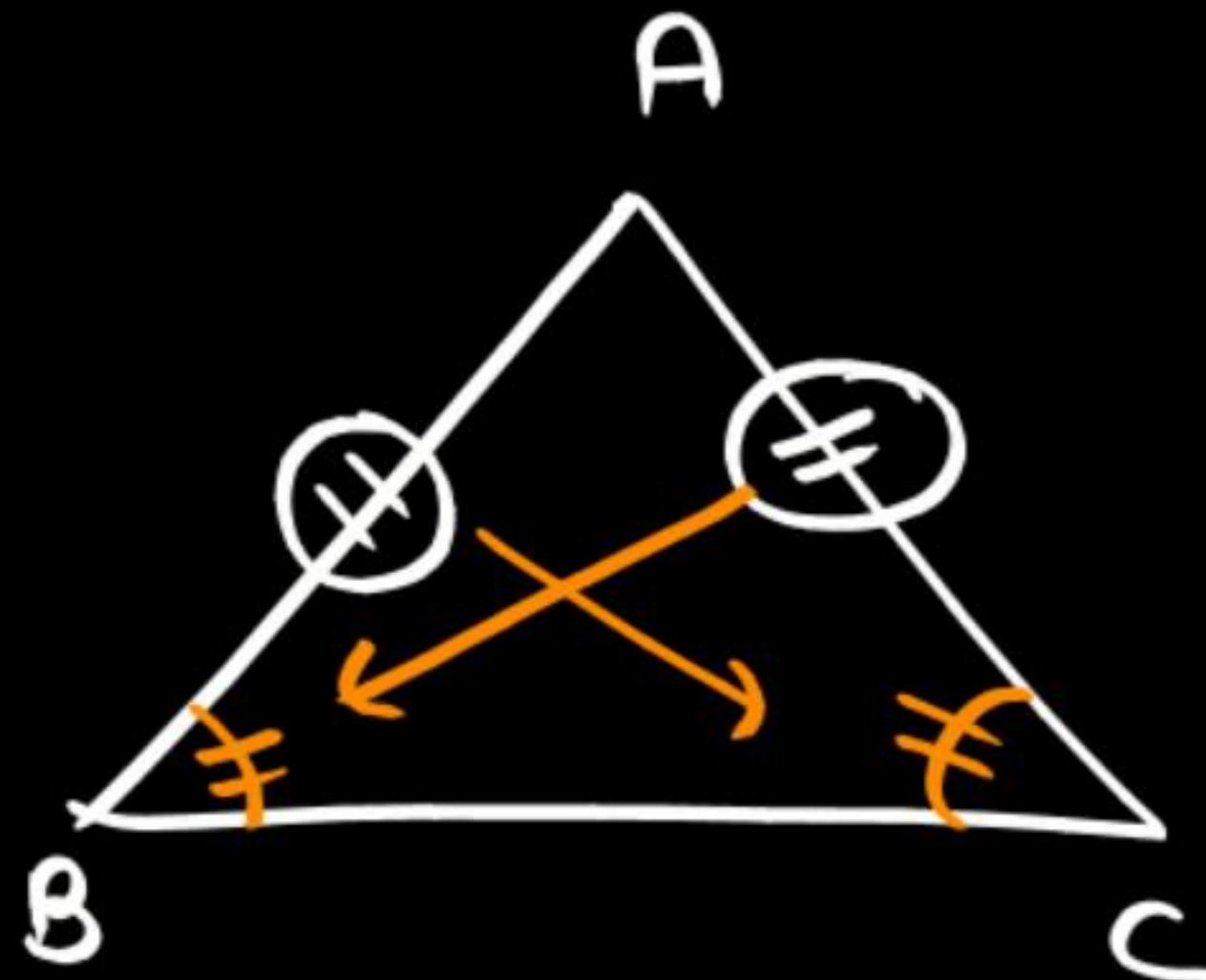
$$(5-2)180$$

$$3 \times 180$$

$$540$$

3. In $\triangle ABC$, If $AD = BD = BC$ and $AB = AC$, then find $\angle A$.

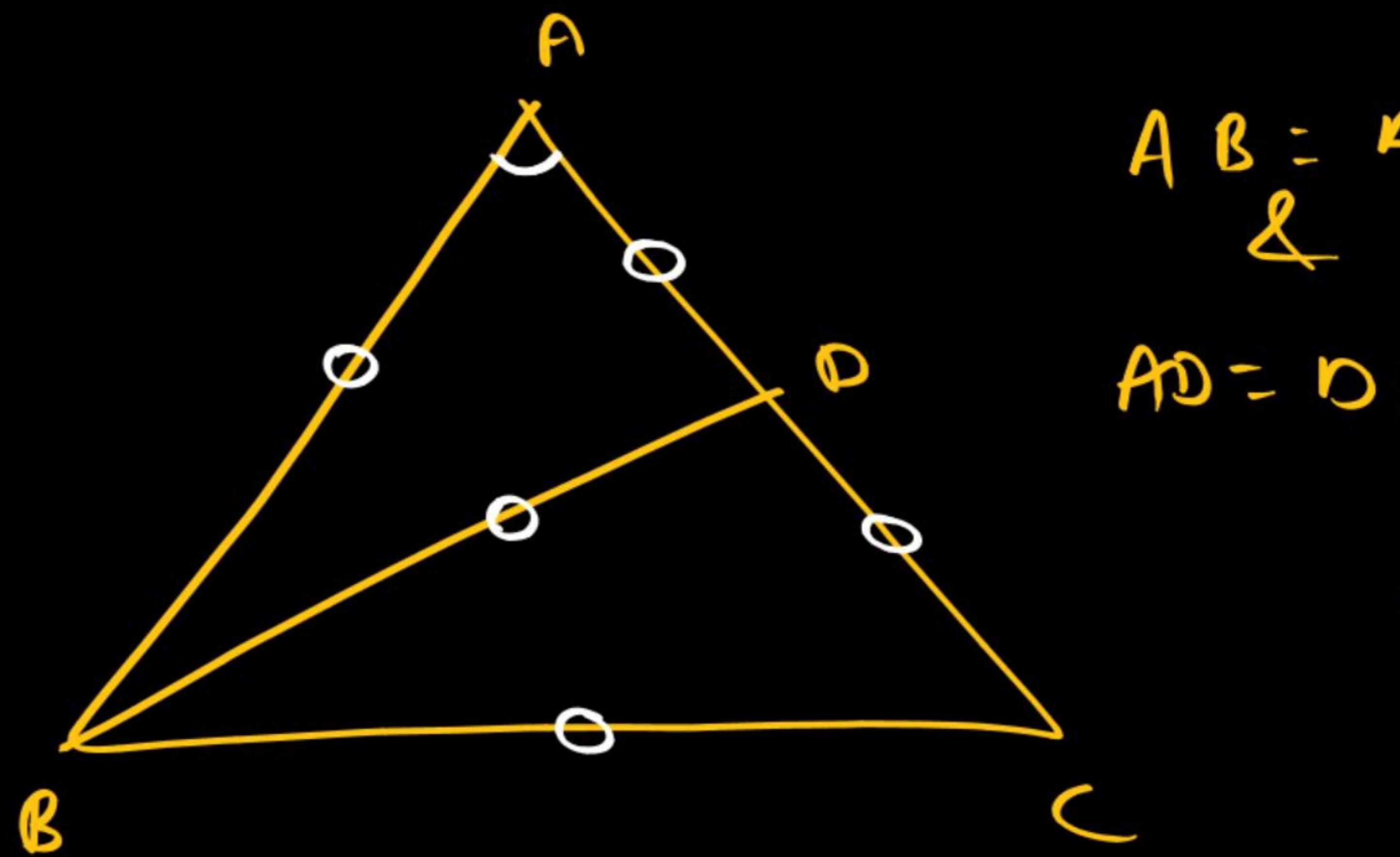
$\triangle ABC$ में, यदि $AD = BD = BC$ और $AB = AC$ तो $\angle A$ ज्ञात करों।



$$5x = 180$$

$$x = \frac{180}{5}$$

$$= \frac{180}{5} = 36^\circ$$

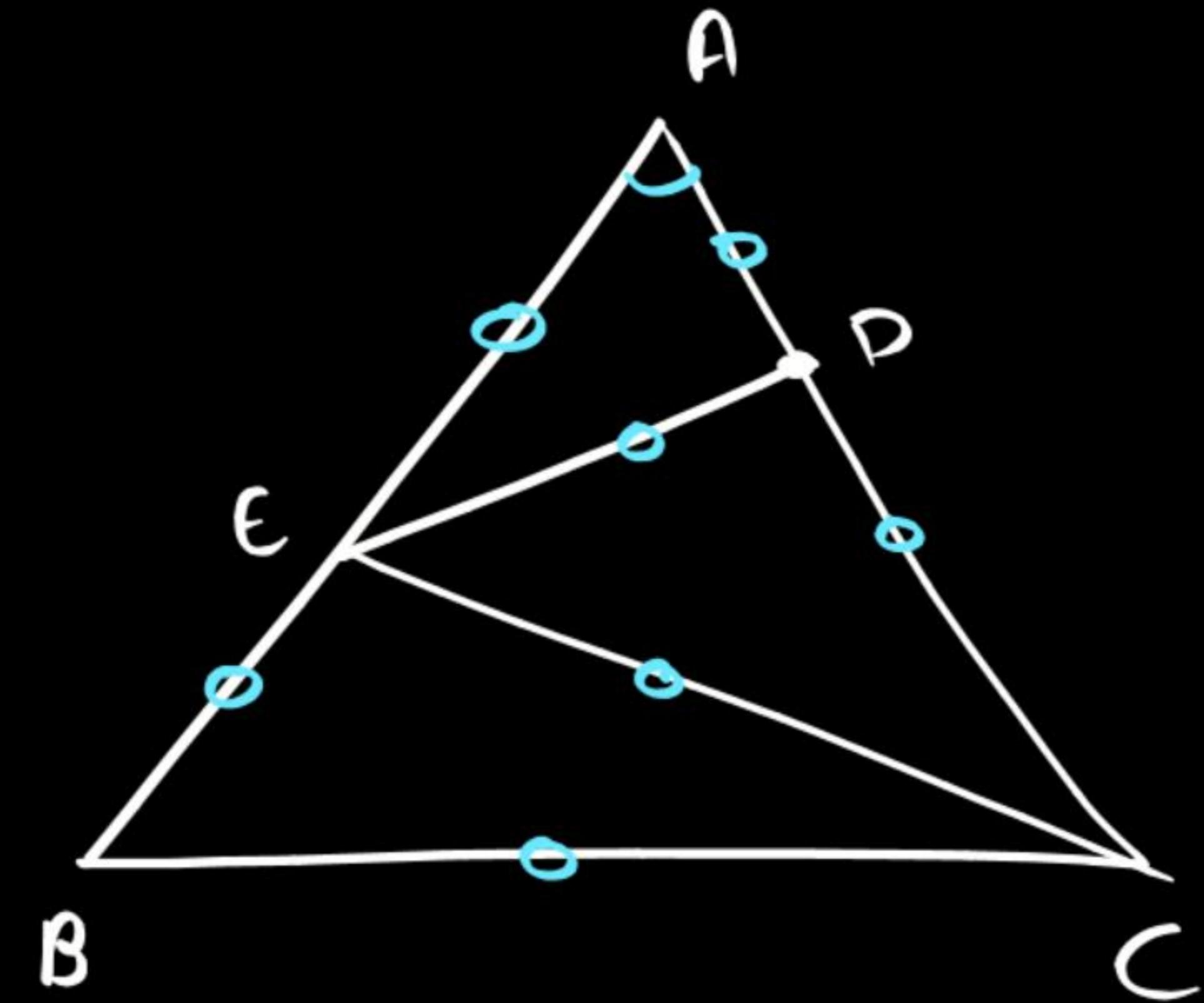


$$AB = AC$$

$$AD = DB = DC$$

$$\angle A = ?$$

$$\angle A = \frac{180}{5} = 36^\circ$$



in $\triangle ABC$

$$AB = AC$$

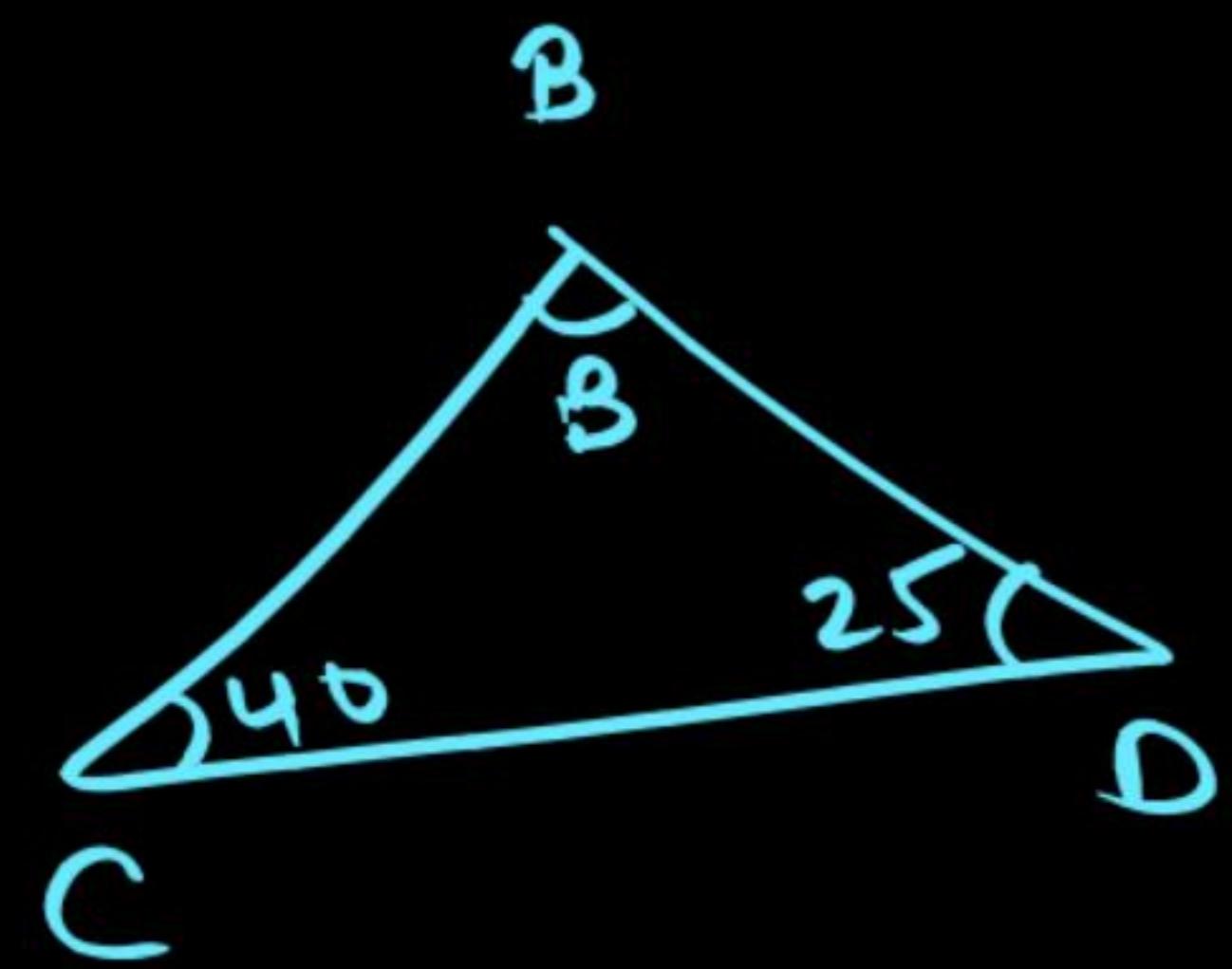
&

$$AD = DE = EC = CB$$

find $\angle A$

$$\angle A = \frac{180}{7} \text{ } ^\circ \text{ Ag}$$

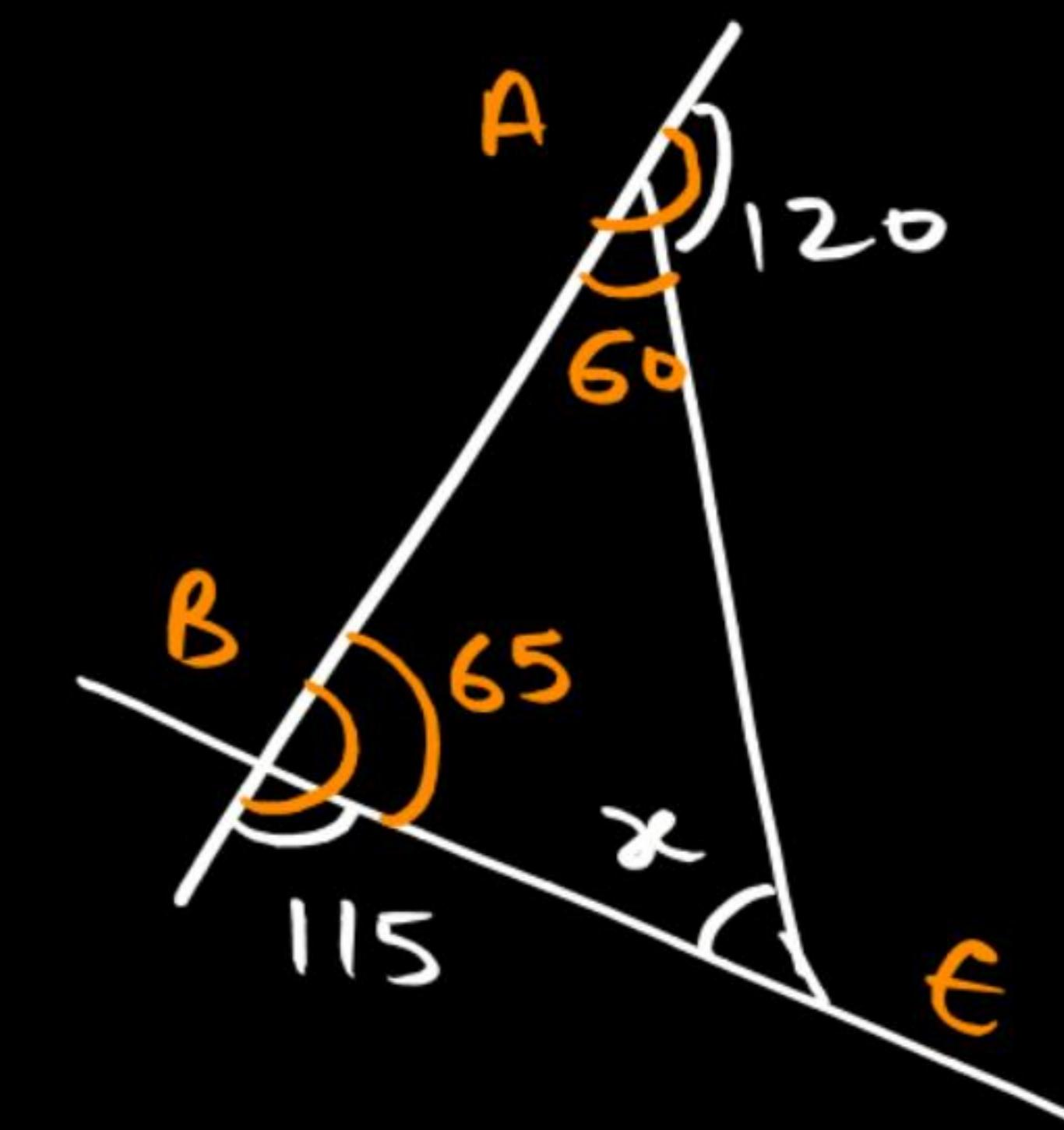
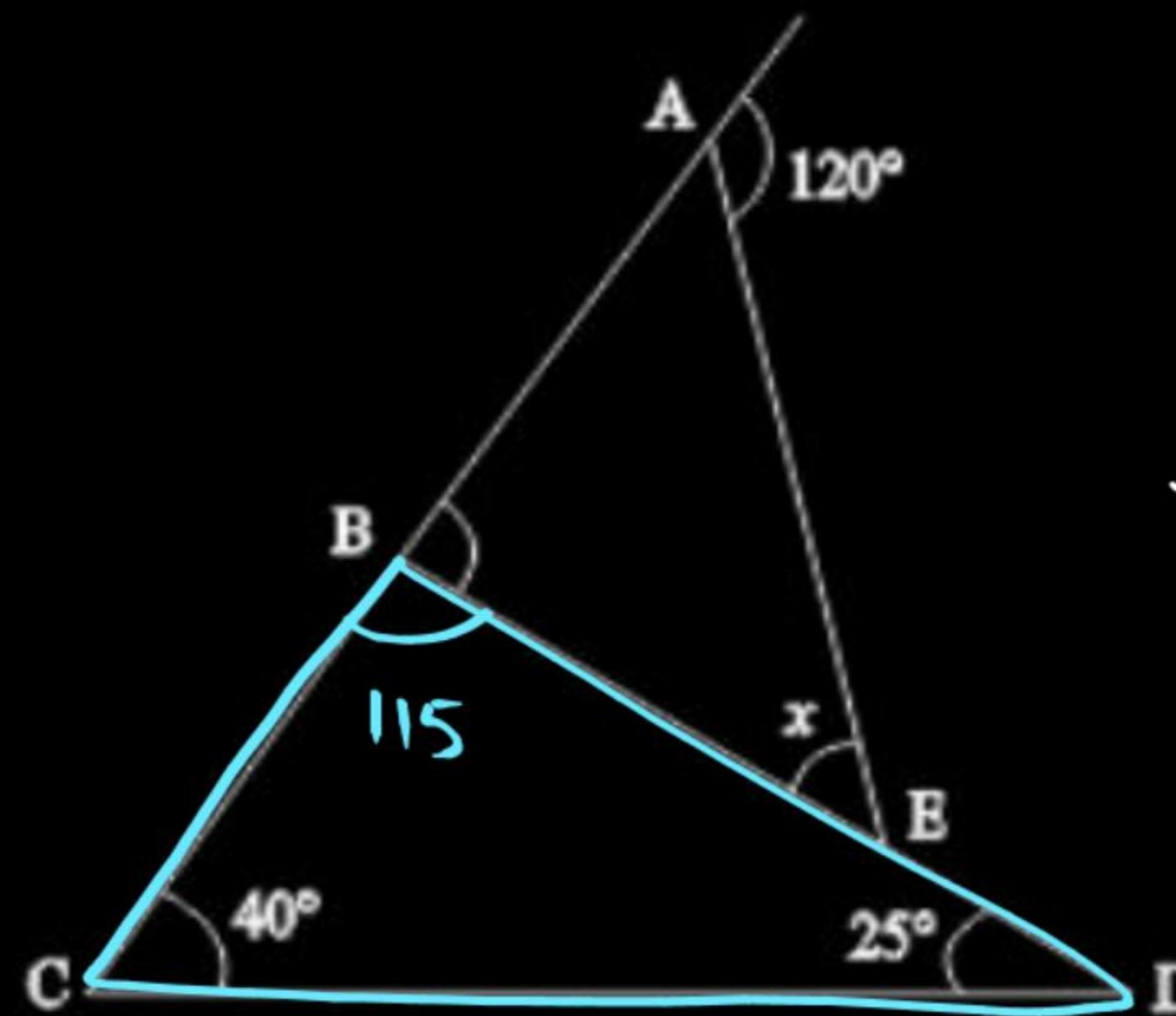
4. In the given figure, Find the value of x?
दी गयी आकृति में, x का मान ज्ञात करो।



$$\angle B + 40 + 25 = 180$$

$$\angle B = 180 - 65$$

$$\angle B = 115^\circ$$



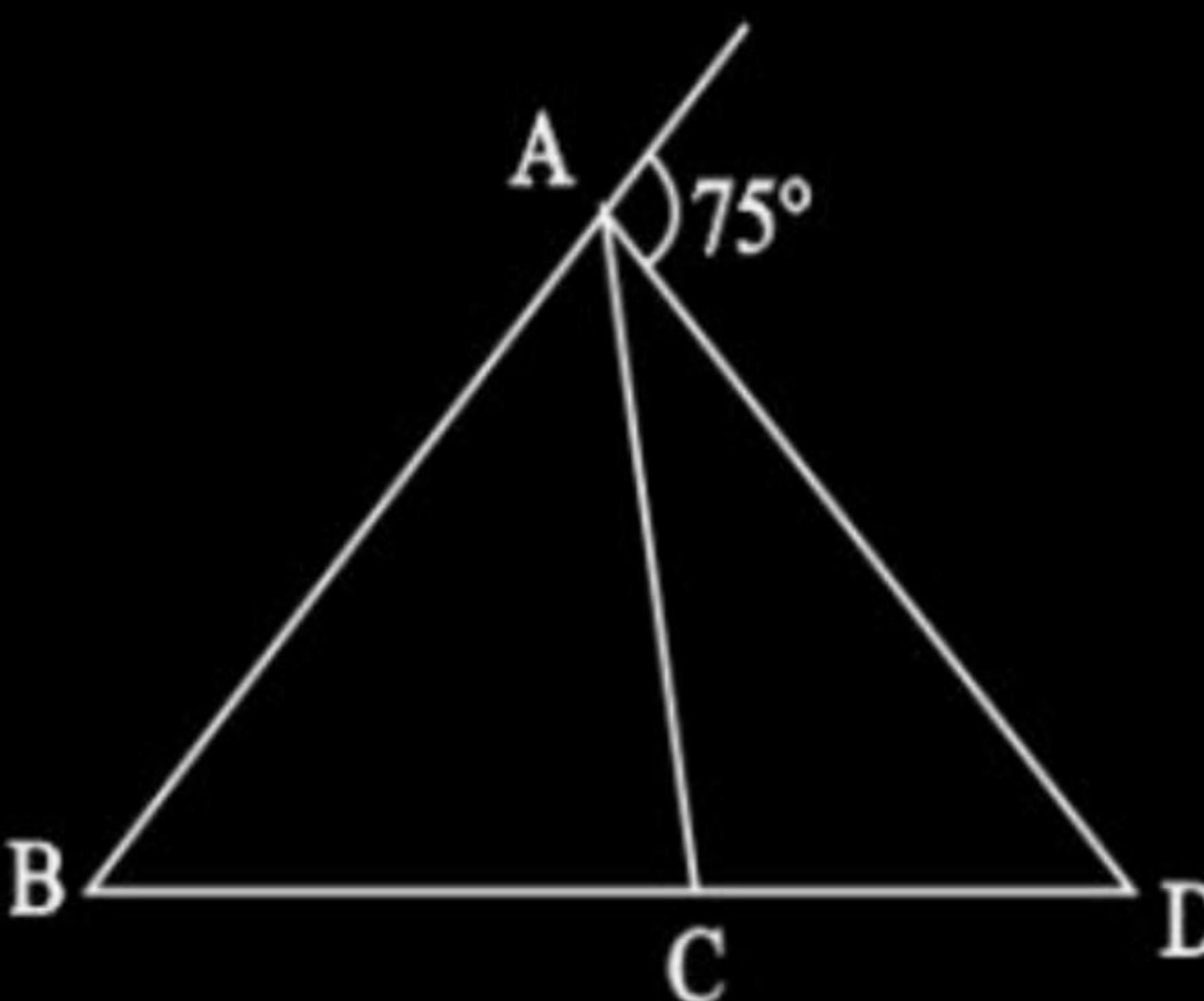
$$60 + 65 + x = 180$$

$$\begin{aligned}x &= 180 - 125 \\&= 55\end{aligned}$$



5. In the given figure, $AC = BC = AD$ then find $\angle D$.

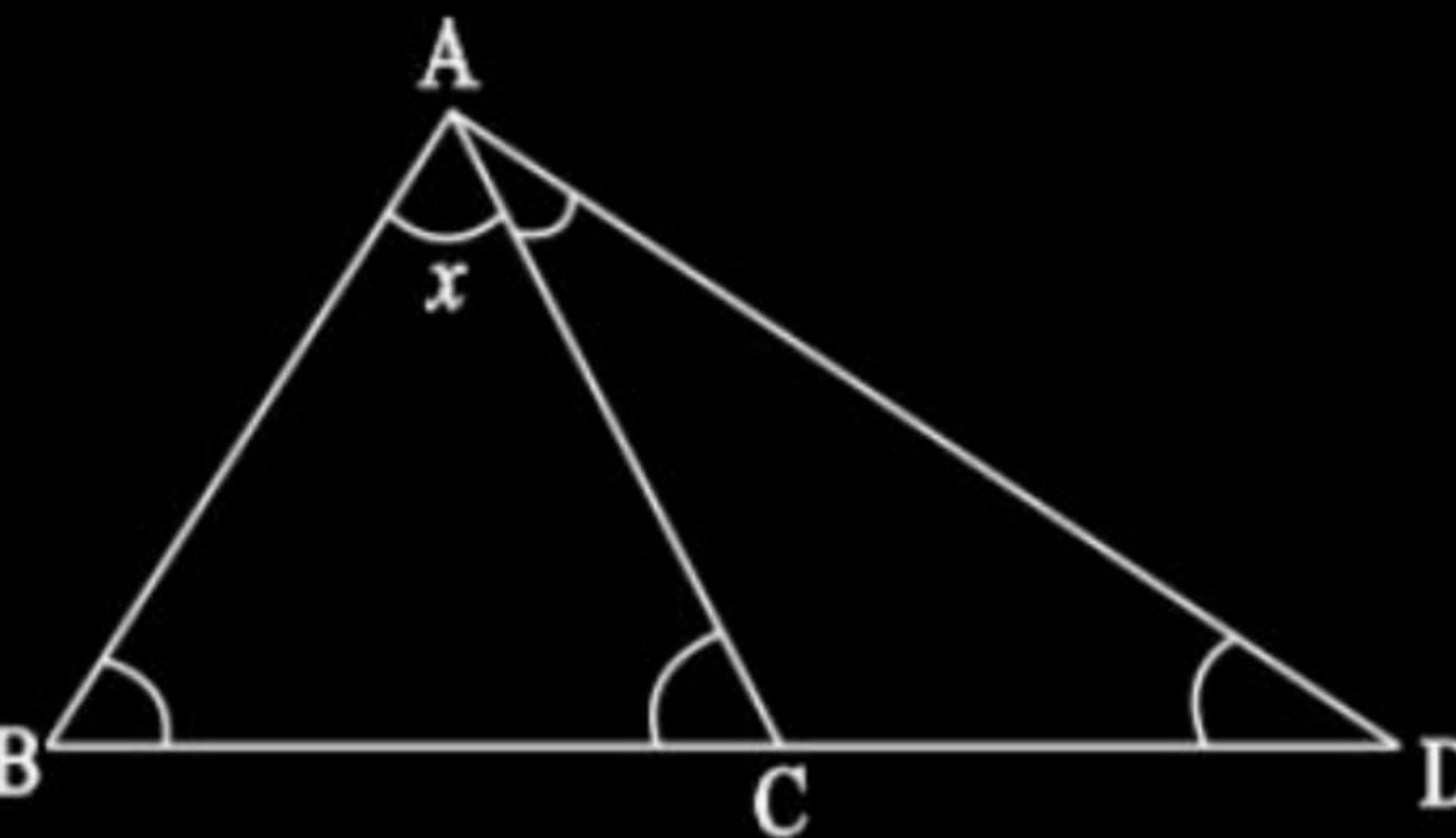
दी गयी आकृति में, $AC = BC = AD$ तो $\angle D$ ज्ञात करों।





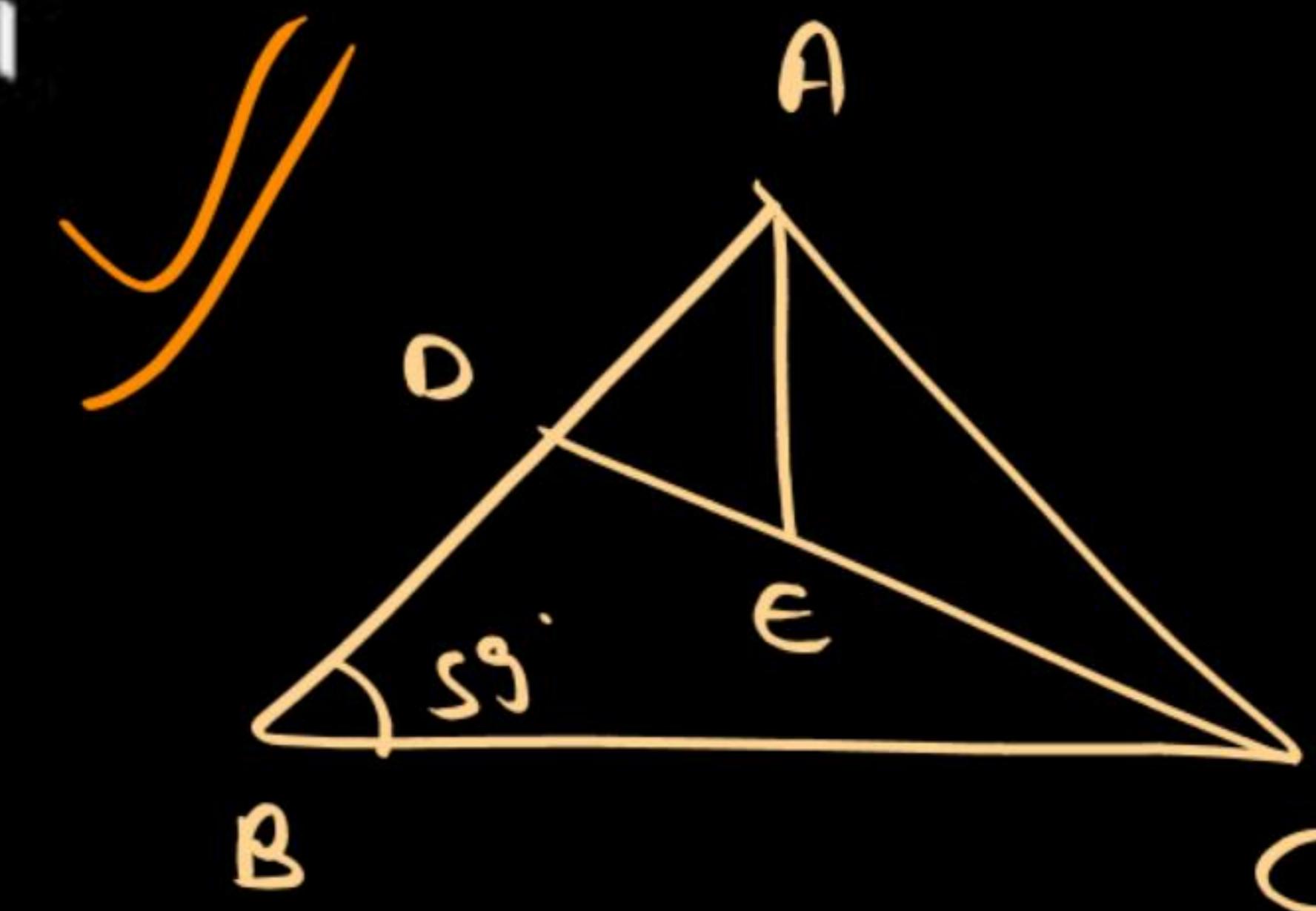
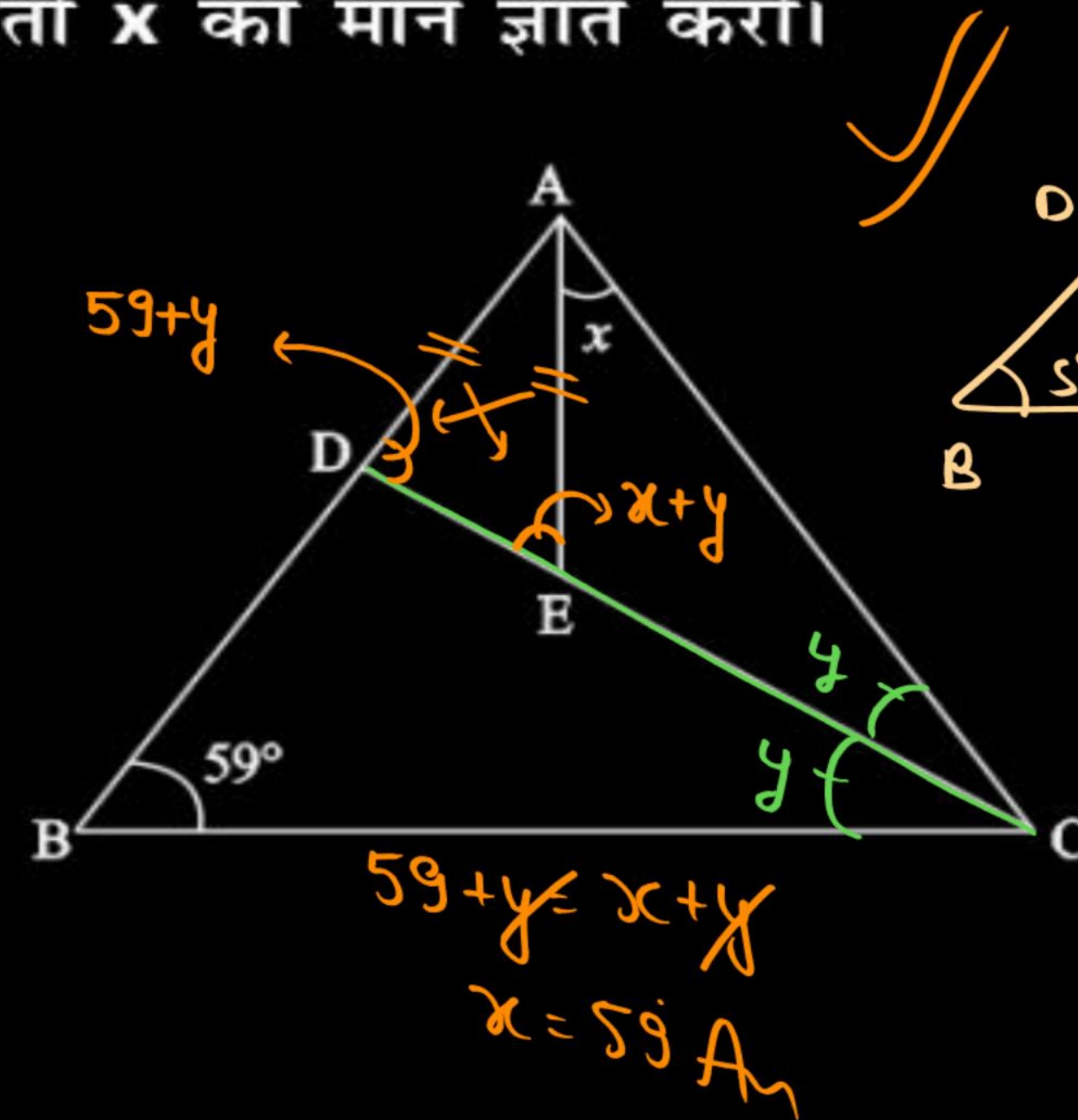
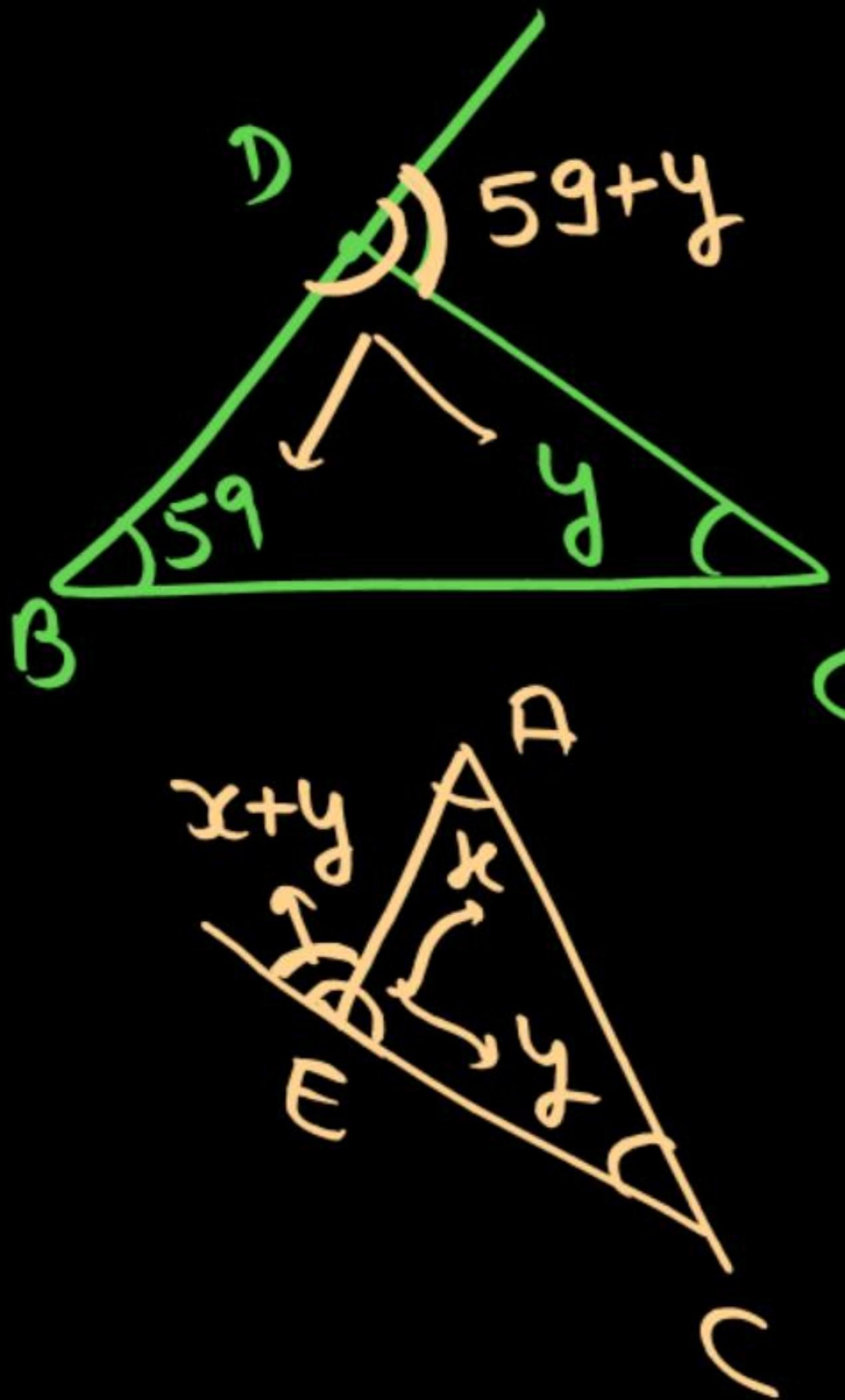
6. In the given figure, $AB = AC = CD$ and $\angle BAD = 84^\circ$,
then find the value of x .

दी गये आकृति में, $AB = AC = CD$ और $\angle BAD = 84^\circ$ तो x
का मान ज्ञात करों।



7. In this given figure, CD is angular bisector of $\angle C$ and $AD = AE$, then find the value of x .

दी गयो आकृति में, CD, $\angle C$ का कोण समद्विभाजक है, तथा $AD = AE$ है। तो x का मान ज्ञात करों।

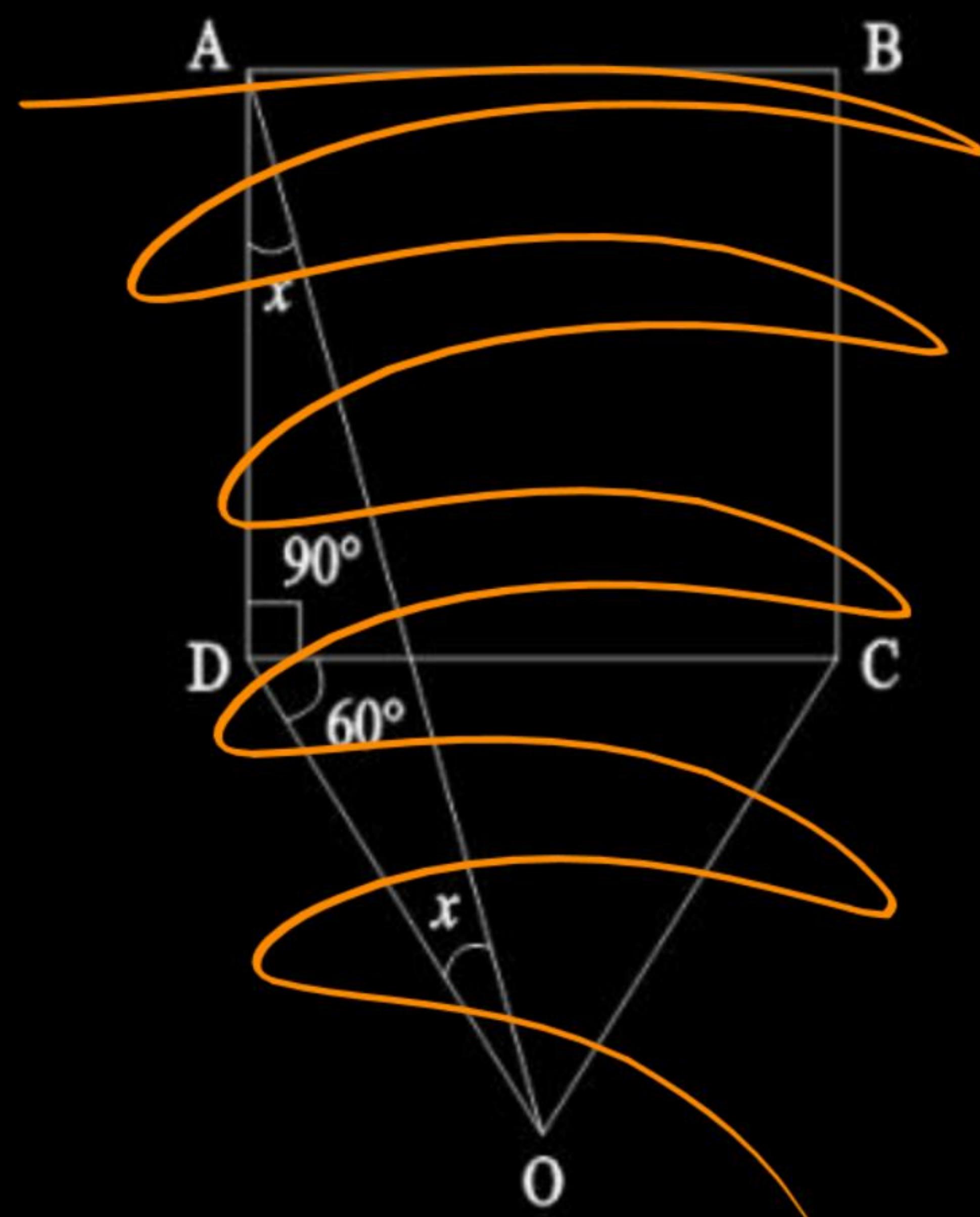


$$59 + y = x + y$$

$$x = 59 \text{ Ans}$$

8. ABCD is a square, where $\triangle DOC$ is an equilateral triangle, then find $\angle DAO$ and $\angle OAD$.

ABCD एक वर्ग है, जिसमें $\triangle DOC$ एक समबाहु त्रिभुज है, तो $\angle DAO$ और $\angle OAD$ ज्ञात करो।



Centres (केंद्र)

*

Angular bisector = incentre (when all meet)

(अंगुली विभाजक)

*

Perpendicular bisector = Circumcentre (where all meet)

(पर्पेंडिकुलर बिसेक्टर)

*

Altitude : Orthocentre (where all meet)

(उच्चार्ता)

*

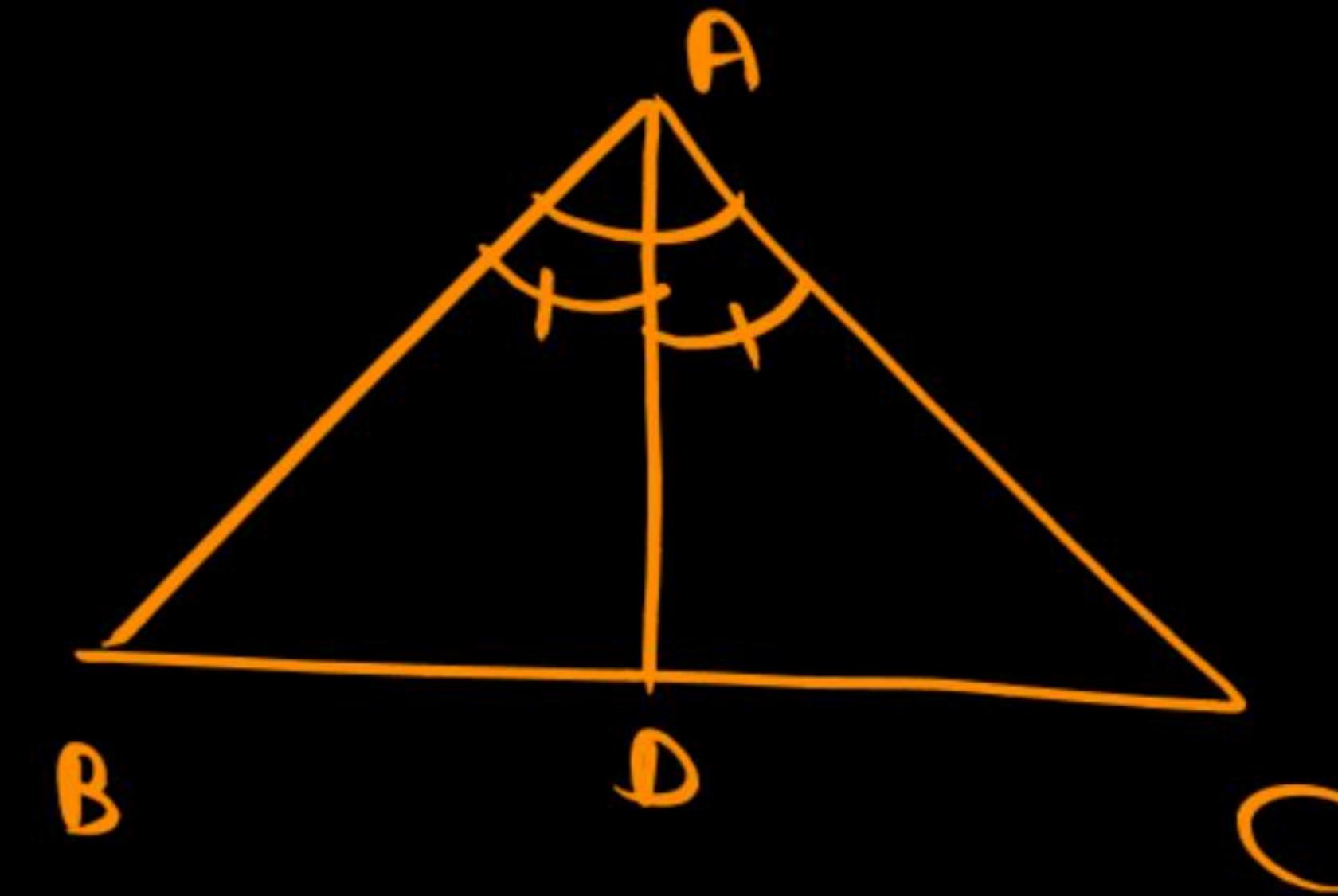
Median : Centroid (where all meet)

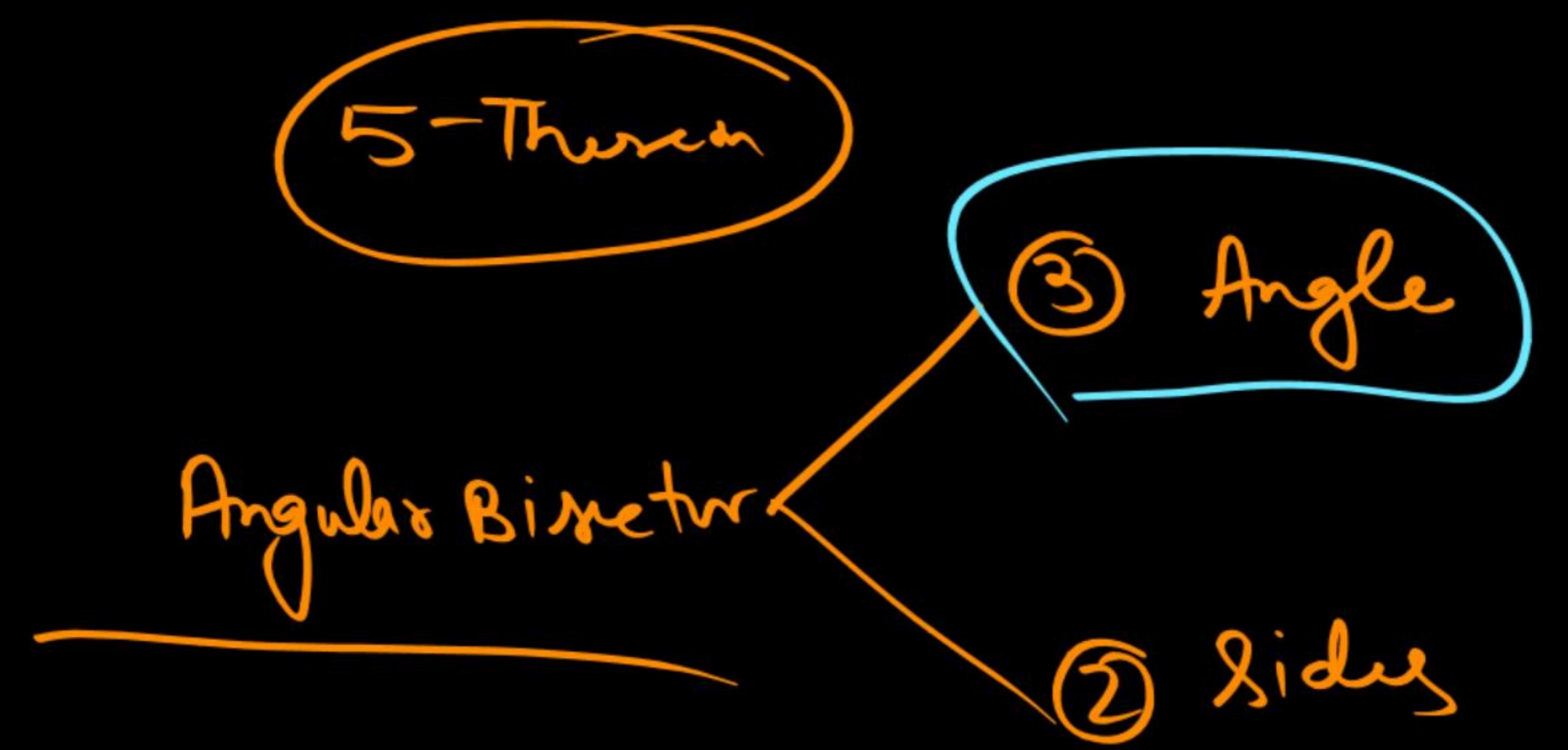
(मध्यस्थी)

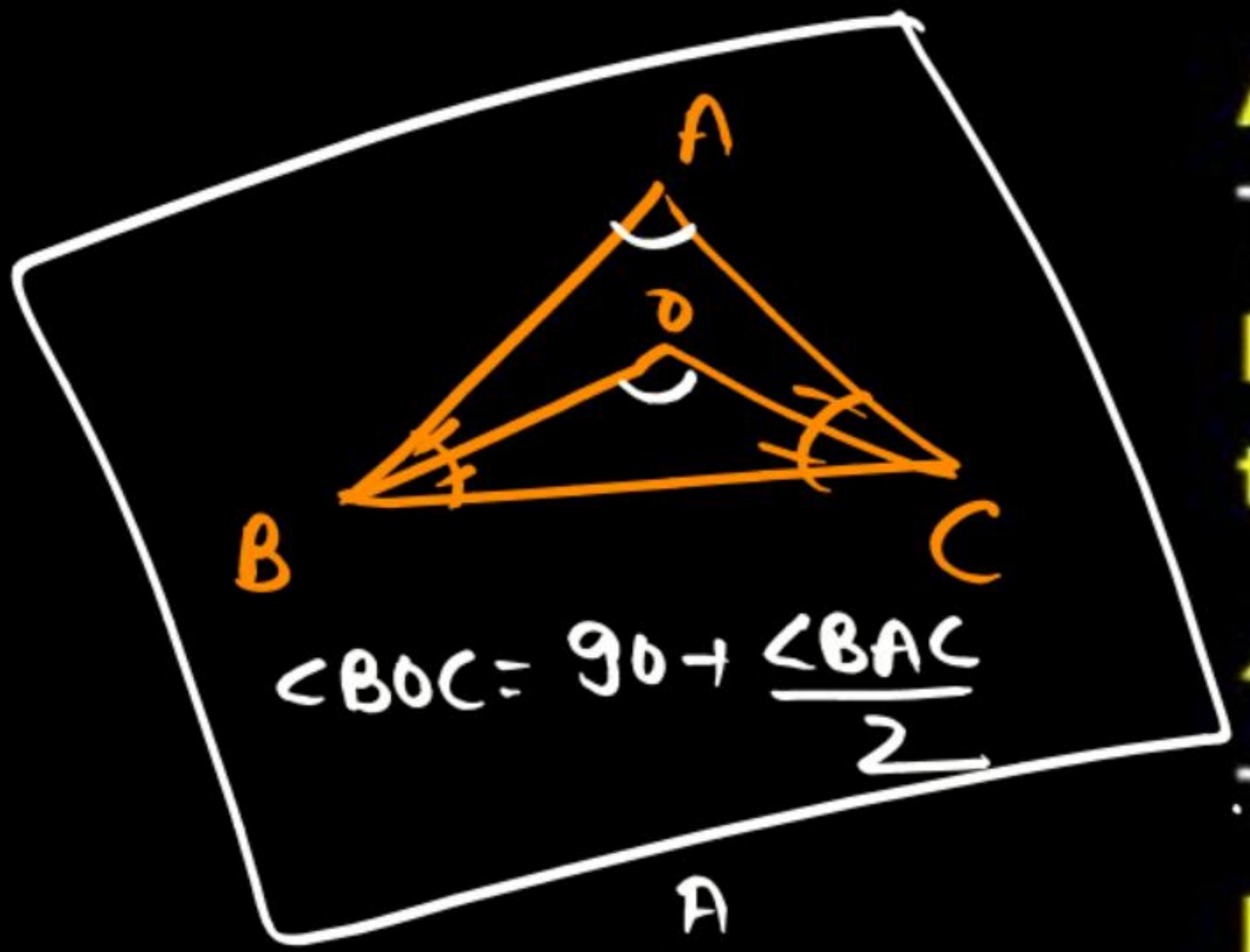
Angular Bisector

(ખોજા કરીને બિસેક્ટ)

In which divides the angle in 2 equal parts







Angular Bisector:

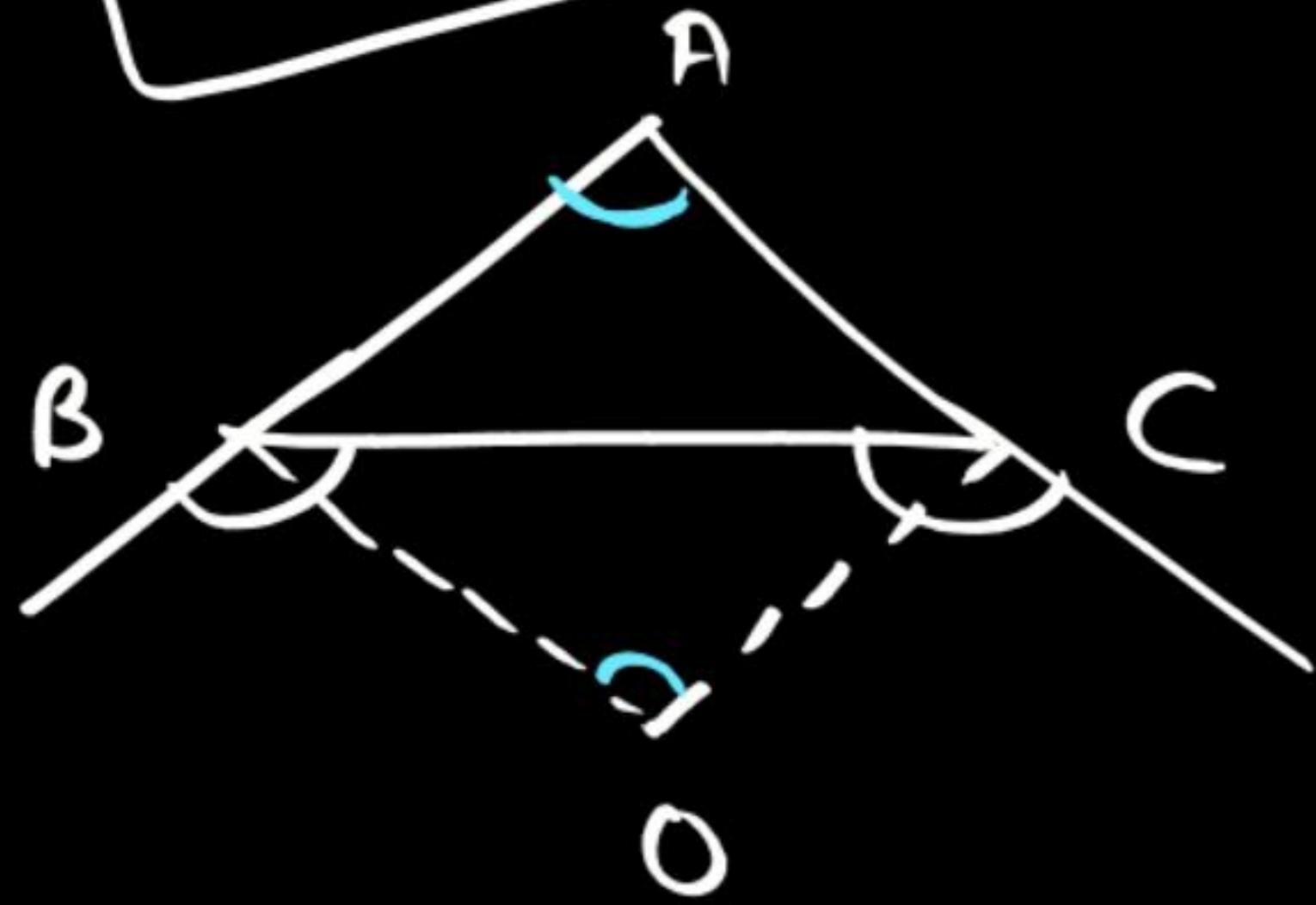
Theorem-1

In a ΔABC , the angular bisector of $\angle B$ and $\angle C$ meets at O, then.

$$\angle BOC \text{ or } \angle O = 90^\circ + \frac{\angle BAC}{2} = 90^\circ + \frac{\angle A}{2}$$

Theorem-2

In a ΔABC , the external bisectors of $\angle B$ and $\angle C$ meets at O, then find $\angle BOC = ?$

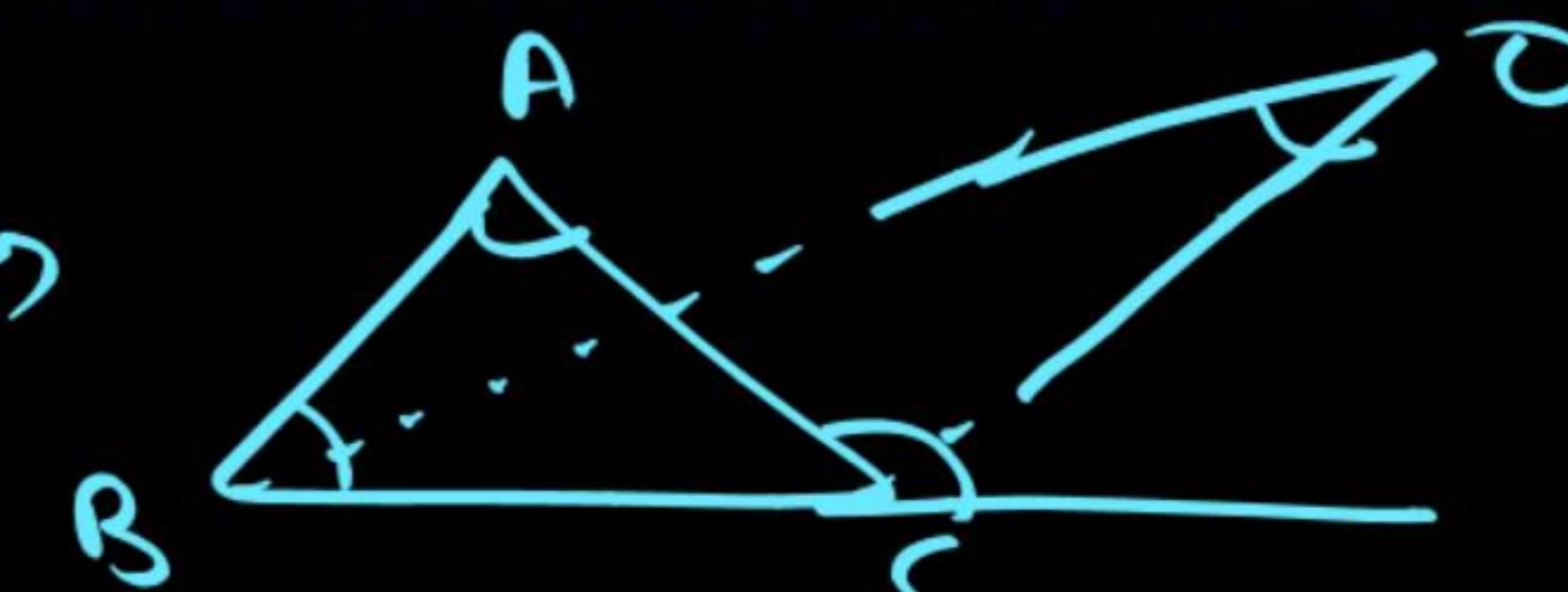


Theorem-3

In a ΔABC , the internal bisector of $\angle B$ and ~~the~~ external bisectors of $\angle C$ meets at O, then

$$\angle BOC = 90 - \frac{\angle BAC}{2}$$

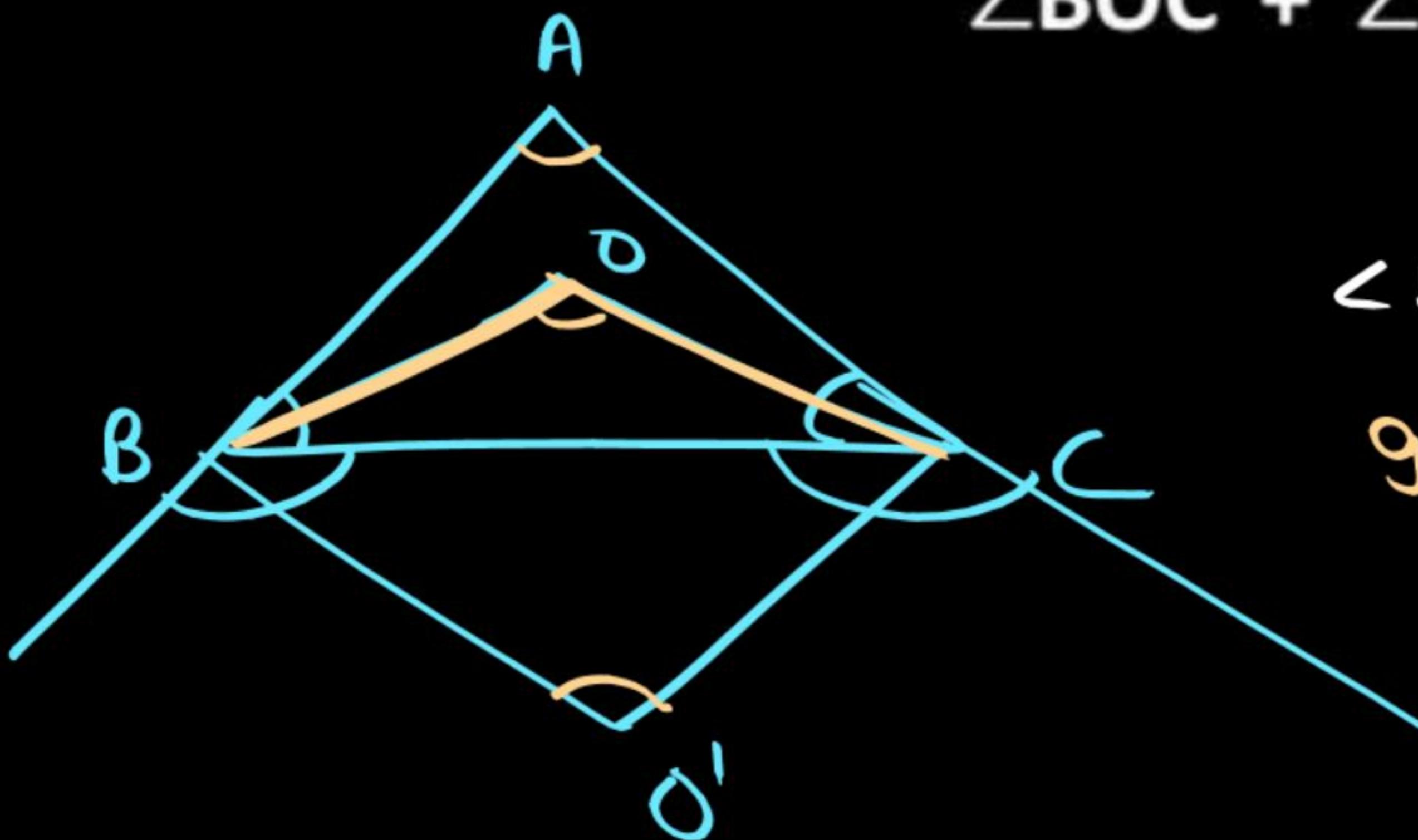
$$\angle BOC = \frac{\angle BAC}{2}$$



$$\angle BOC = \frac{\angle BAC}{2}$$

9. In a ΔABC , the angular bisector of $\angle B$ and $\angle C$ meets at O and the external bisectors of $\angle B$ and $\angle C$ meet at O' , then find $\angle BOC + \angle BO'C$.

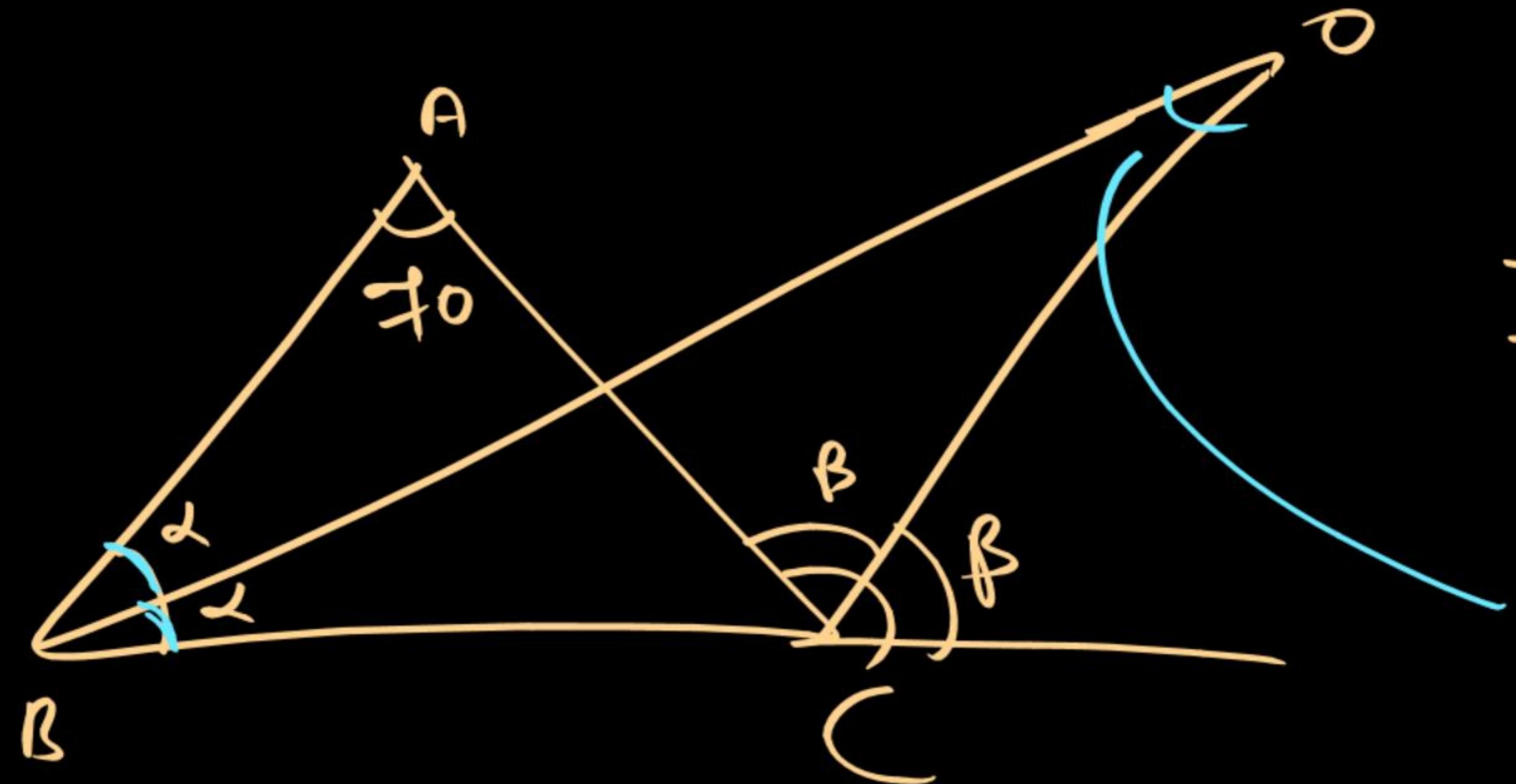
ΔABC में, $\angle B$ and $\angle C$ के कोण समद्विभाजक O पर और $\angle B$ and $\angle C$ के बाह्य समद्विभाजक O' पर मिलते हैं, तो $\angle BOC + \angle BO'C$ ज्ञात करों।



$$\angle BOC + \angle BO'C = ?$$

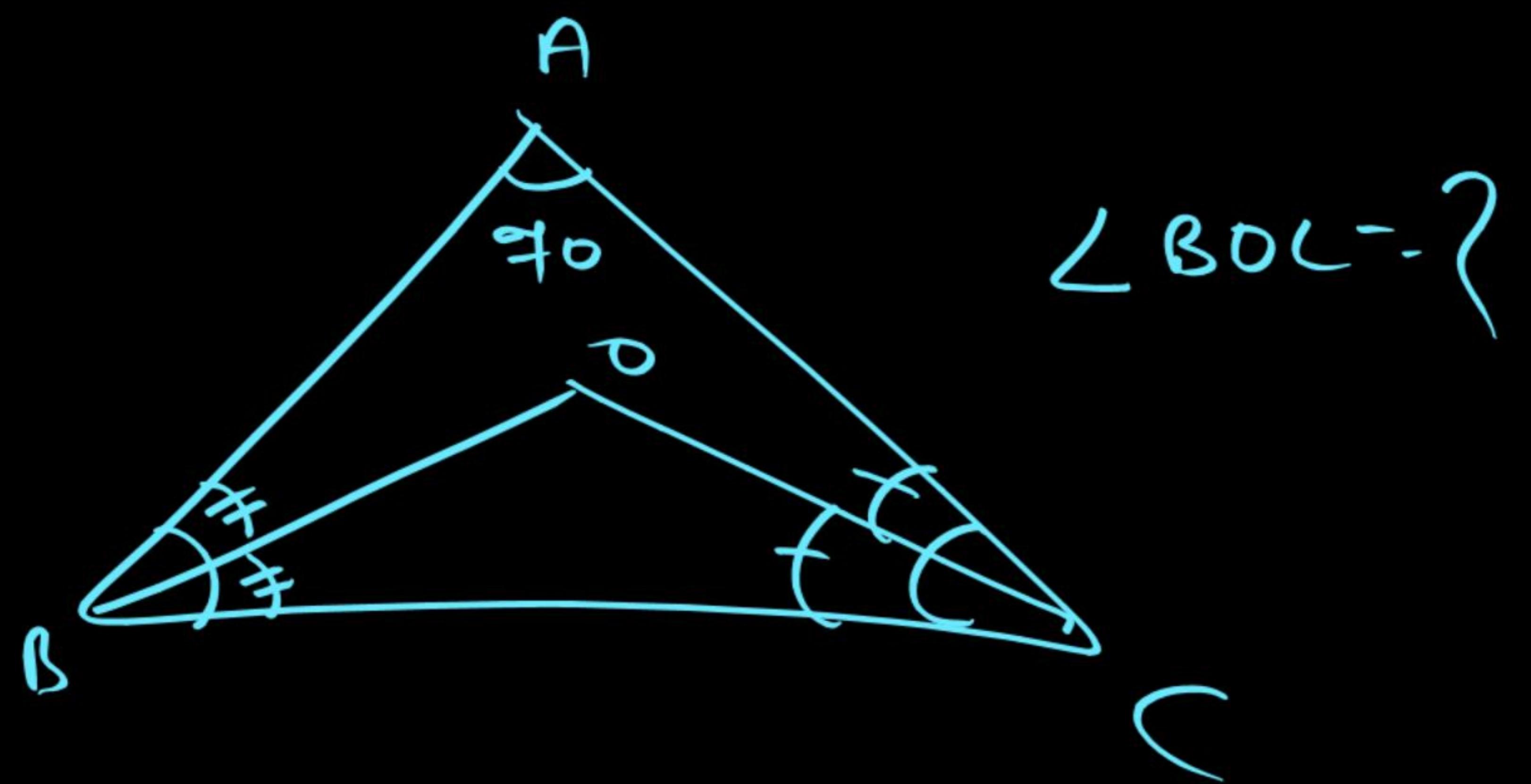
$$90 + \frac{\angle BAC}{2} + 90 - \frac{\angle BAC}{2}$$

$$180^\circ$$



find $L_0 = ?$

$$\frac{\pi}{2} = 35^\circ \text{ A}$$

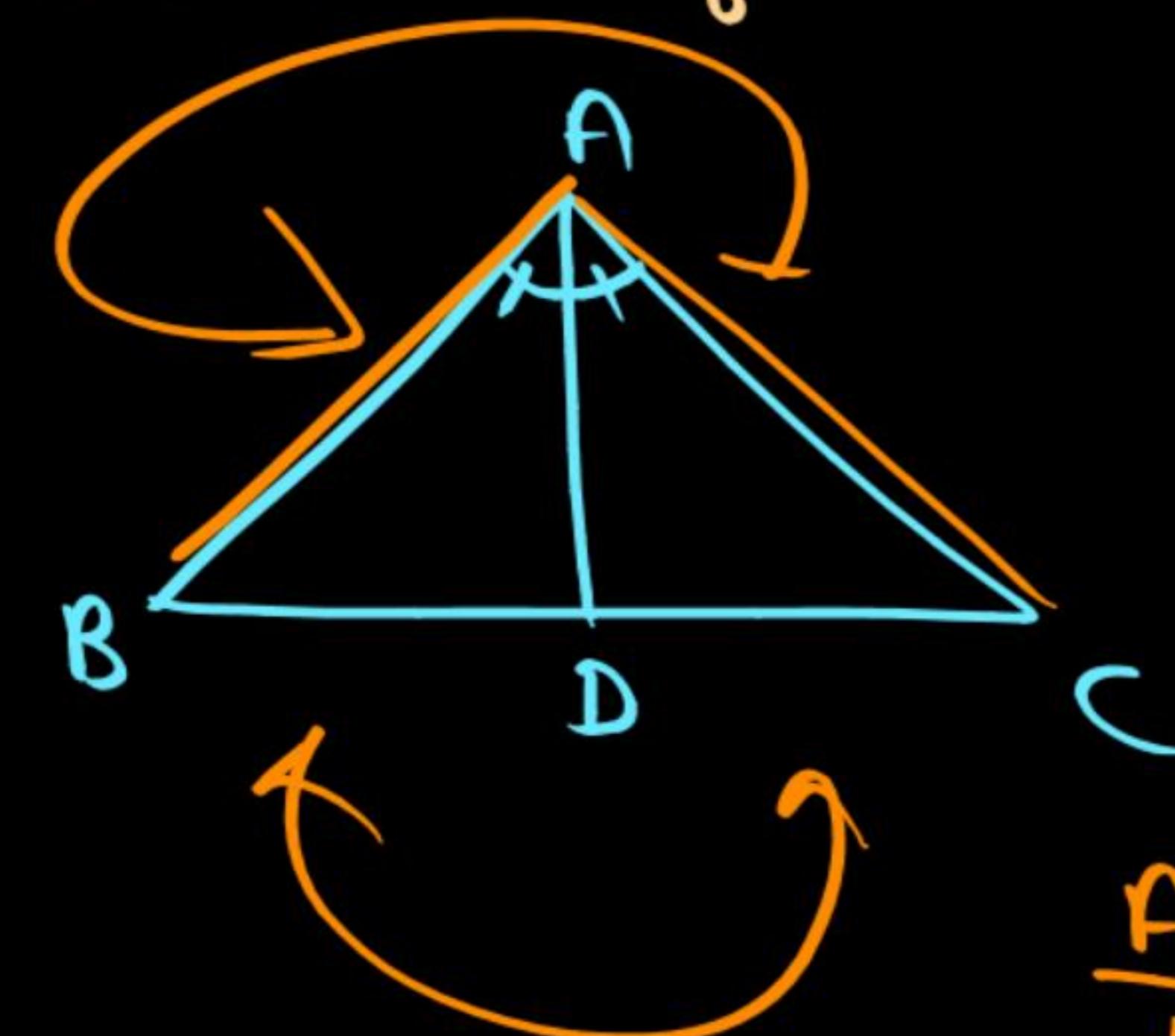


$$\begin{aligned}\angle BOC &= 90 + \frac{\angle BAC}{2} \\ &= 90 + 35^\circ \\ &= 125^\circ\end{aligned}$$

Angular Bisectors in Sides → 2 (Theorem)

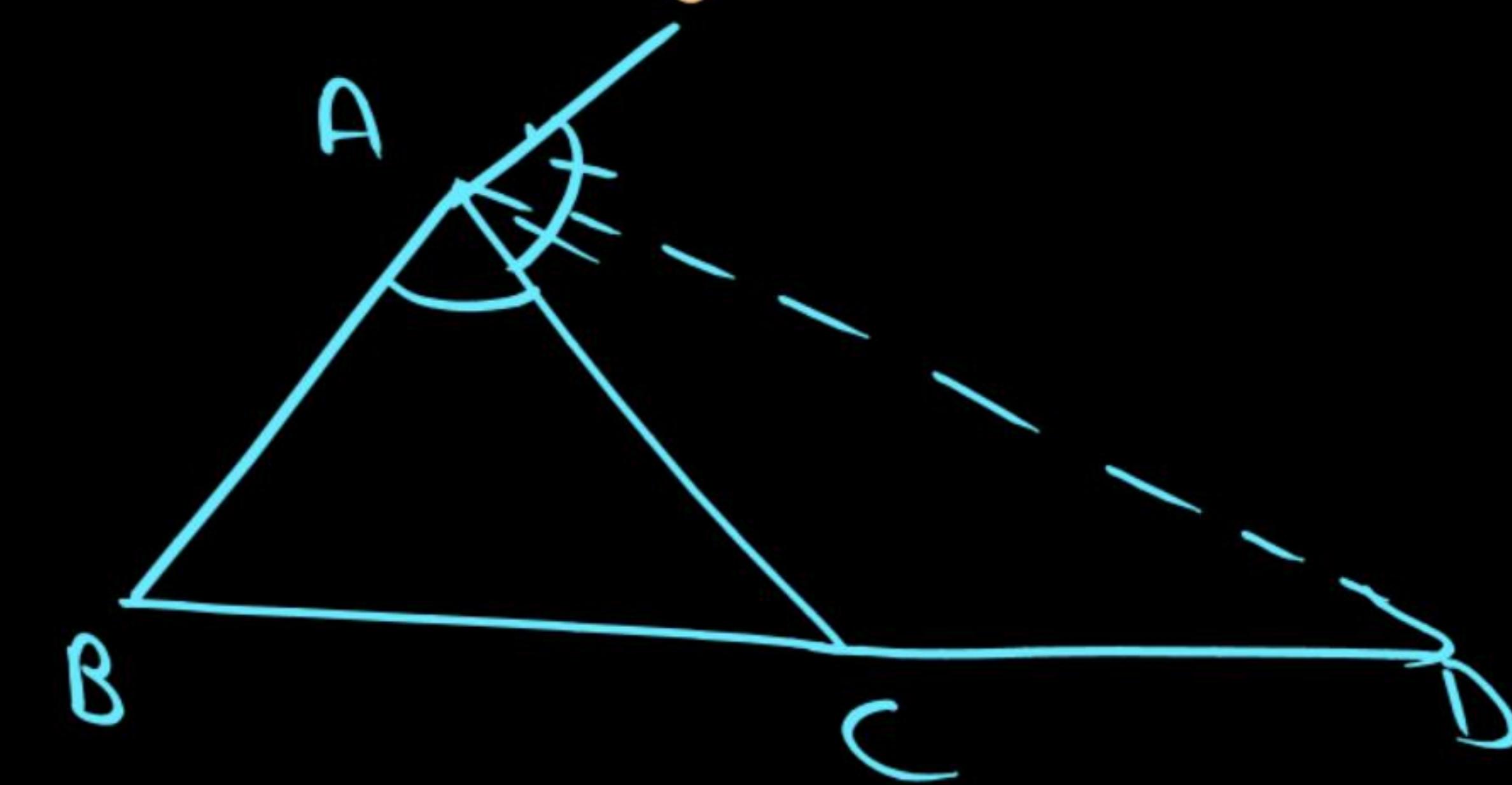
① In $\triangle ABC$, AD is Internal

Bisectors of $\angle A$



② In $\triangle ABC$, AD is External

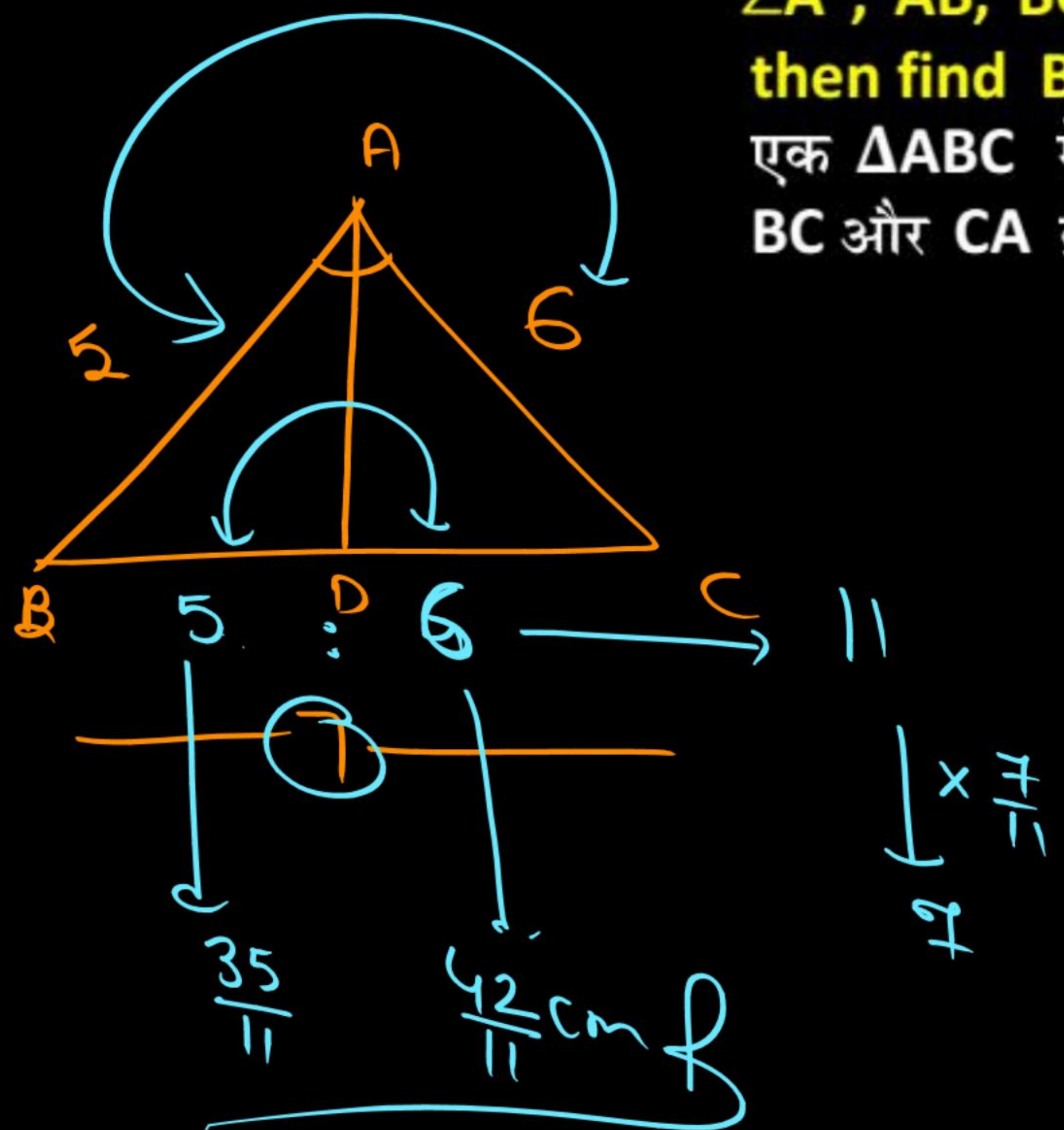
Bisectors of $\angle A$



$$\frac{AB}{AC} = \frac{BD}{DC}$$

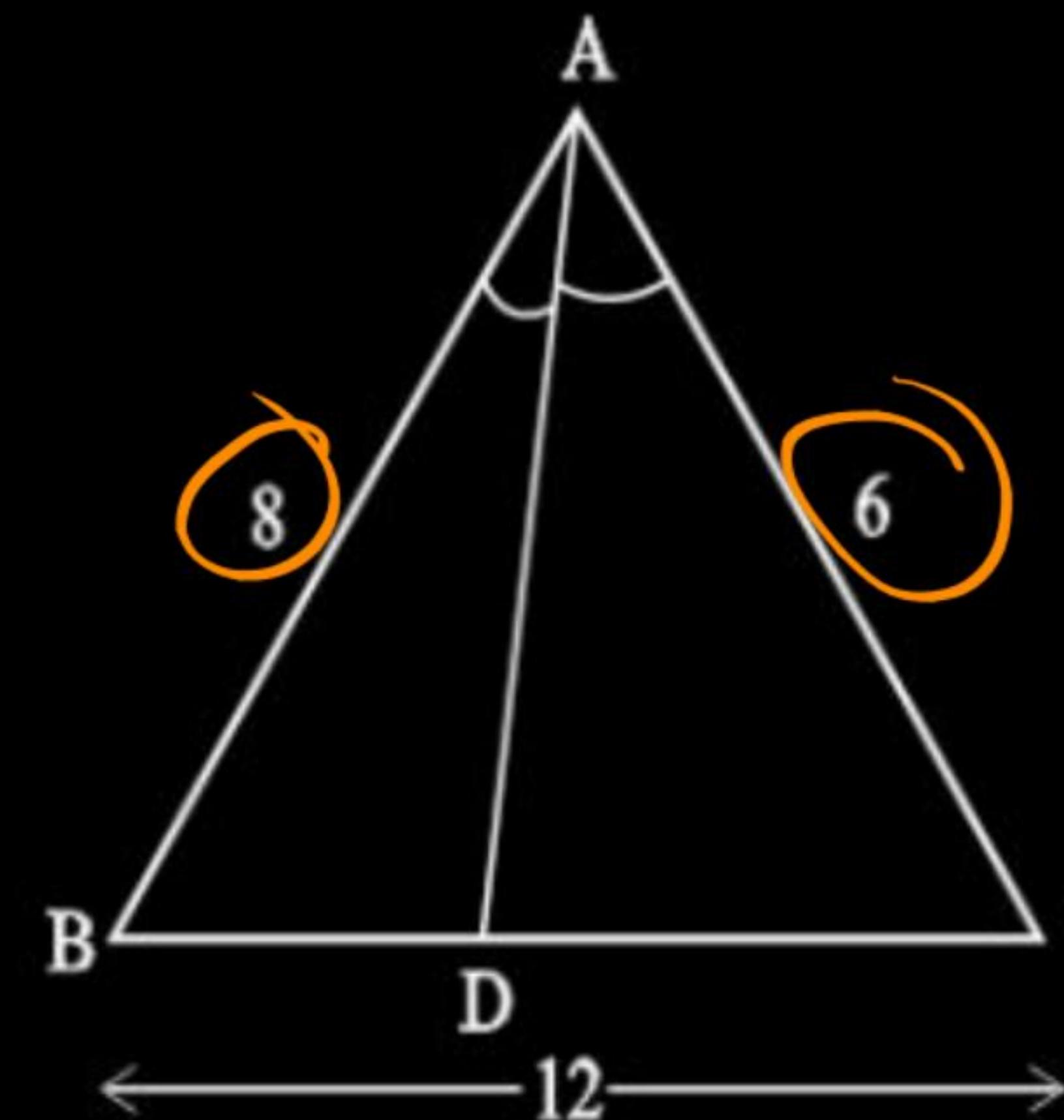
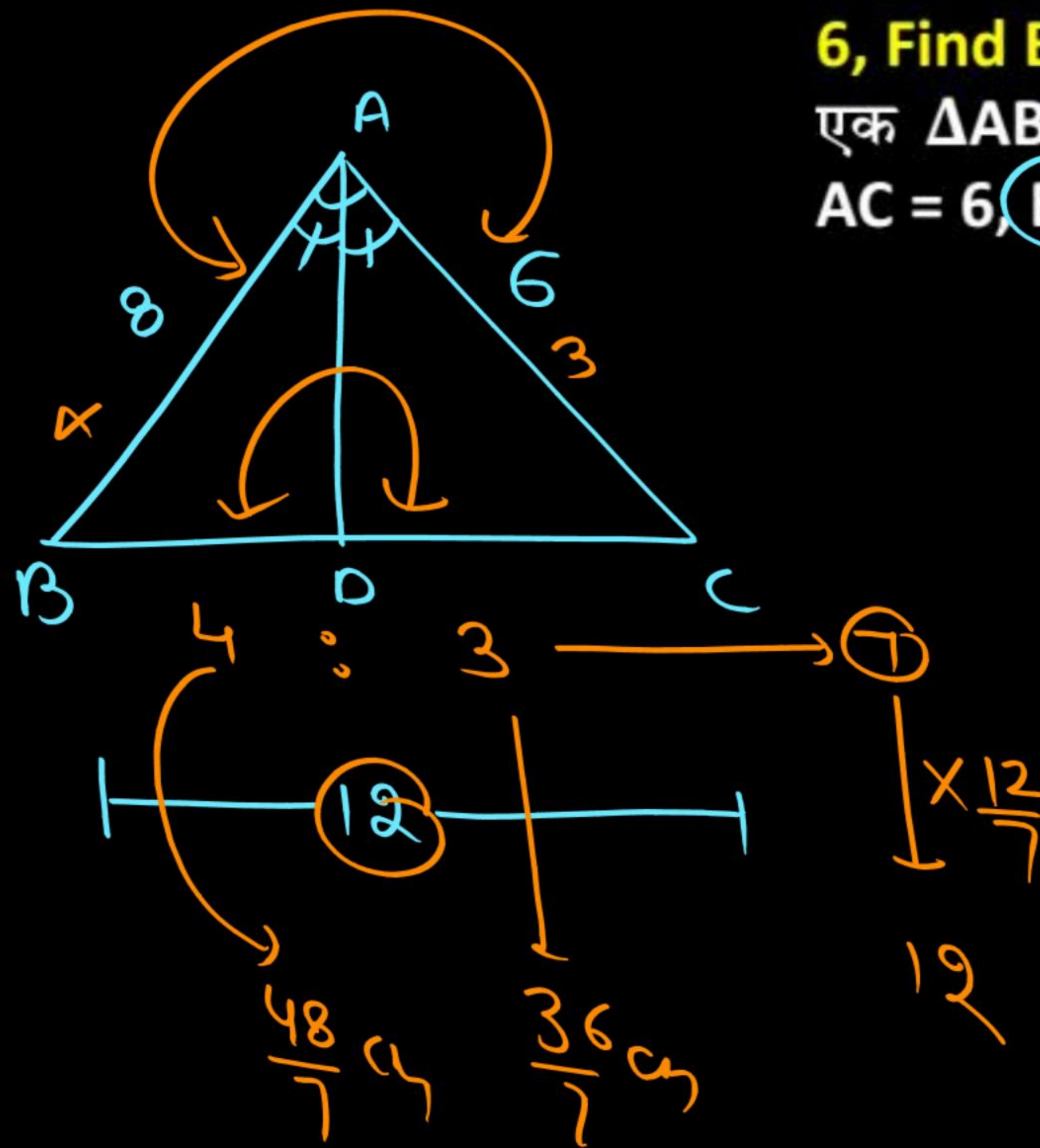
10. In a ΔABC , AD is the internal angular bisector of $\angle A$, AB, BC and CA are 5, 6, and 7 respectively, then find BD, DC.

एक ΔABC में, AD, $\angle A$ का अंतः कोण समद्विभाजक है, AB, BC और CA क्रमशः 5, 6, और 7, तो BD, DC ज्ञात करों।



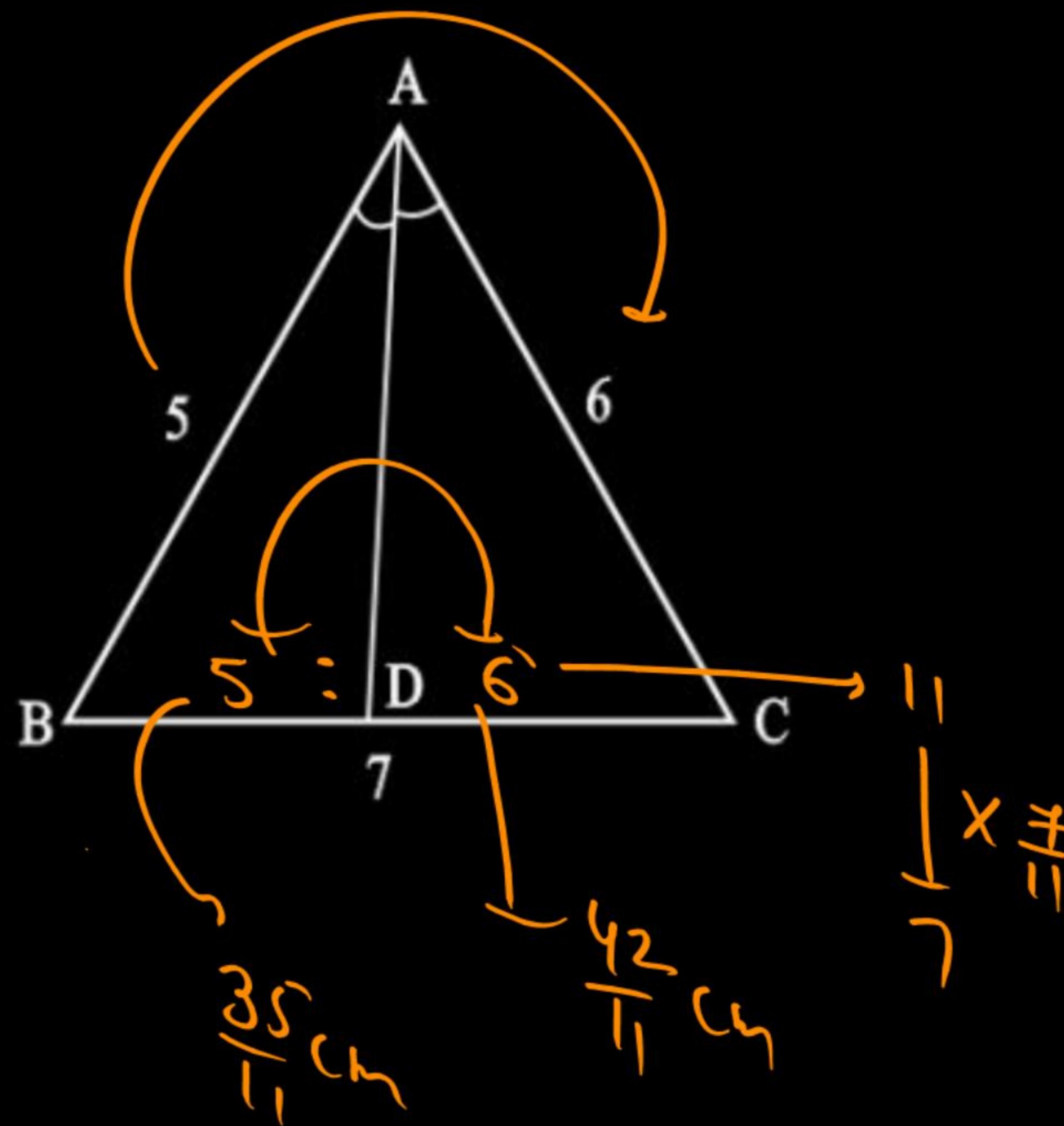
11. In ΔABC , AD is the angular bisector. If $AB = 8$, $AC = 6$, Find BD , DC .

एक ΔABC में, AD एक कोण समद्विभाजक है, यदि $AB = 8$, $AC = 6$, BD , DC ज्ञात करों।



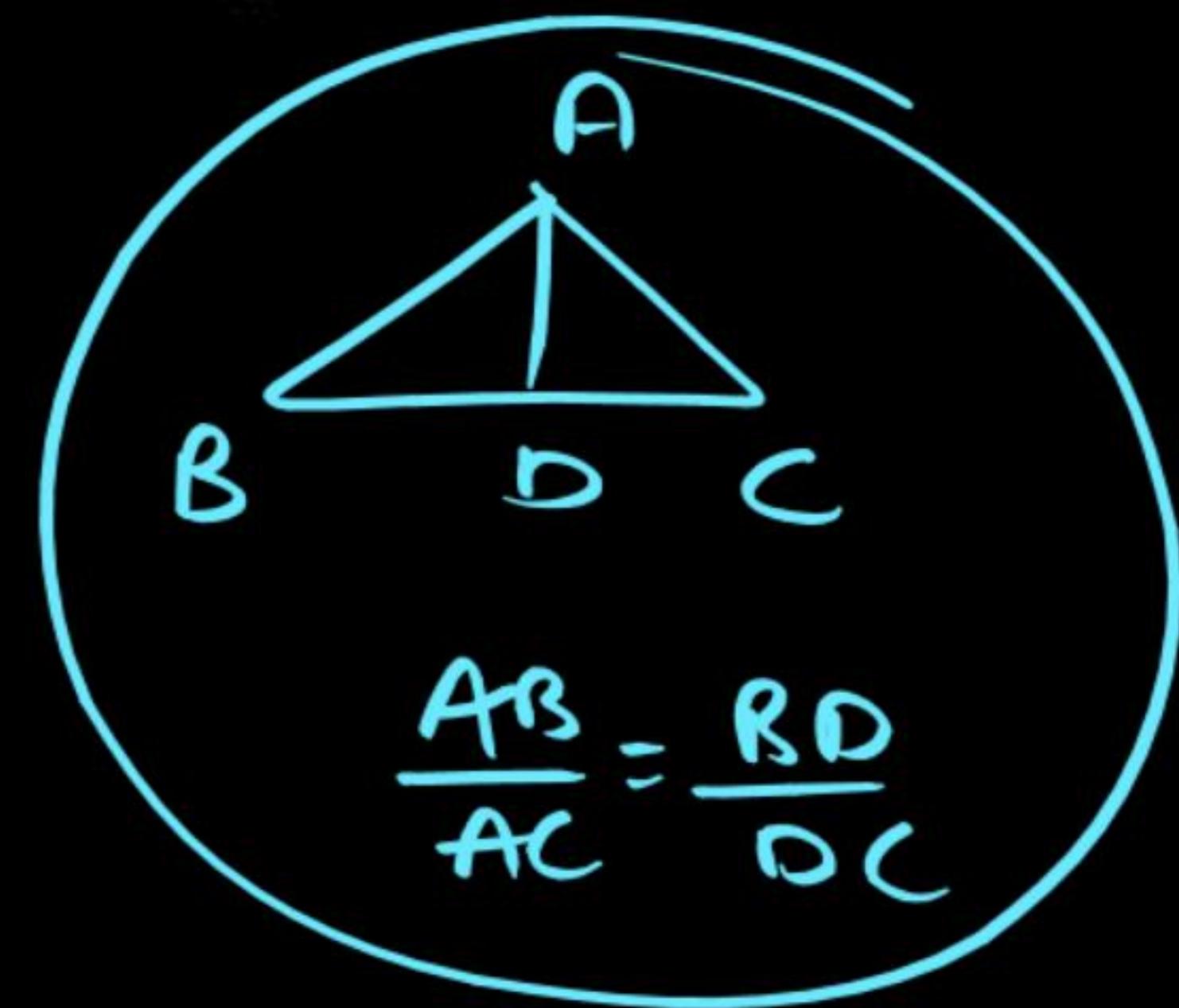
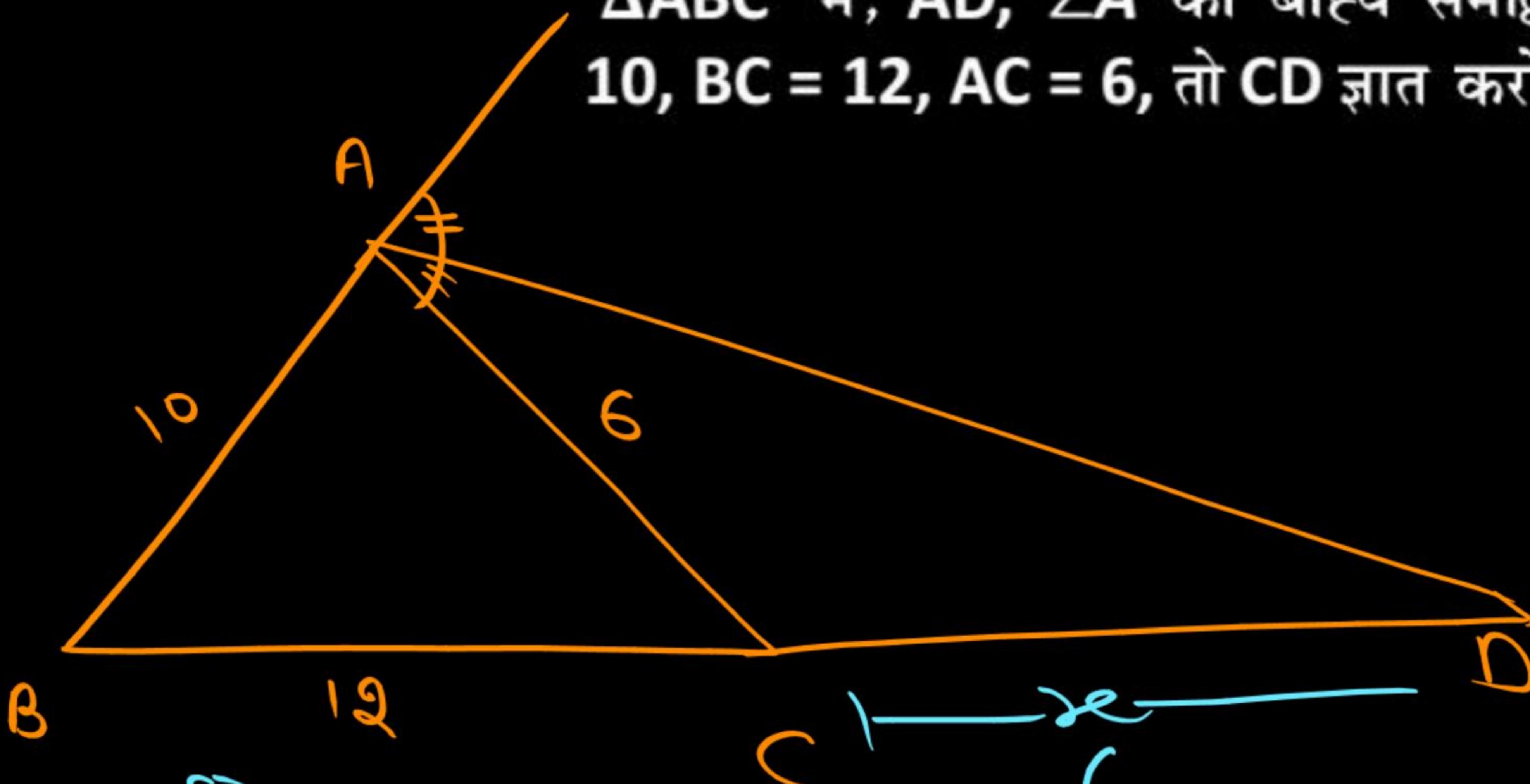
12. In ΔABC , AD is the angular bisector, if $AB = 5$, $AC = 6$, $BC = 7$, then find BD , DC .

एक ΔABC में, AD कोण समद्विभाजक है, यदि $AB = 5$, $AC = 6$, $BC = 7$, तो BD , DC ज्ञात करों।



13. In ΔABC , AD is the external bisector of $\angle A$. If $AB = 10$, $BC = 12$, $AC = 6$, Then find CD.

ΔABC में, AD, $\angle A$ का बाह्य समद्विभाजक है। यदि $AB = 10$, $BC = 12$, $AC = 6$, तो CD ज्ञात करो।



$$\frac{AB}{AC} = \frac{BD}{DC}$$

$$\frac{5+6}{3+6} = \frac{12+x}{x}$$

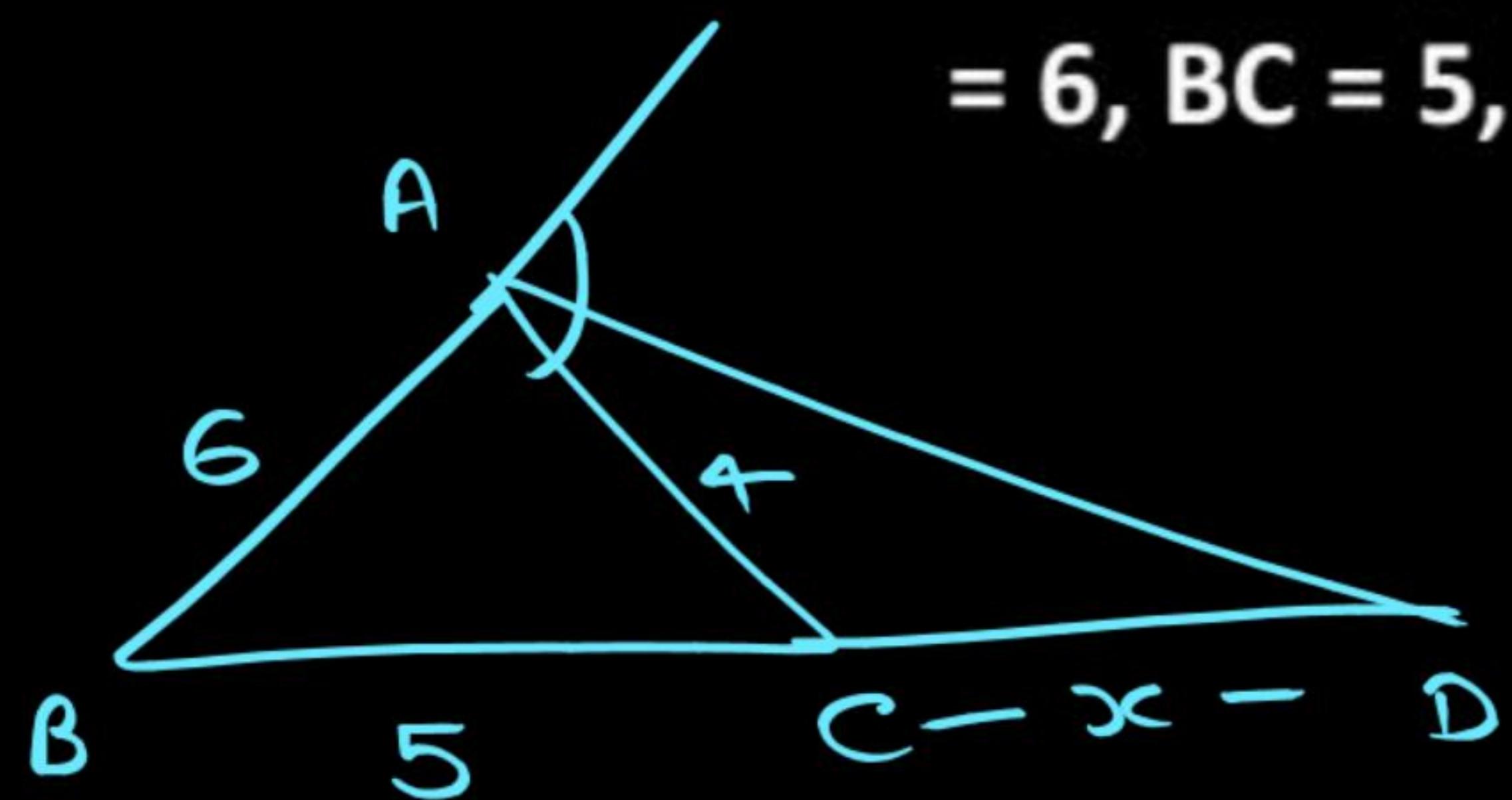
$$5h = 36 + 3h$$

$$2h = 36, h = 18$$

18

14. In ΔABC , AD is the external bisector of $\angle A$. If AB = 6, BC = 5, AC = 4, Then find CD.

ΔABC में, AD, $\angle A$ का बाह्य समद्विभाजक है। यदि AB = 6, BC = 5, AC = 4, तो CD ज्ञात करो।



$$\frac{AB}{AC} = \frac{BD}{DC} \Rightarrow \frac{6}{4} = \frac{5+x}{x}$$

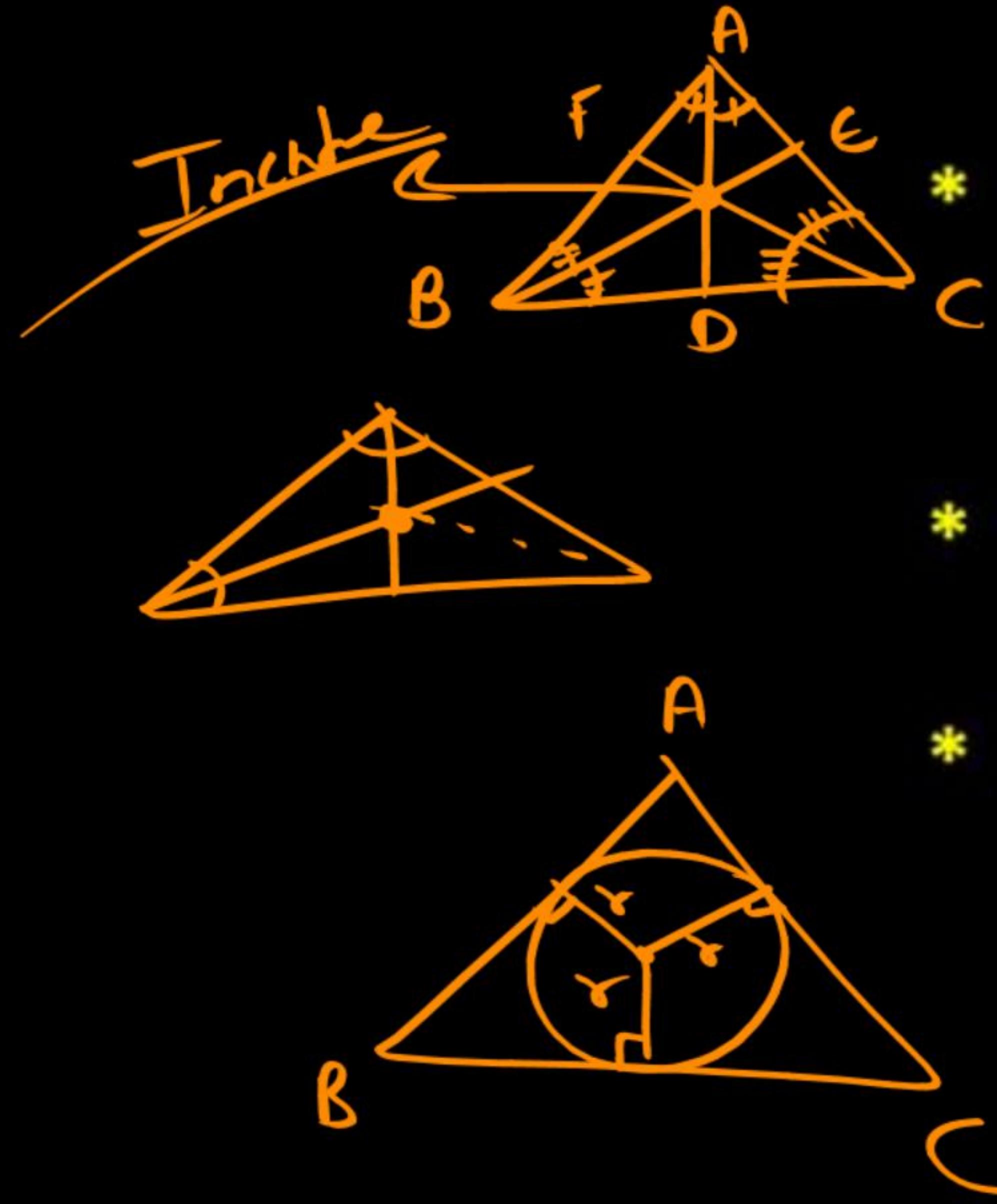
$$3n = 10 + 2n$$

$$\textcircled{n=10}$$



Centres:

1. Incentre  Angular bisector
Excentre 
2. Circumcenter → Perpendicular bisector
3. Orthocentre → Altitude
4. Centroid → Medians



Incentre: (अन्तर्केंद्र)

It is the point of intersection of all the 3 angular bisectors.

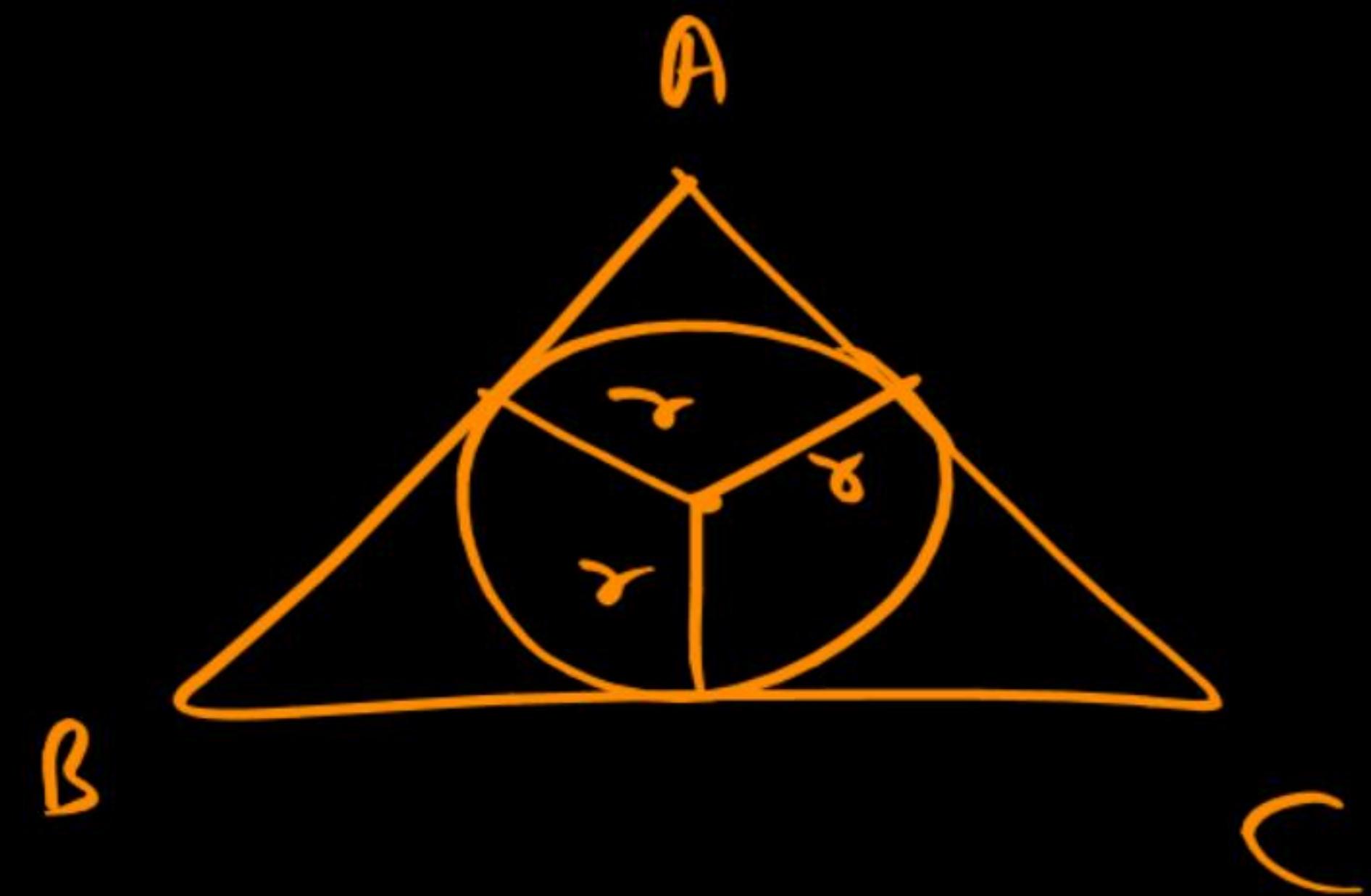
यह तीनों कोणों के समद्विभाजकों का प्रतिच्छेदन बिन्दु है।

Two angular bisector can also form incentre.

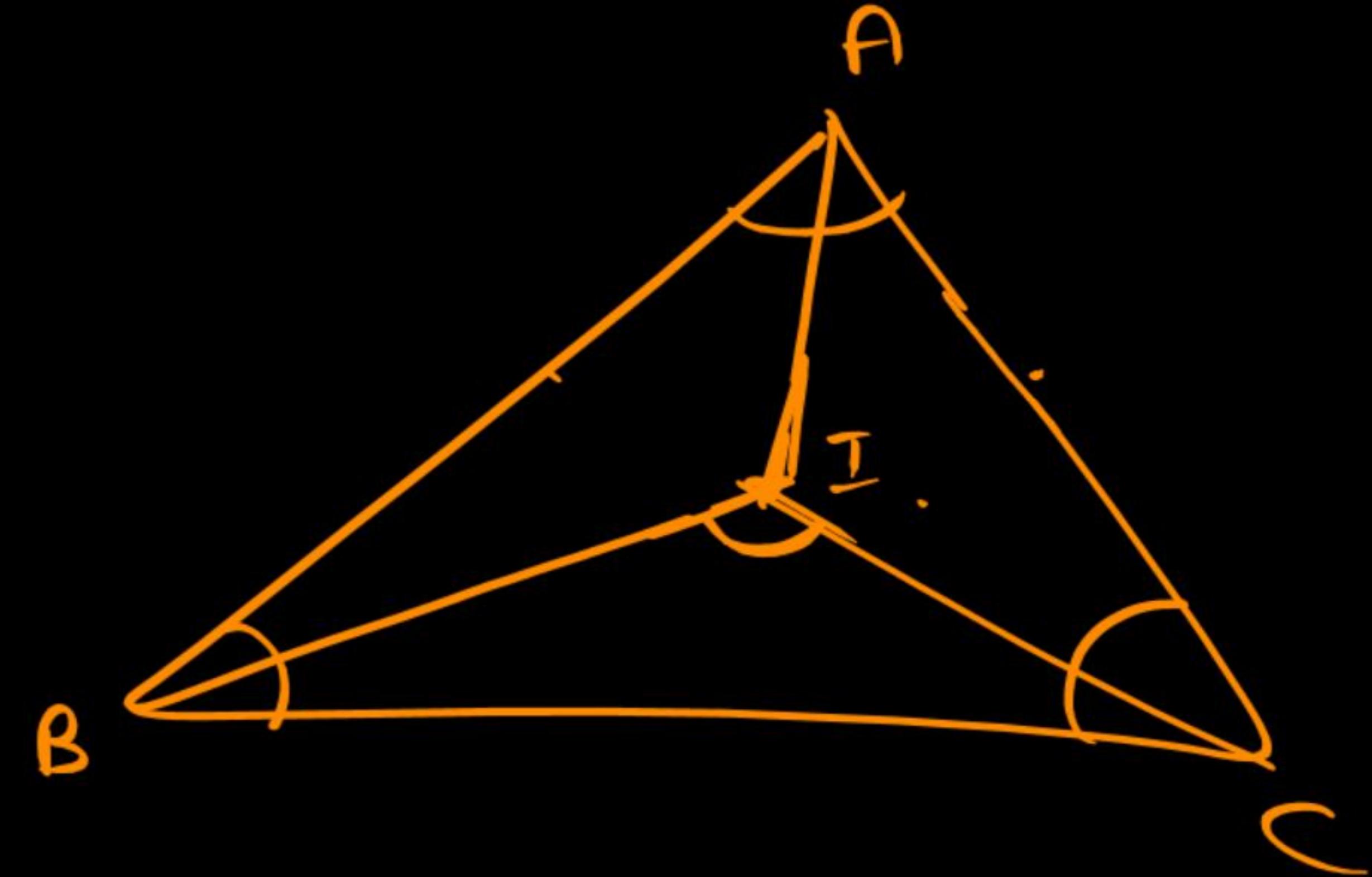
दो कोणीय समद्विभाजक भी अन्तः केन्द्र बना सकते हैं।

The perpendicular distance from the centre to the side of the triangle is always same and that is known as radius of the circle

केन्द्र से त्रिभुज की लम्बवत् दूरी हमेशा समान होती है और इसे वृत्त की त्रिज्या के रूप में जाना जाता है।



$$\gamma = \frac{\text{Area of } \triangle}{\text{Semi-perimeter}}$$



$$\angle BIC = 90 + \frac{\angle BAC}{2}$$

$$\angle AIC = 90 - \frac{\angle ABC}{2}$$

$$\angle AIB = 90 - \frac{\angle ACB}{2}$$



15. In a ΔABC , O is an incentre. If $\angle BOC = 125^\circ$, then find the value of $\angle BAC$.

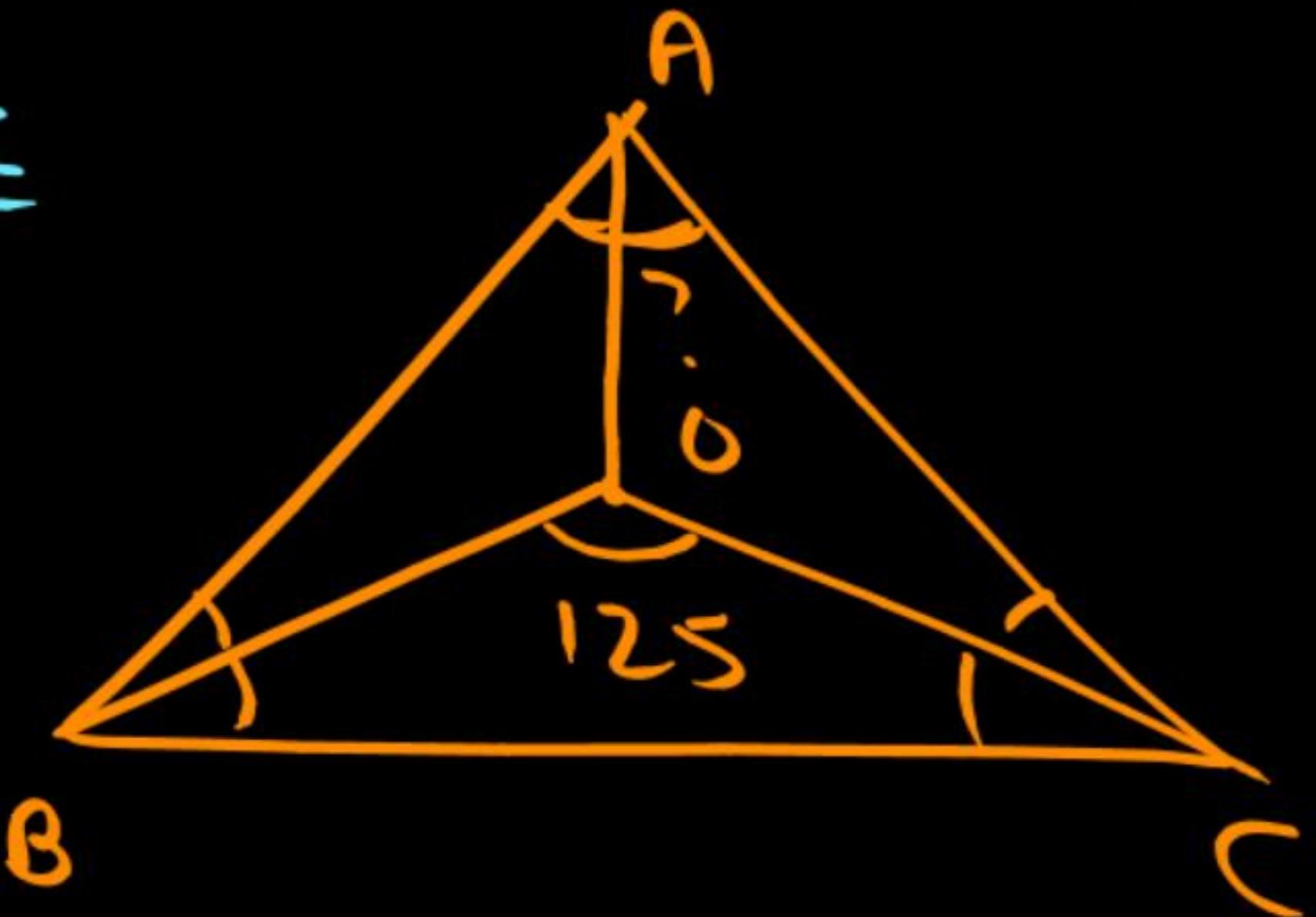
एक ΔABC में, O अन्तः केन्द्र है। यदि $\angle BOC = 125^\circ$ है, तो $\angle BAC$ का मान ज्ञात कीजिए।

$$\angle BOC = 90 + \frac{\angle BAC}{2}$$

$$125 = 90 + \frac{\angle BAC}{2}$$

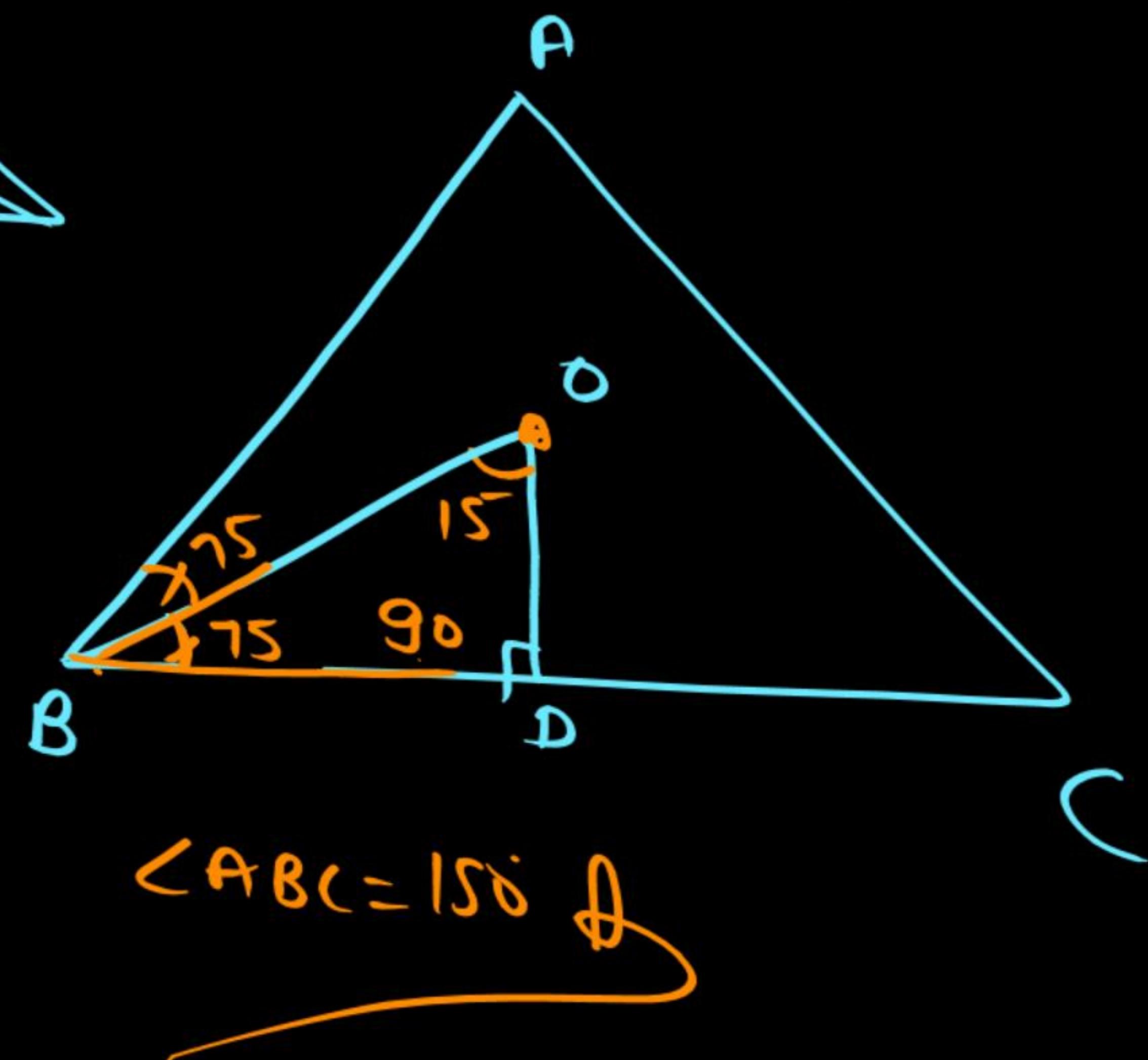
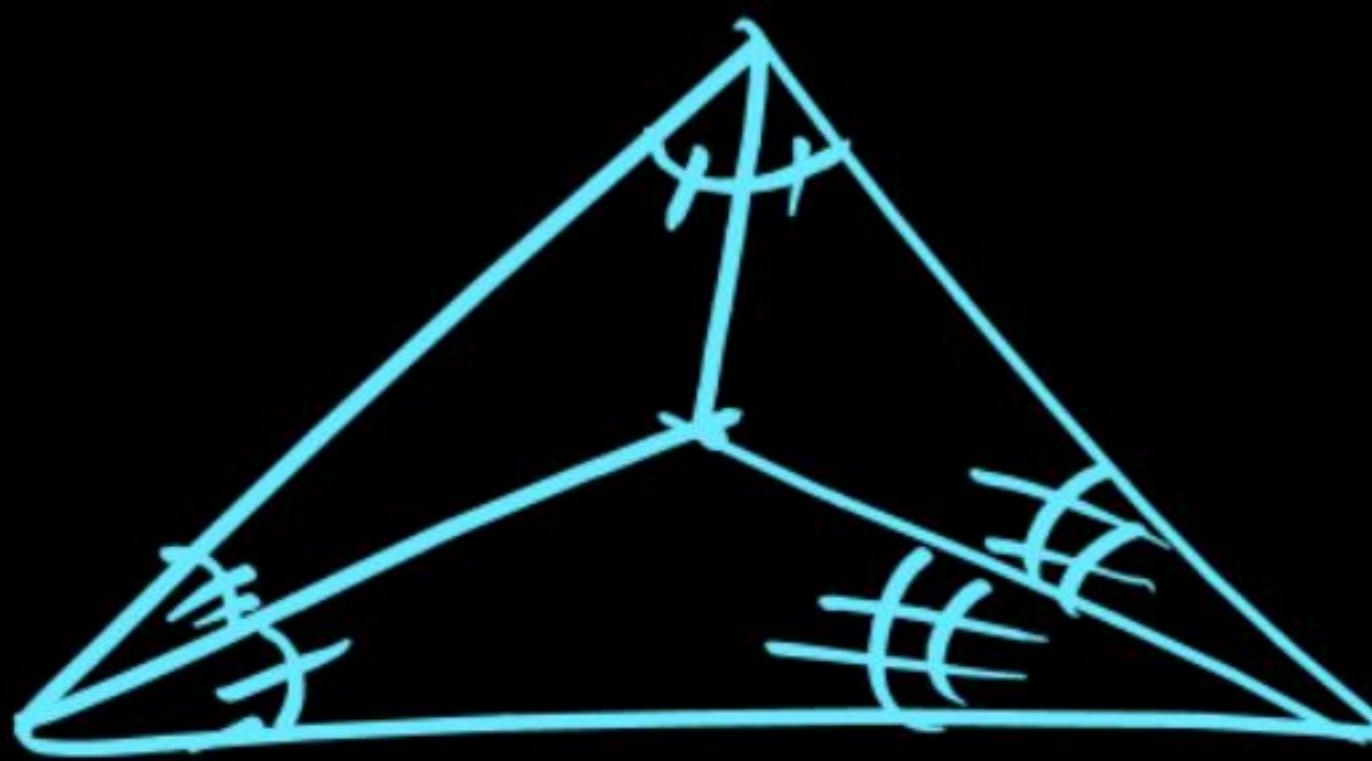
$$35 = \frac{\angle BAC}{2}$$

$$\angle BAC = 70$$



16. In a ΔABC , O is the incentre and OD is perpendicular on BC. If $\angle BOD = 15^\circ$, Find $\angle ABC$?

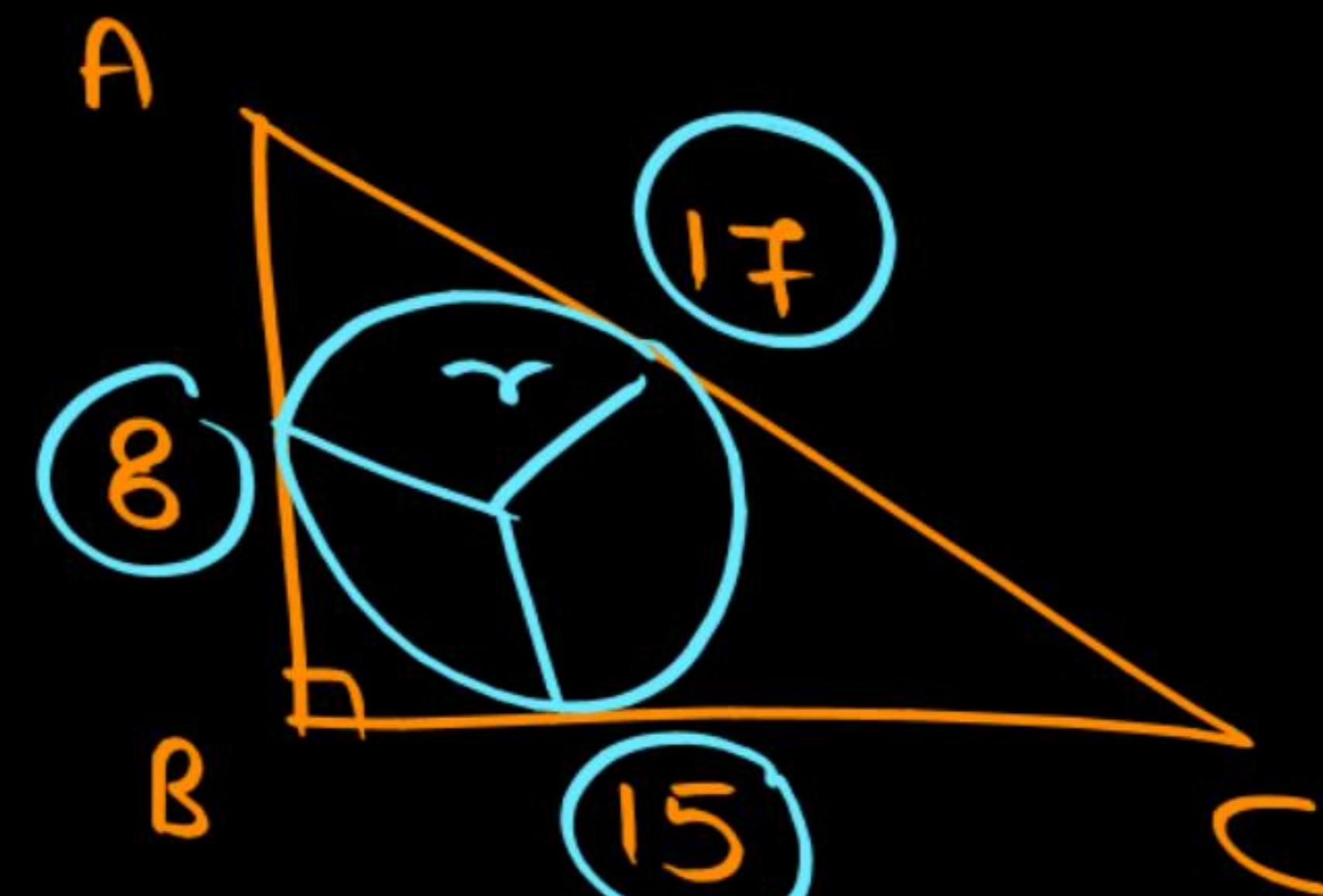
एक ΔABC में, O अन्तः केन्द्र है। और OD, BC पर लम्ब है।
यदि $\angle BOD = 15^\circ$, $\angle ABC$ का पता लगाया।



$$\angle ABC = 150^\circ$$

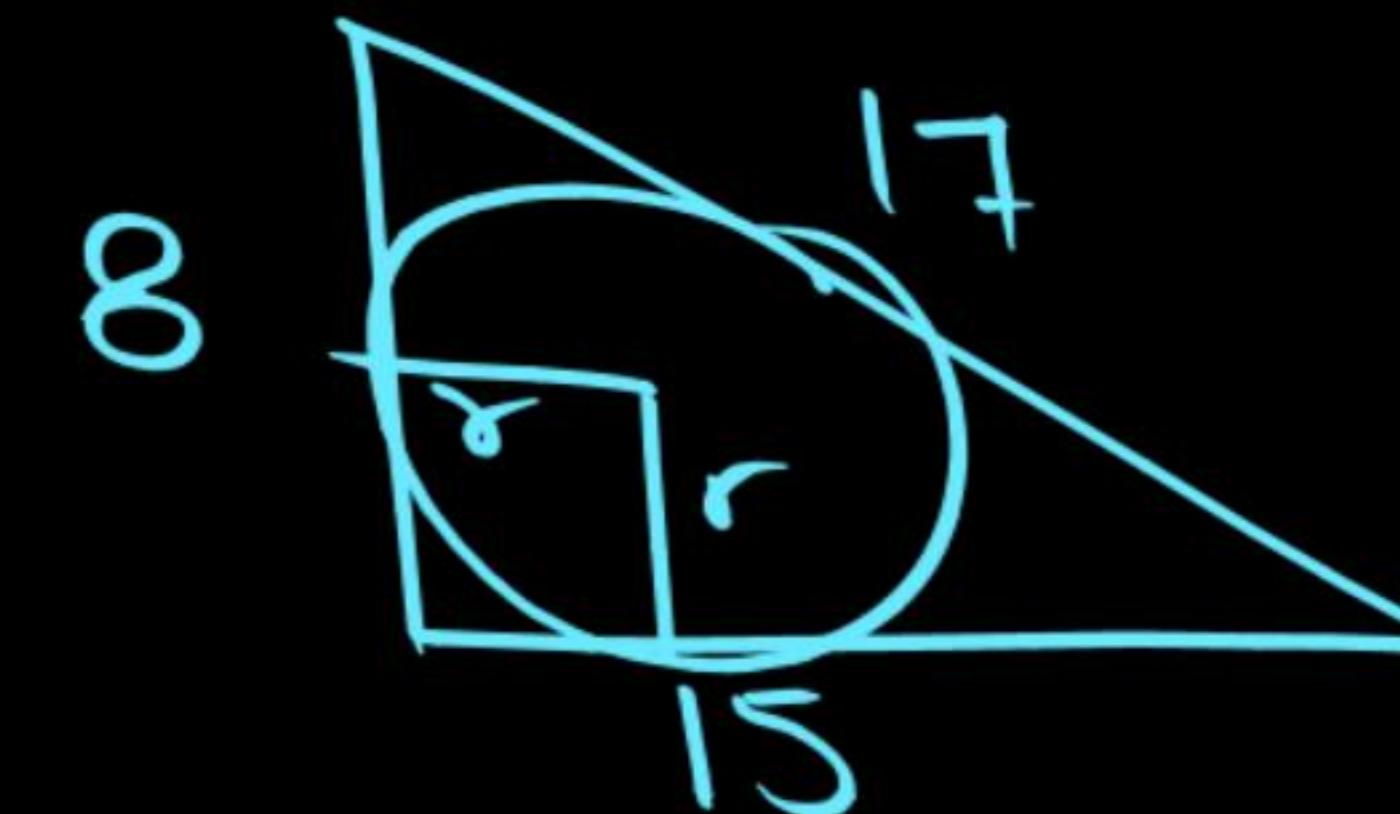
17. In a right angle ΔABC , the perpendicular and base sides are 8 and 15 cm, then, find the radius of incircle.

एक समकोण में ΔABC , लम्ब तथा आधार की भुजायं 8 सेमी. तथा 15 सेमी. है, तो अन्तःवृत्त की त्रिज्या ज्ञात करें।

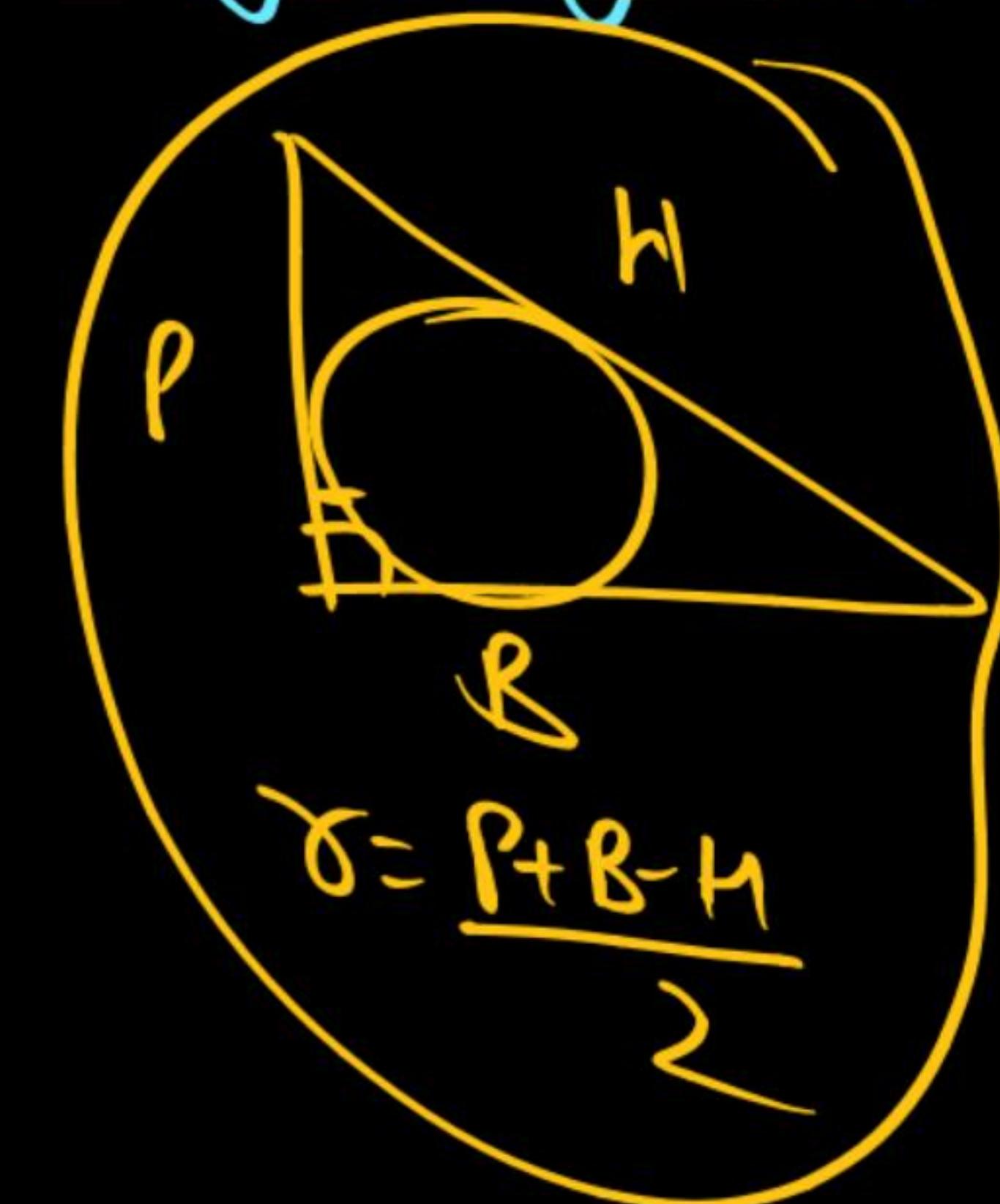


$$\begin{aligned}
 r &= \frac{A_{\text{of } \Delta}}{S \cdot P} \\
 &= \frac{\frac{1}{2} \times 15 \times 8}{\frac{1}{2} \times 17 \times 13} = \frac{120}{170} = 3
 \end{aligned}$$

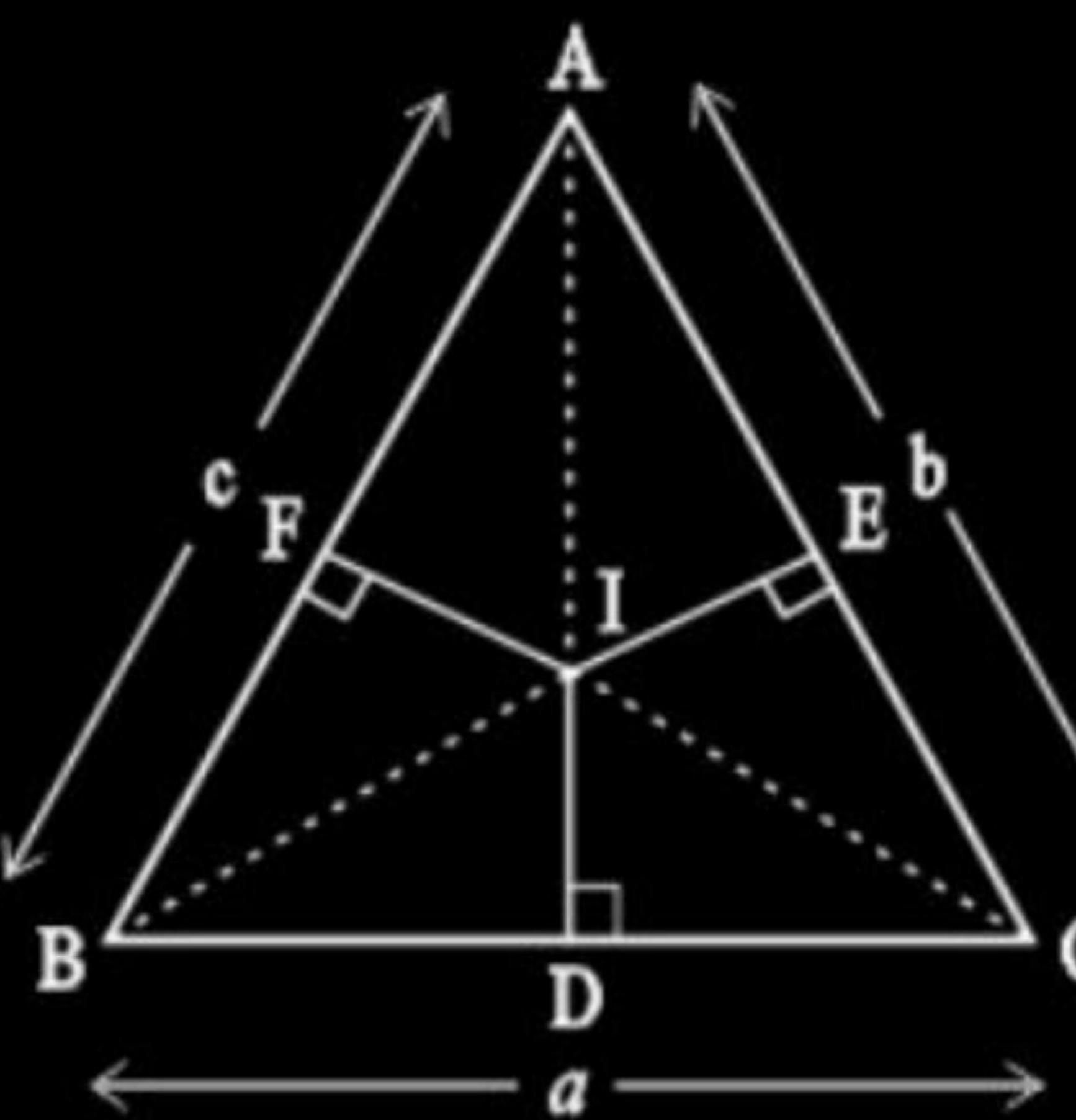
Trick (Valid for Right Angle)



$$\begin{aligned}
 r &= \frac{8+15-17}{2} \\
 &= \frac{6}{2} = 3
 \end{aligned}$$



$$r = \frac{P+B-H}{2}$$

Note:

$$AI : ID = (b + c) : a$$

$$BI : IE = (a + c) : b$$

$$CI : IF = (a + b) : c$$



18. In a ΔABC , O is the incentre, If $AO : OE = 5 : 4$, $CO : OD = 3 : 2$, find $BO : OF$.

एक ΔABC में, अंतः केन्द्र है, यदि $AO : OE = 5 : 4$, $CO : OD = 3 : 2$, $BO : OF$ ज्ञात करों।



19. In ΔABC , O is the incentre, $AO : OD = 5 : 2$, $BO : OE = 3 : 2$,
then find $CO : OF$.

एक ΔABC में, O अन्तः केन्द्र है, $AO : OD = 5 : 2$, $BO :$
 $OE = 3 : 2$, तो $CO : OF$ ज्ञात कीजिए।



Excentre:

20. In ΔABC , O is excentre, if $\angle ABC = 60^\circ$, find $\angle AOC$.

एक ΔABC में, O बाह्य केन्द्र है। यदि $\angle ABC = 60^\circ$,
 $\angle AOC$ ज्ञात करों।

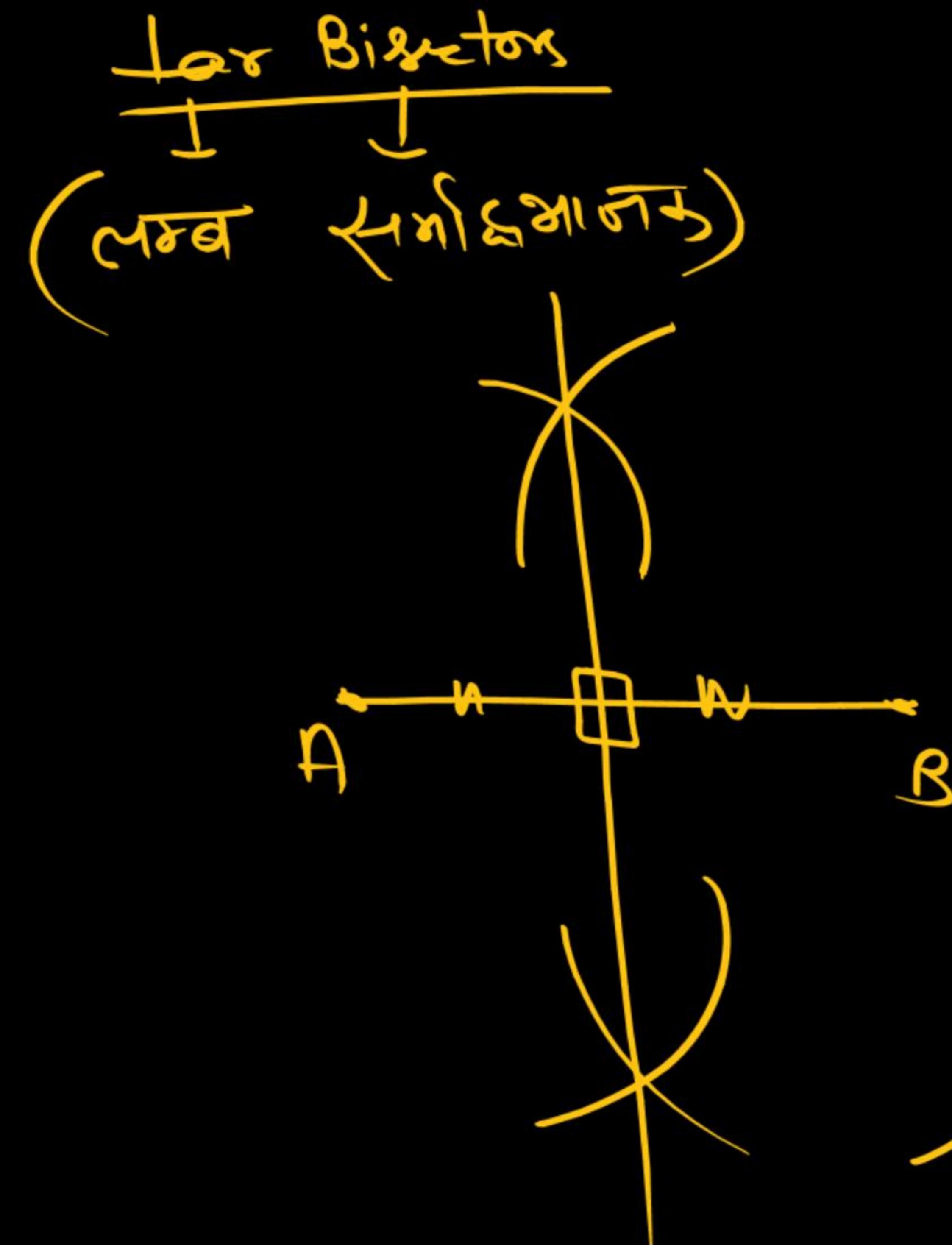


Example:

If I and X are the incenter and ex-center of a ΔABC and $\angle AXC = 48^\circ$, then find the measure of $\angle AIC$.

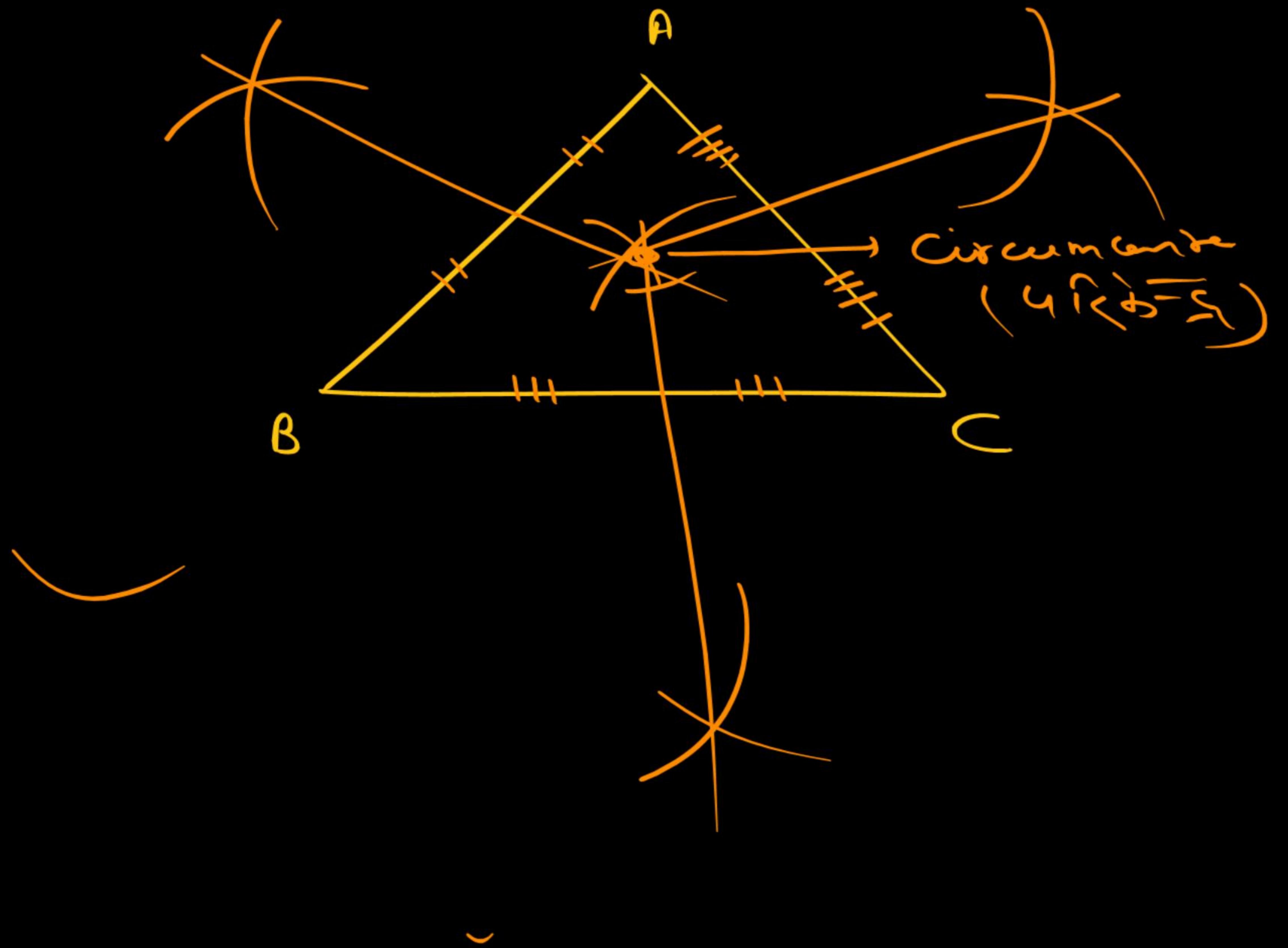
- (a) 144°
- (b) 132°
- (c) 120°
- (d) 108°

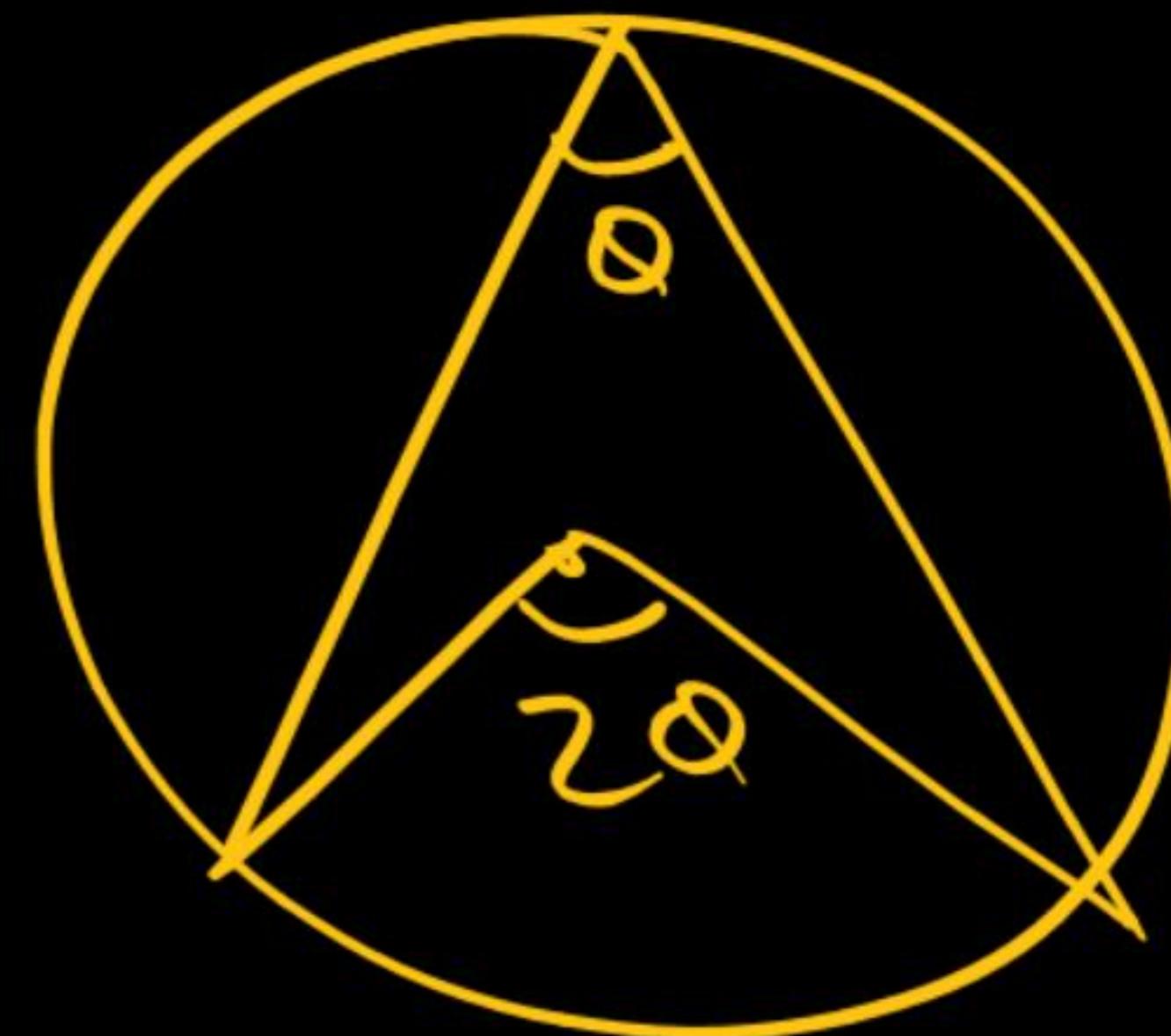
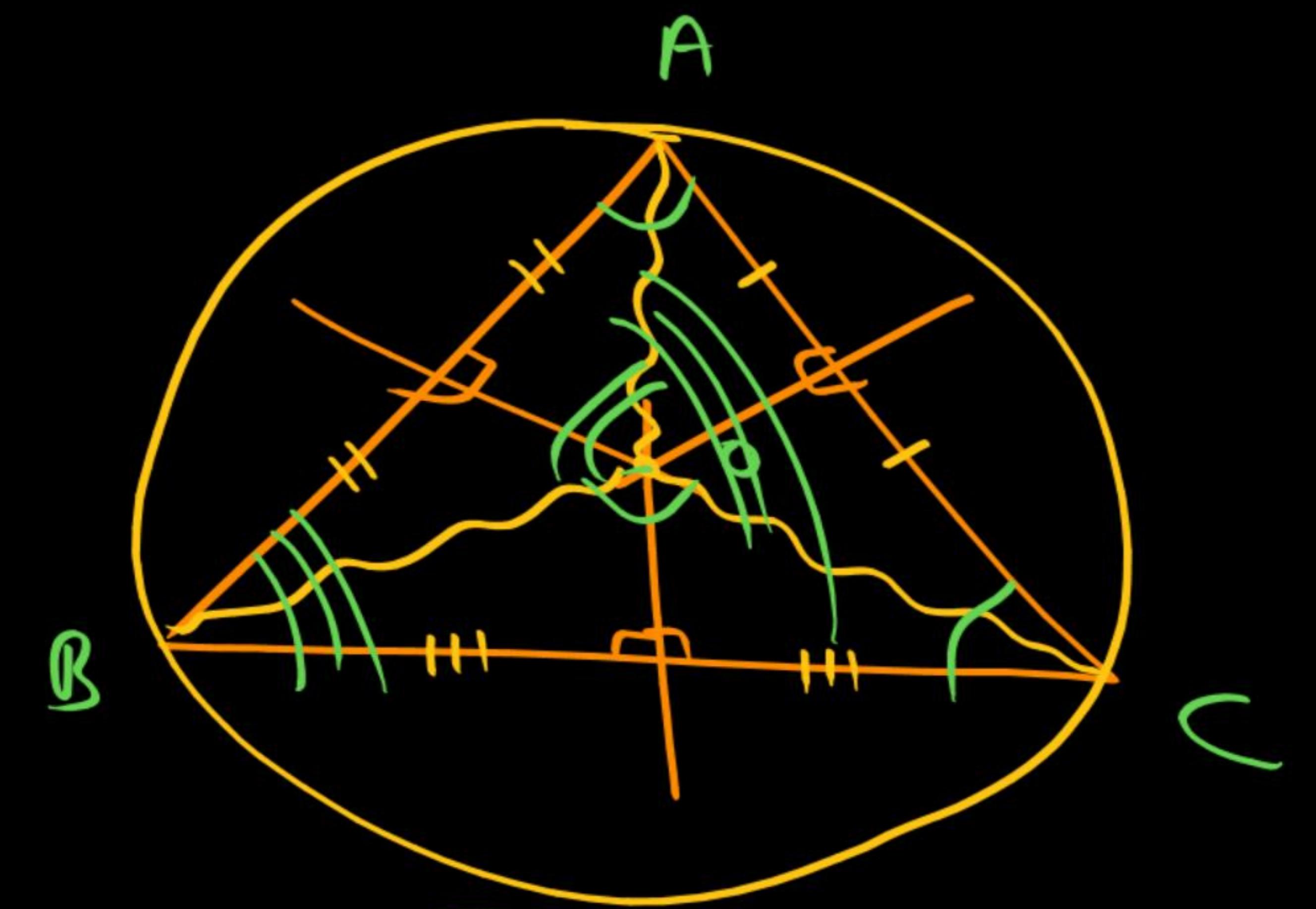
Circumcentre \rightarrow Side (or Bisector)
(परिकेन्द्र)



Circumcentre:

- * It is the point of intersection of all the three side perpendicular bisectors.
यह तीनों भुजाओं के सभी लम्ब समद्विभाजकों का प्रतिच्छेदन बिन्दु है।
- * All sides of the triangle are divided into two equal parts.
त्रिभुज की सभी भुजाय दो बराबर भागों में विभाजित होती है।
- * The distance between centre to the vertices of the triangle is always same, called radius of circumcircle.
त्रिभुज के केन्द्र से शिखर की दूरी हमेशा समान होती है, जिसे त्रिज्या कहा जाता है।

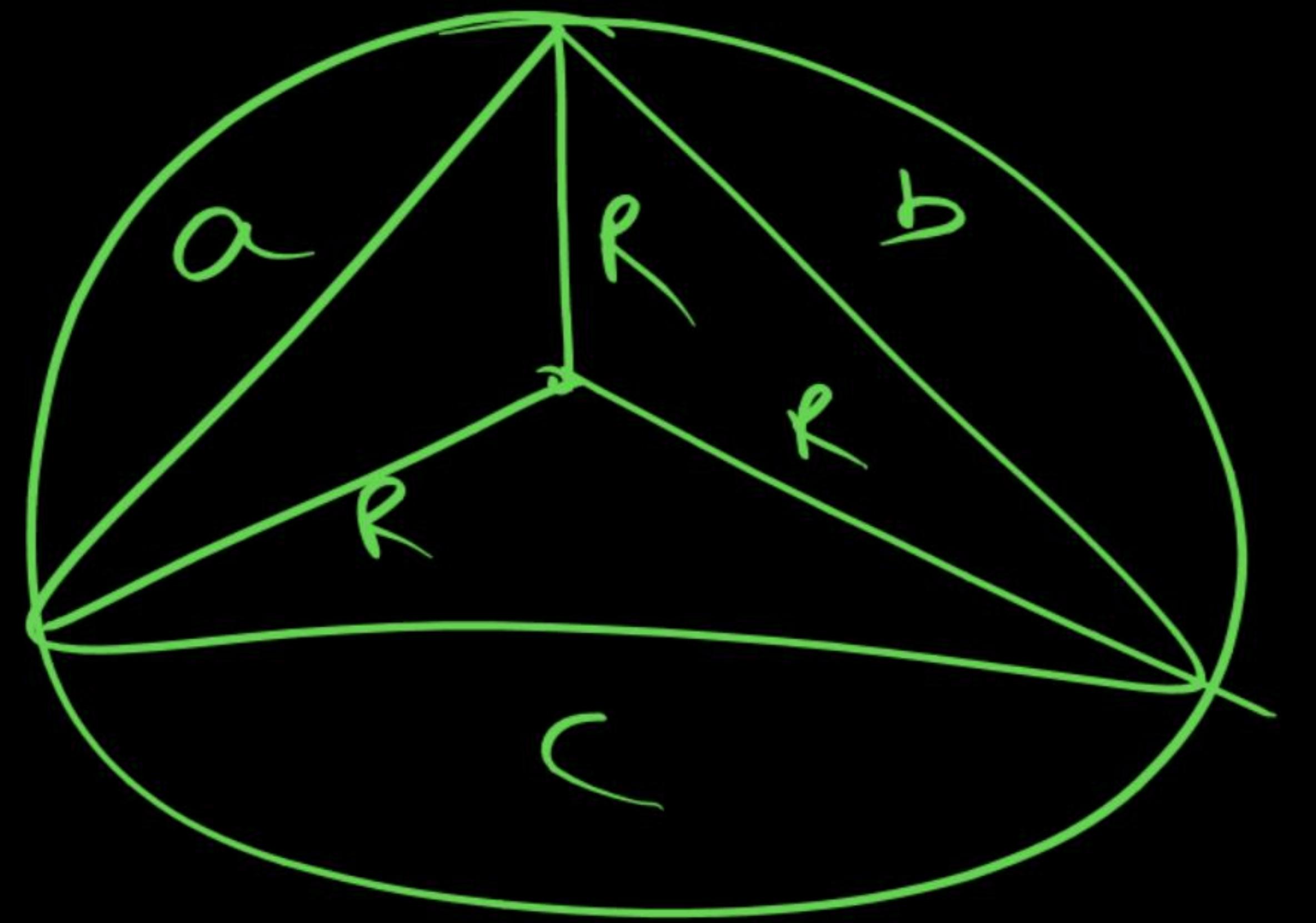




$$\angle BOC = 2 \angle BAC$$

$$\angle AOC = 2 \angle ABC$$

$$\angle AOB = 2 \angle ACB$$

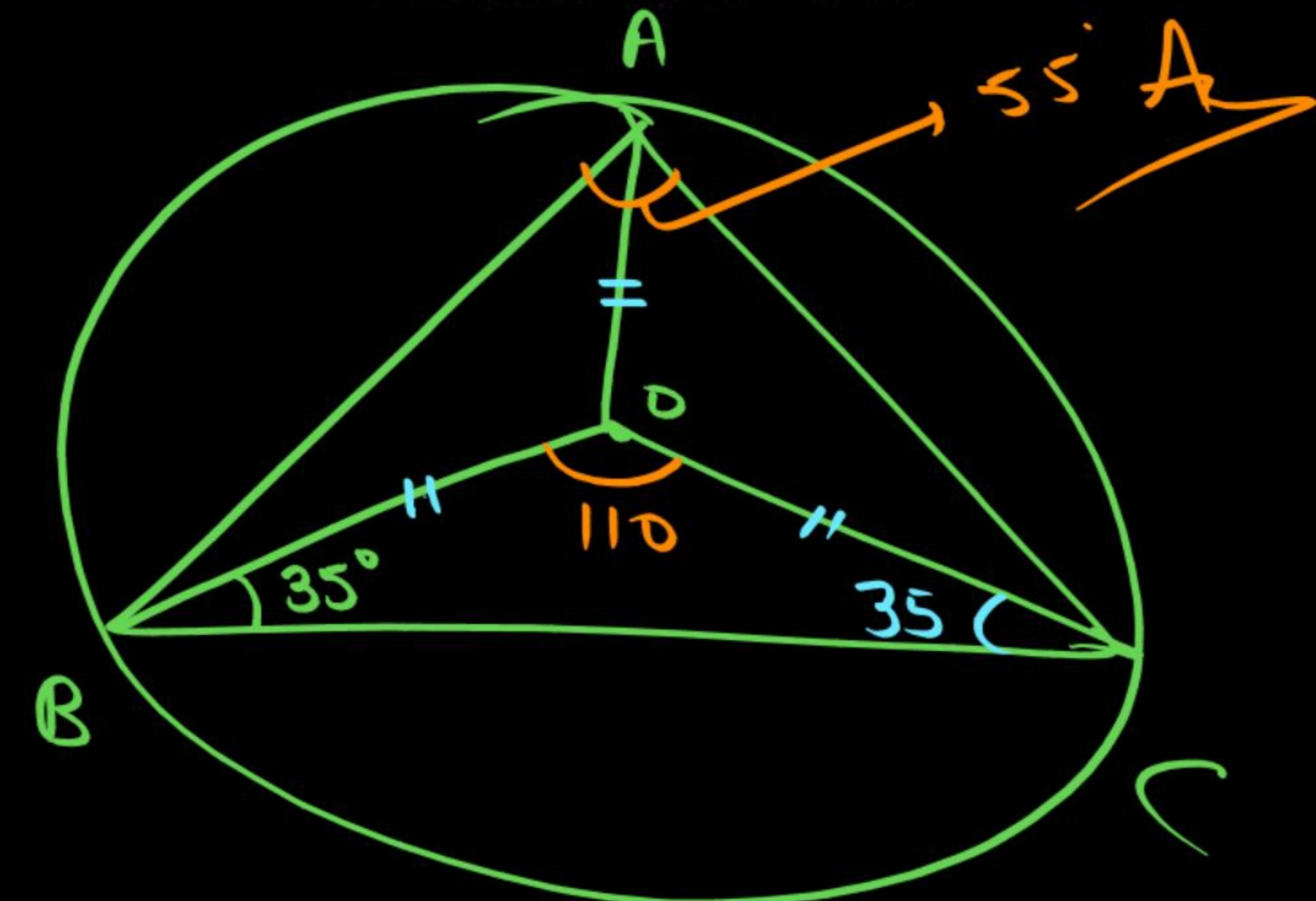


$$R = \frac{abc}{4A}$$

21. In a ΔABC , O is the circumcentre and $\angle OBC = 35^\circ$. Find $\angle BAC$.

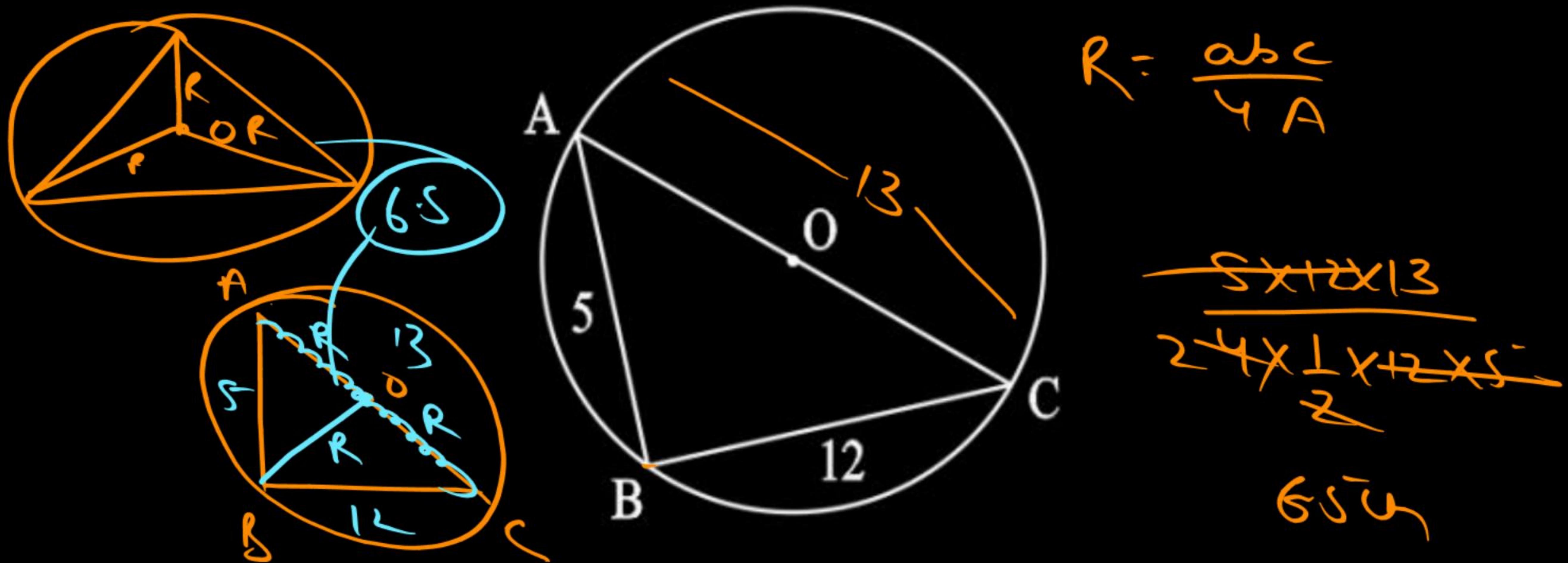


एक ΔABC में, O परिकेन्द्र है और $\angle OBC = 35^\circ$ । $\angle BAC$ ज्ञात करें।

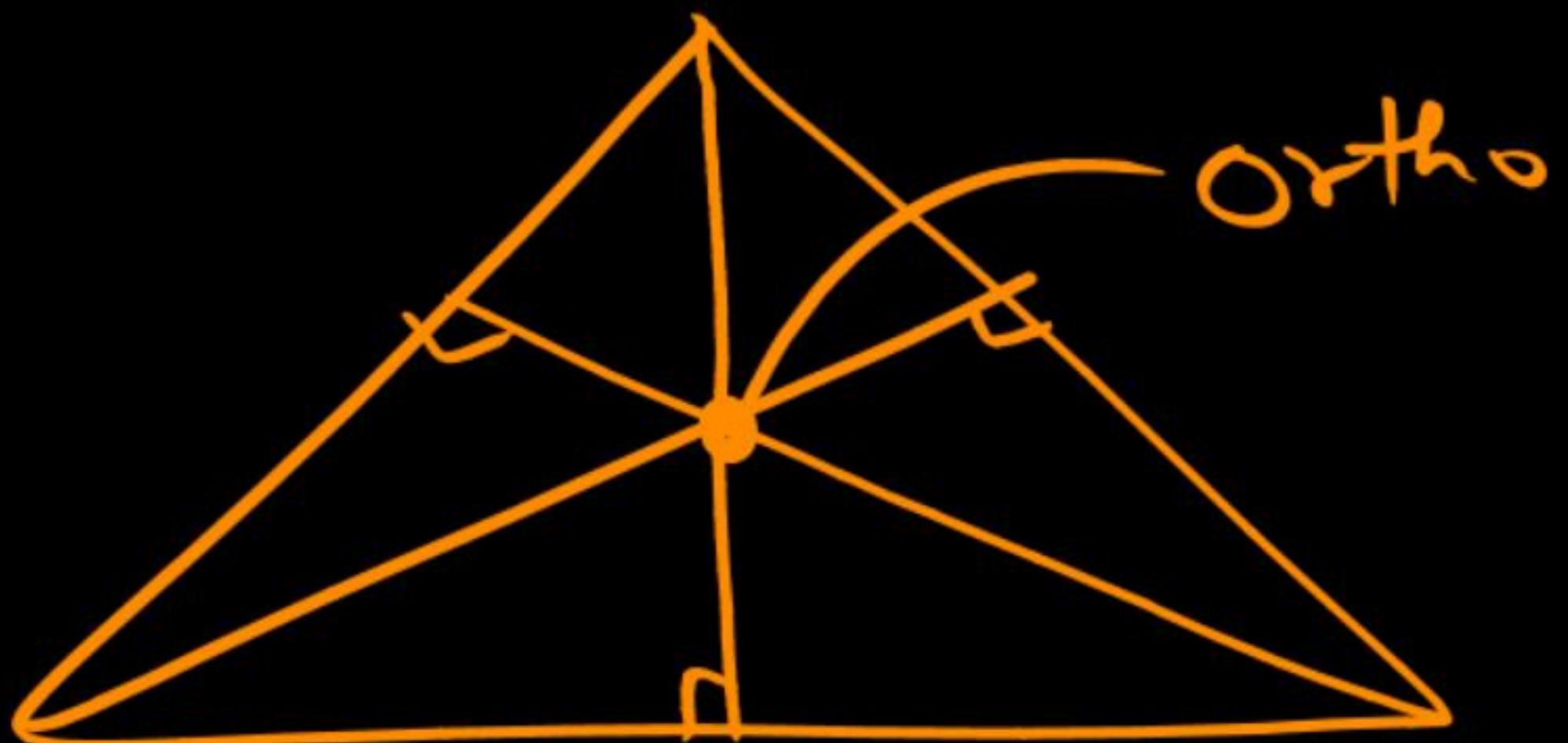


22. In this given figure, O is the circumcentre. In ΔABC , $AB = 5$ units, $BC = 12$ units, then find the radius.

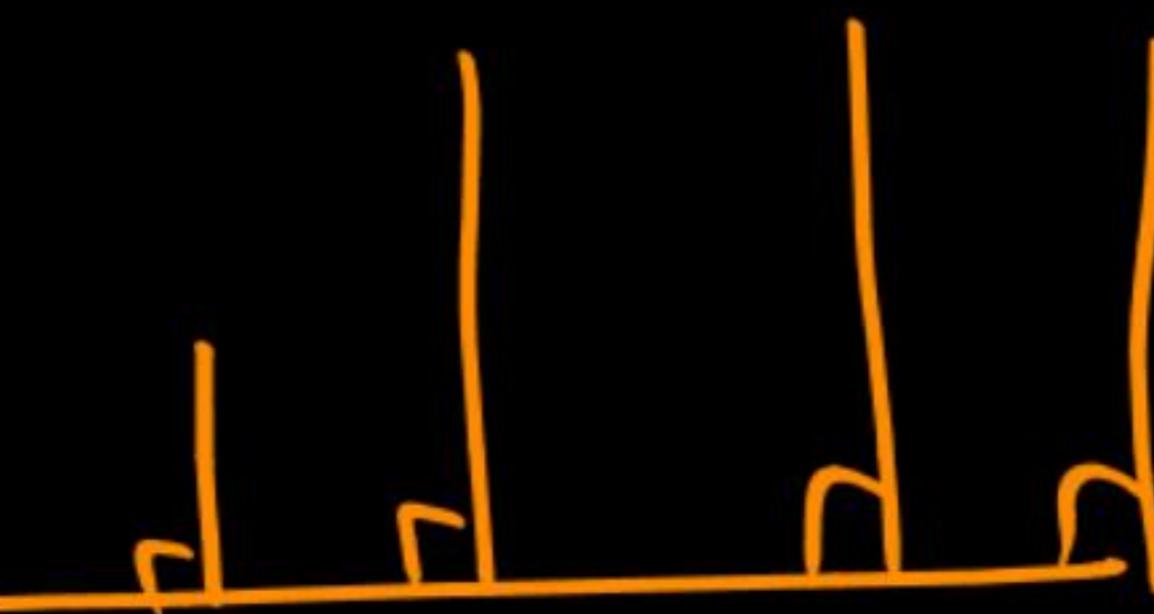
दी गये आकृति में, O परिकेन्द्र है। ΔABC में, $AB = 5$ इकाई,
 $BC = 12$ इकाई, तो त्रिज्या ज्ञात करों।



Orthocentre (ଓর্থোসেন্ট্ৰ)



Altitude
(ওল্টিড্ৰ)

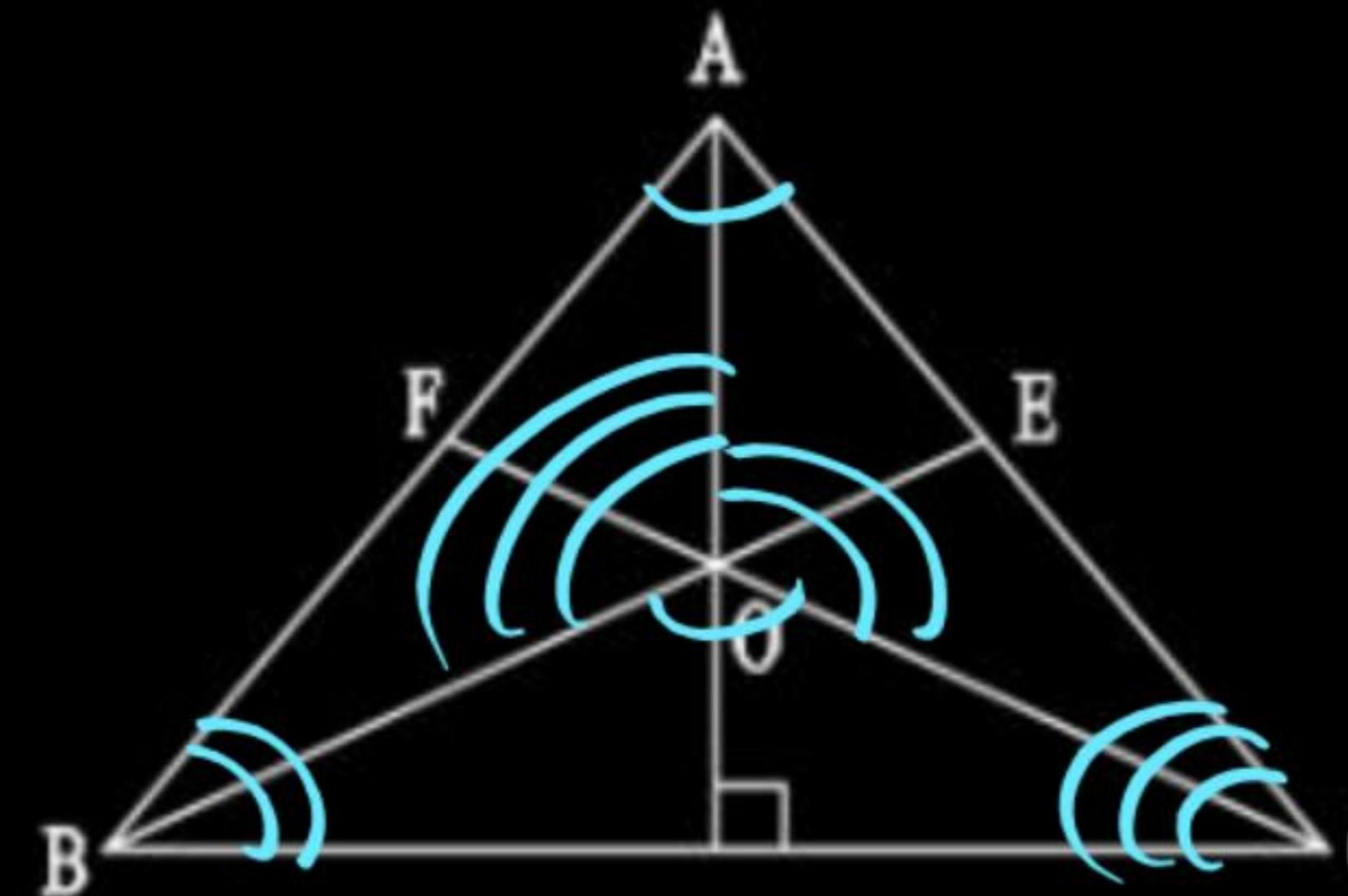


Orthocentre:

It is the point of intersection of all the 3 altitudes of triangle.

यह त्रिभुज के तीनों लम्ब केन्द्रों का प्रतिच्छेदन बिन्दु है।

$$\begin{aligned} \cancel{\angle BAC + \angle BOC = 180^\circ} \\ \cancel{\angle ABC + \angle AOC = 180^\circ} \\ \cancel{\angle ACB + \angle AOB = 180^\circ} \end{aligned}$$



In quadrilateral AEOF,

$$\angle x + \angle y = 180^\circ$$

$$\angle FOE = \angle BOC = y^\circ$$

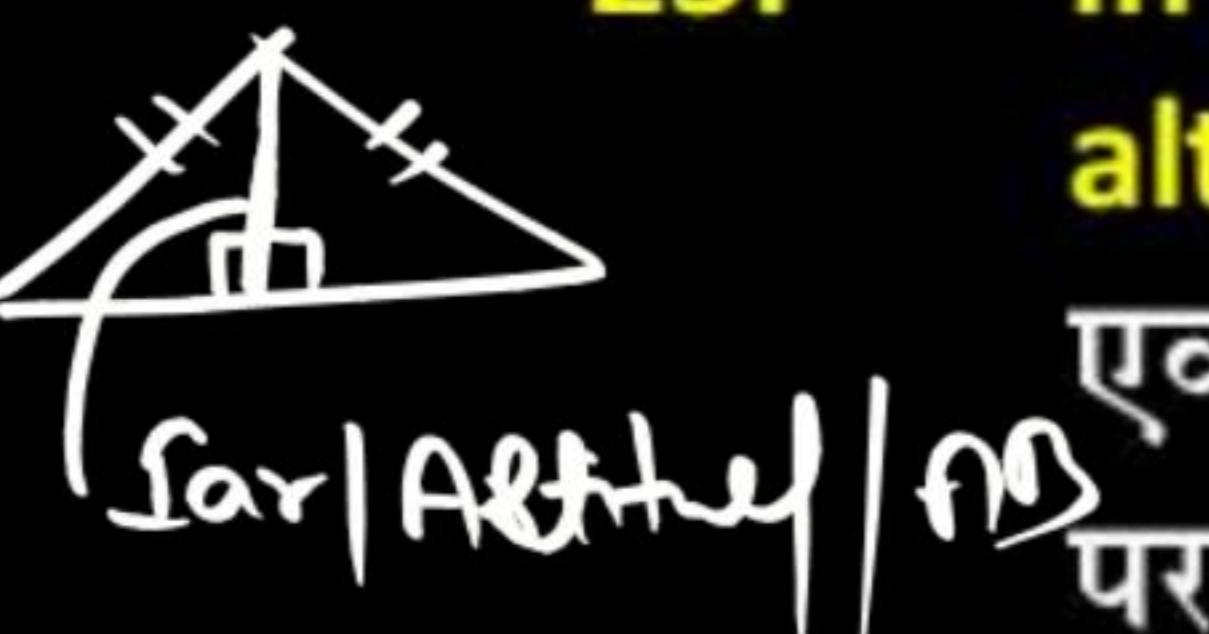
[Vertically Opposite Angles]

$$\text{So, } \angle BOC + \angle BAC = 180^\circ$$

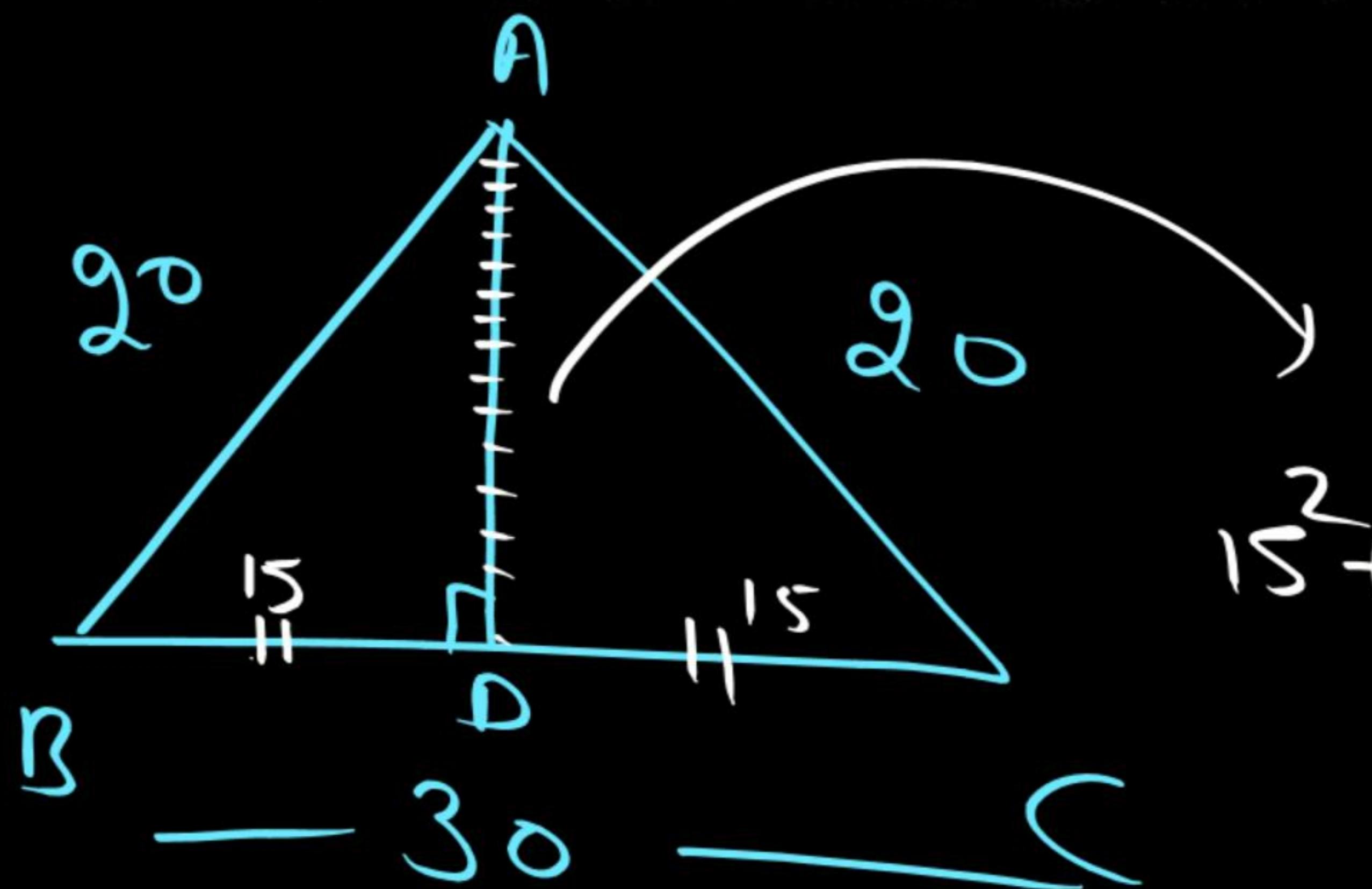
$$\text{or, } \angle AOC + \angle ABC = 180^\circ$$

$$\text{or, } \angle ACB + \angle AOB = 180^\circ$$

23. In a ΔABC , if $AB = 20$, $AC = 20$, $BC = 30$. Find the length of altitude on side BC.



एक ΔABC में, यदि $AB = 20$, $AC = 20$, $BC = 30$ भुजा BC पर लम्ब की लम्बाई ज्ञात करों।



$$15^2 + AD^2 = 20^2$$

$$AD^2 = 400 - 225$$

$$AD^2 = 175$$

$$\text{Ans} = 5\sqrt{7}$$

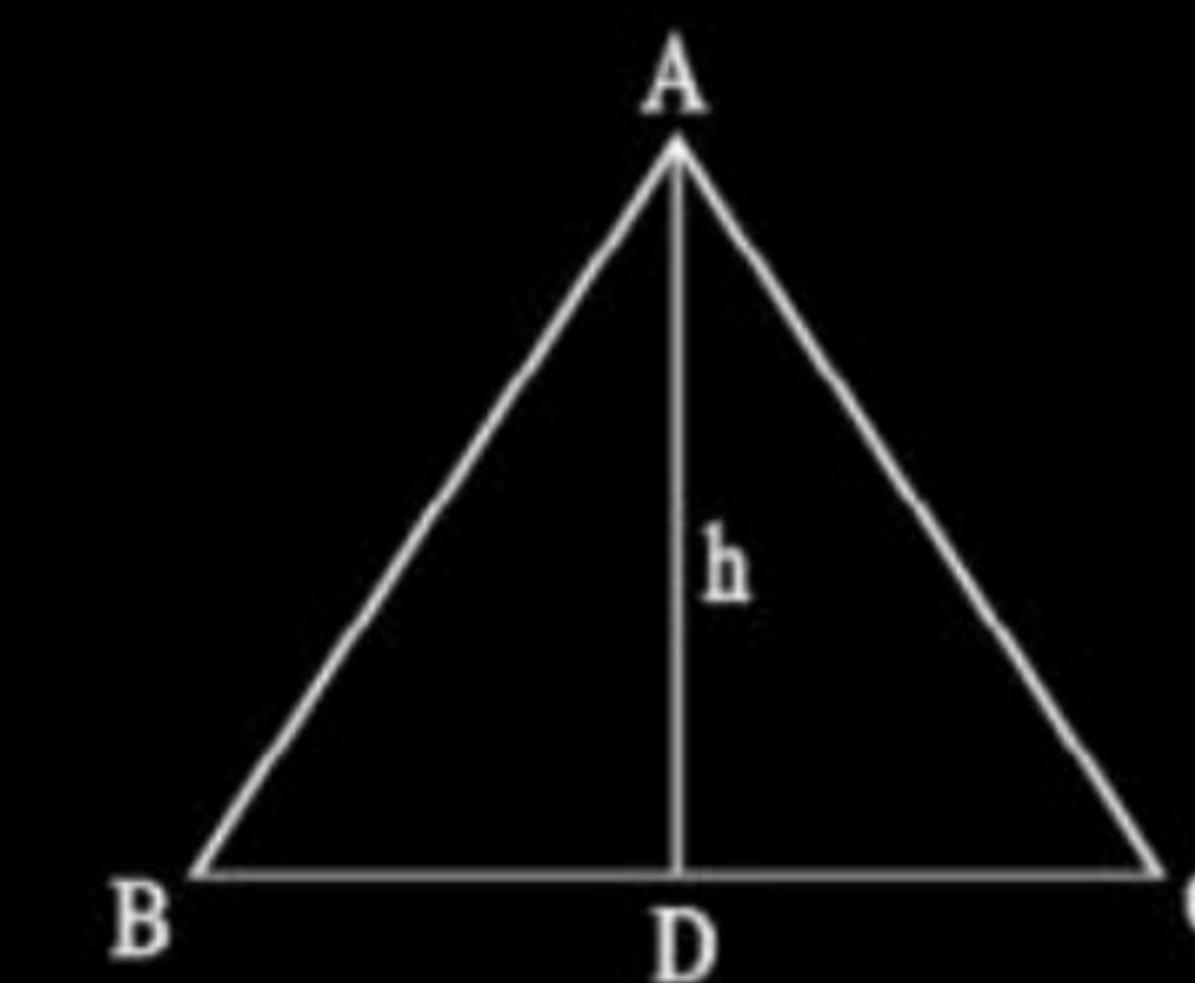
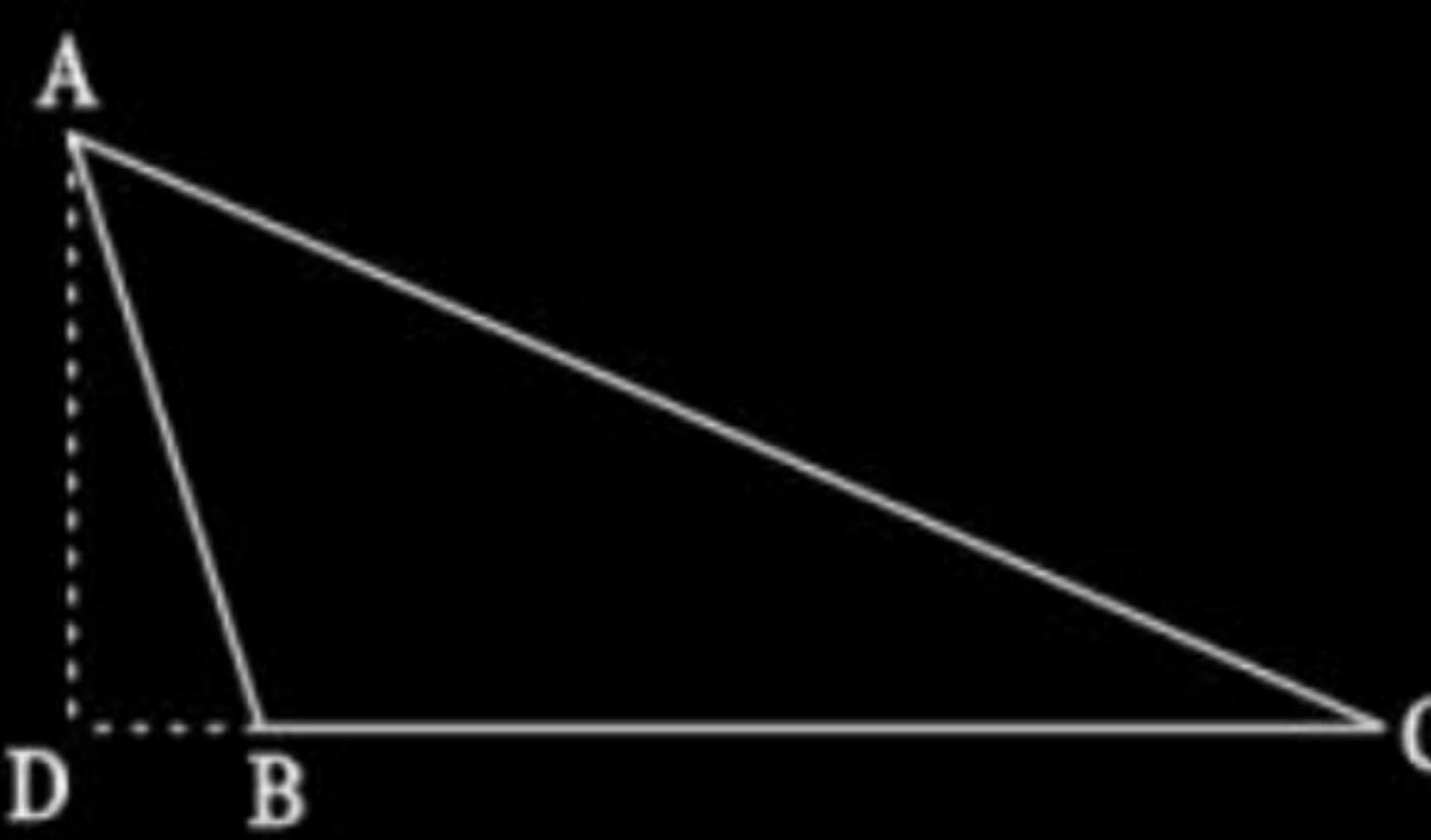


24. In a ΔABC , if $AB = AC = 20$ cm, $BC = 30$. Find the length of altitude on side AC.

एक ΔABC में, यदि $AB = AC = 20$ cm, $BC = 30$ भुजा AC पर लम्ब की लम्बाई ज्ञात करों।

Medians:

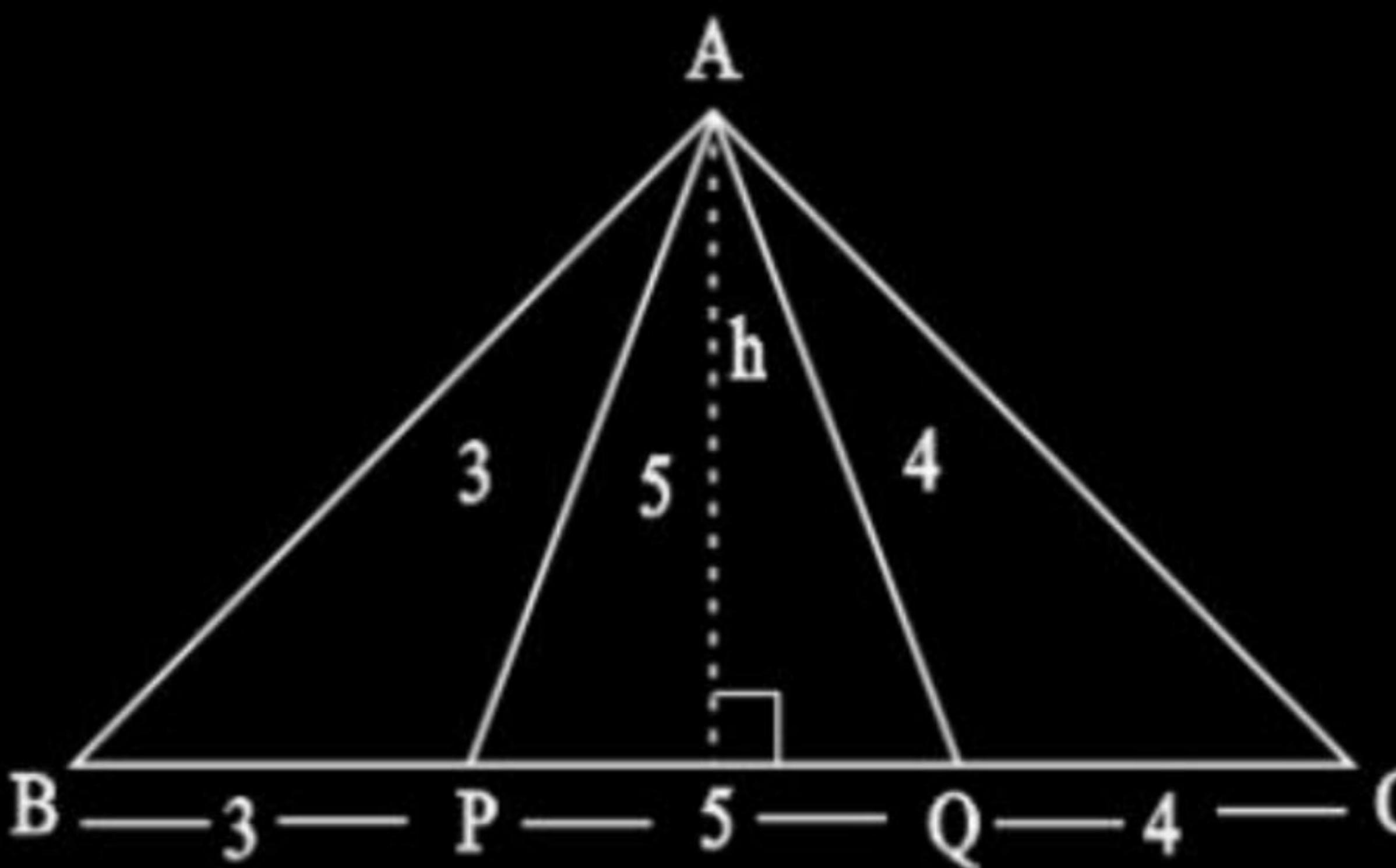
- * Height of triangle can be outside the triangle.



AD → Height

BC → Base

*



$$\text{Ar}(\Delta BAP) : \text{Ar}(\Delta PAQ) : \text{Ar}(\Delta AQC)$$

$$\frac{1}{2} \times 3 \times h : \frac{1}{2} \times 5h : \frac{1}{2} \times 4 \times h$$
$$3 : 5 : 4$$



- * Median always divides the area of triangle in two equal parts.
- * Median formed on side 'a'

$$M_a = \sqrt{\frac{2b^2 + 2c^2 - a^2}{4}}$$

- * Median formed on side 'b' and 'c'

$$M_b = \sqrt{\frac{2a^2 + 2c^2 - b^2}{4}}$$

$$M_c = \sqrt{\frac{2a^2 + 2b^2 - c^2}{4}}$$



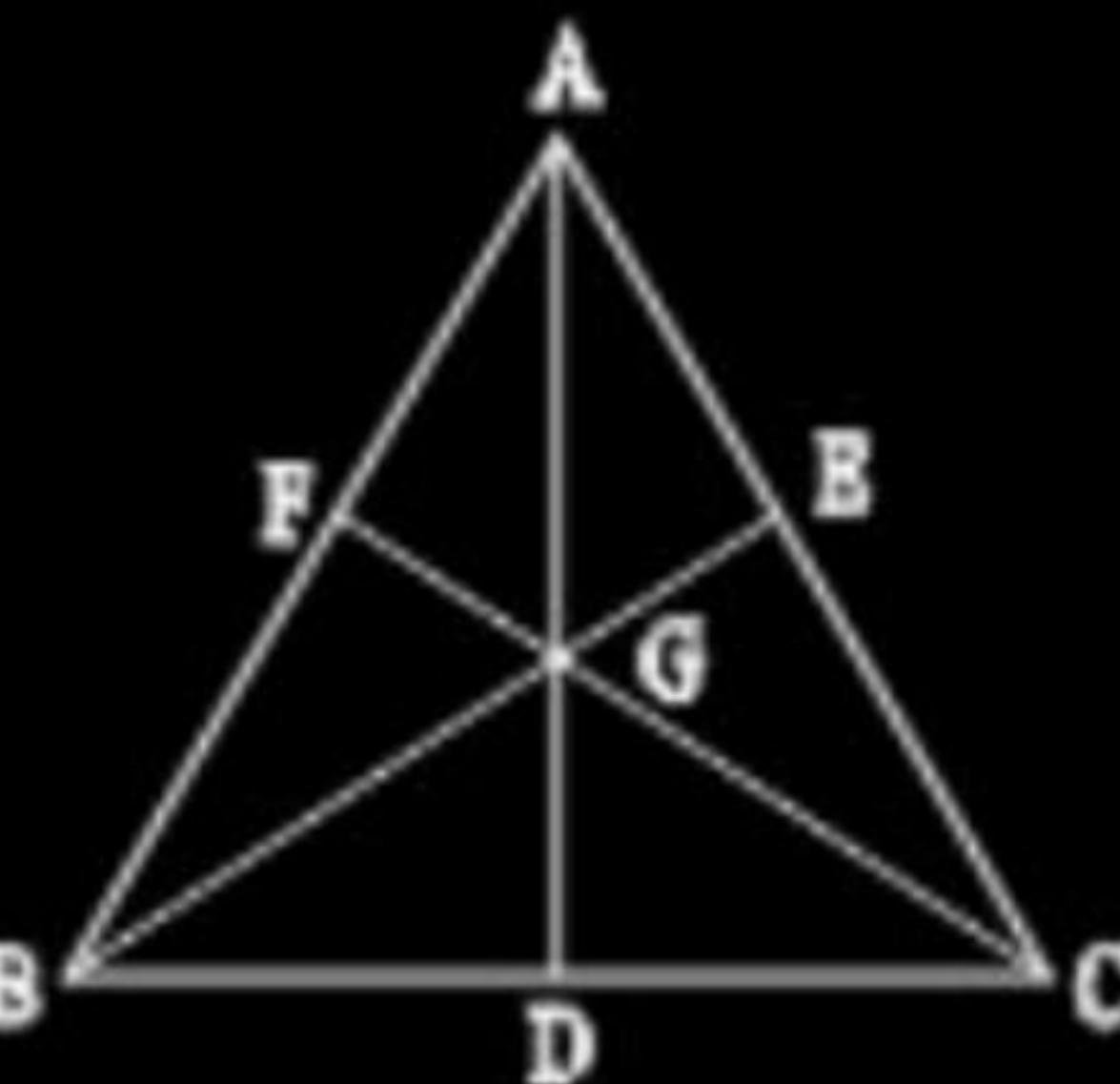
- * **Centroid:** It is the point of intersection of all the three medians.

Centroid \approx Centre of Gravity \approx 'G'

$$AG : GD = 2 : 1$$

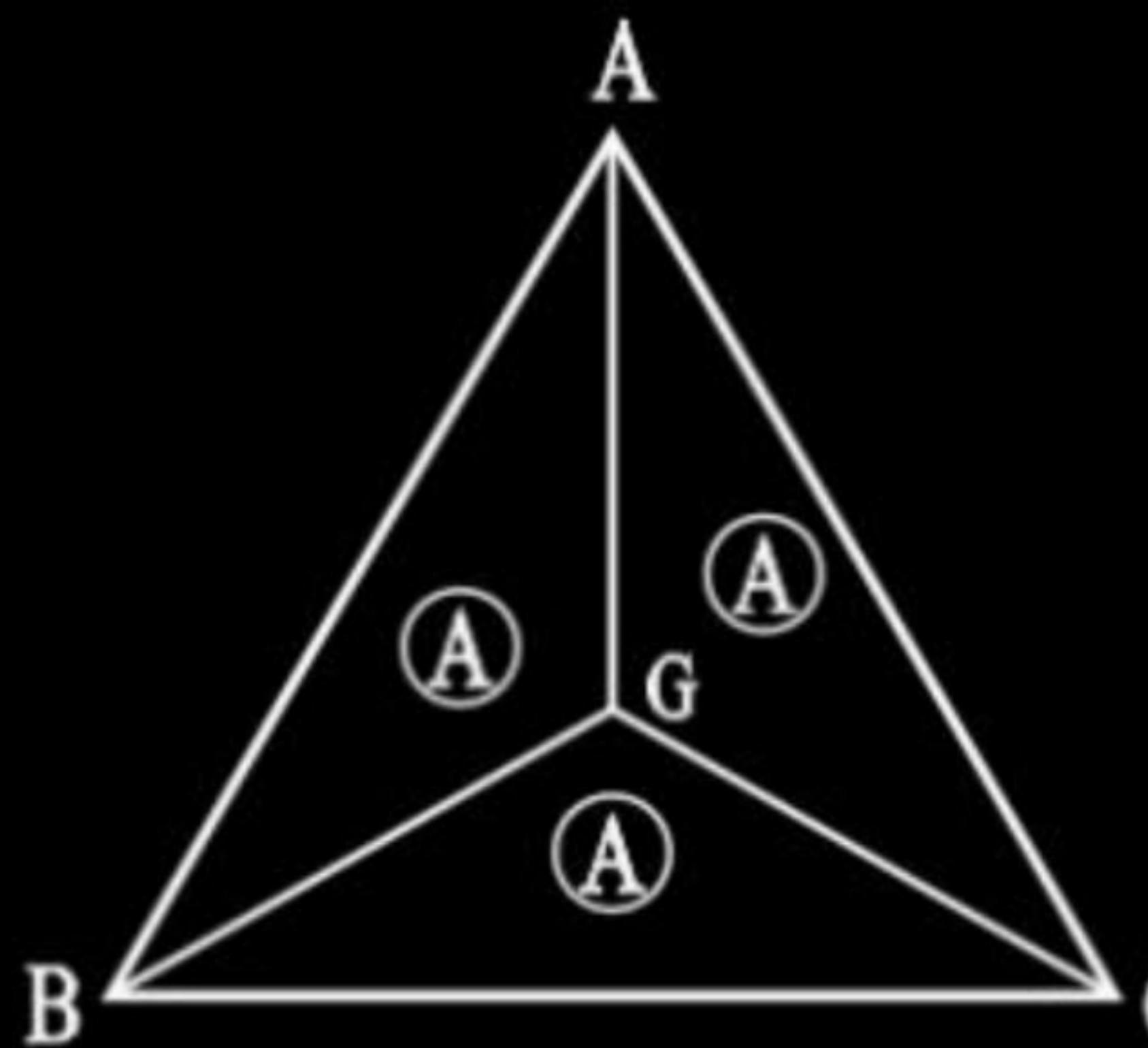
$$BG : GE = 2 : 1$$

$$CG : GF = 2 : 1$$



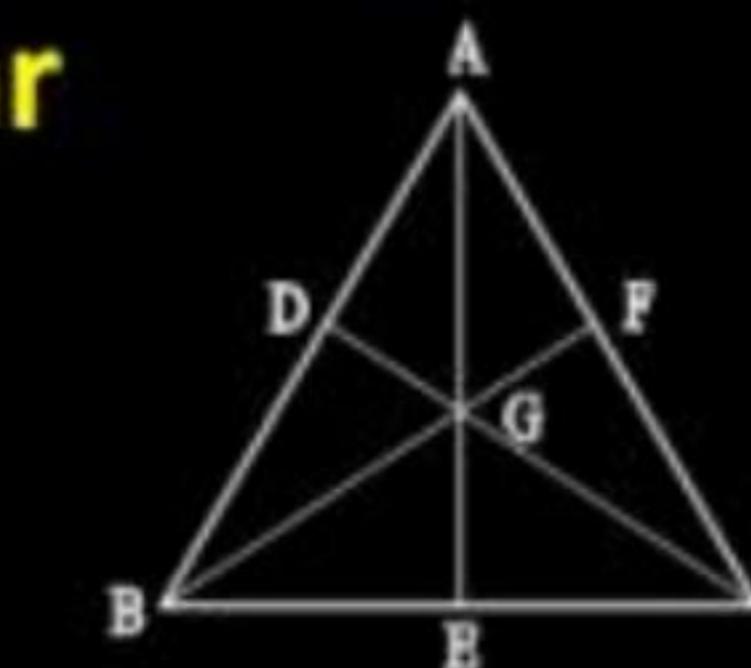
Centroid divides the median in 2 : 1

- * Centroid divides the area in three equal part



$$ar(\Delta AGB) = ar(\Delta BGC) = ar(\Delta AGC)$$

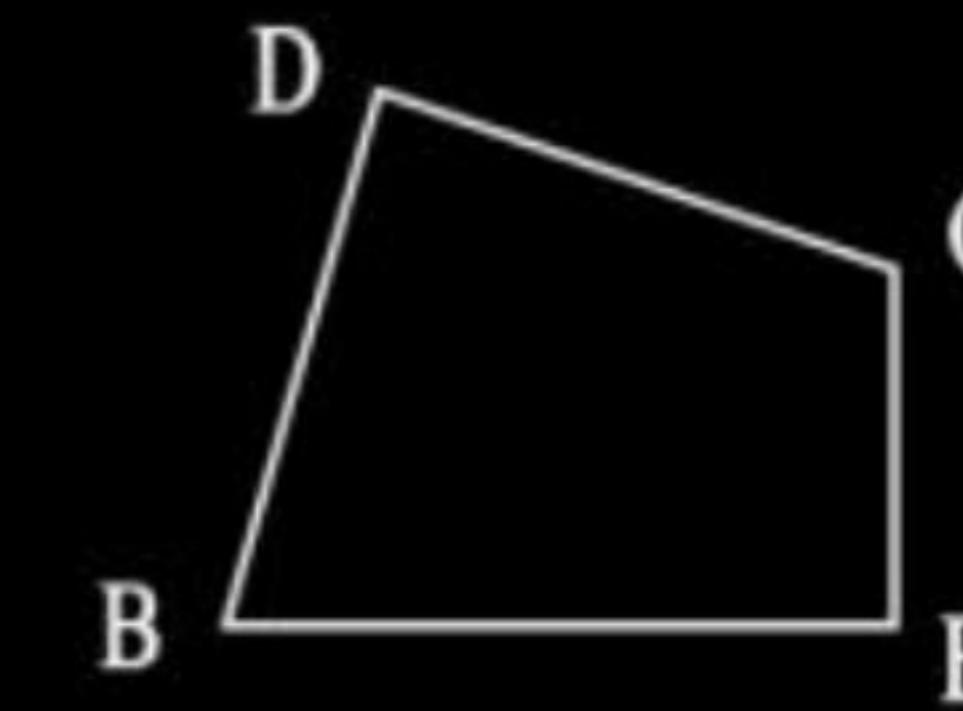
- * Centroid divides the triangle in 3 quadrilateral area of quadrilateral so formed in three equal parts



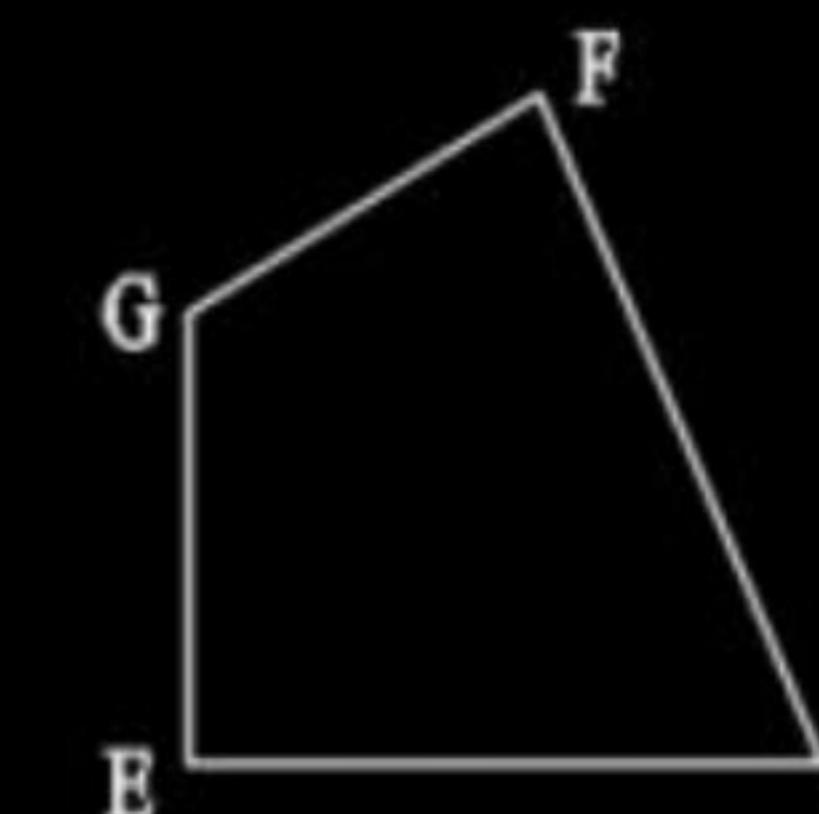
Area of quadrilateral ADGF



Area of quadrilateral BEGD



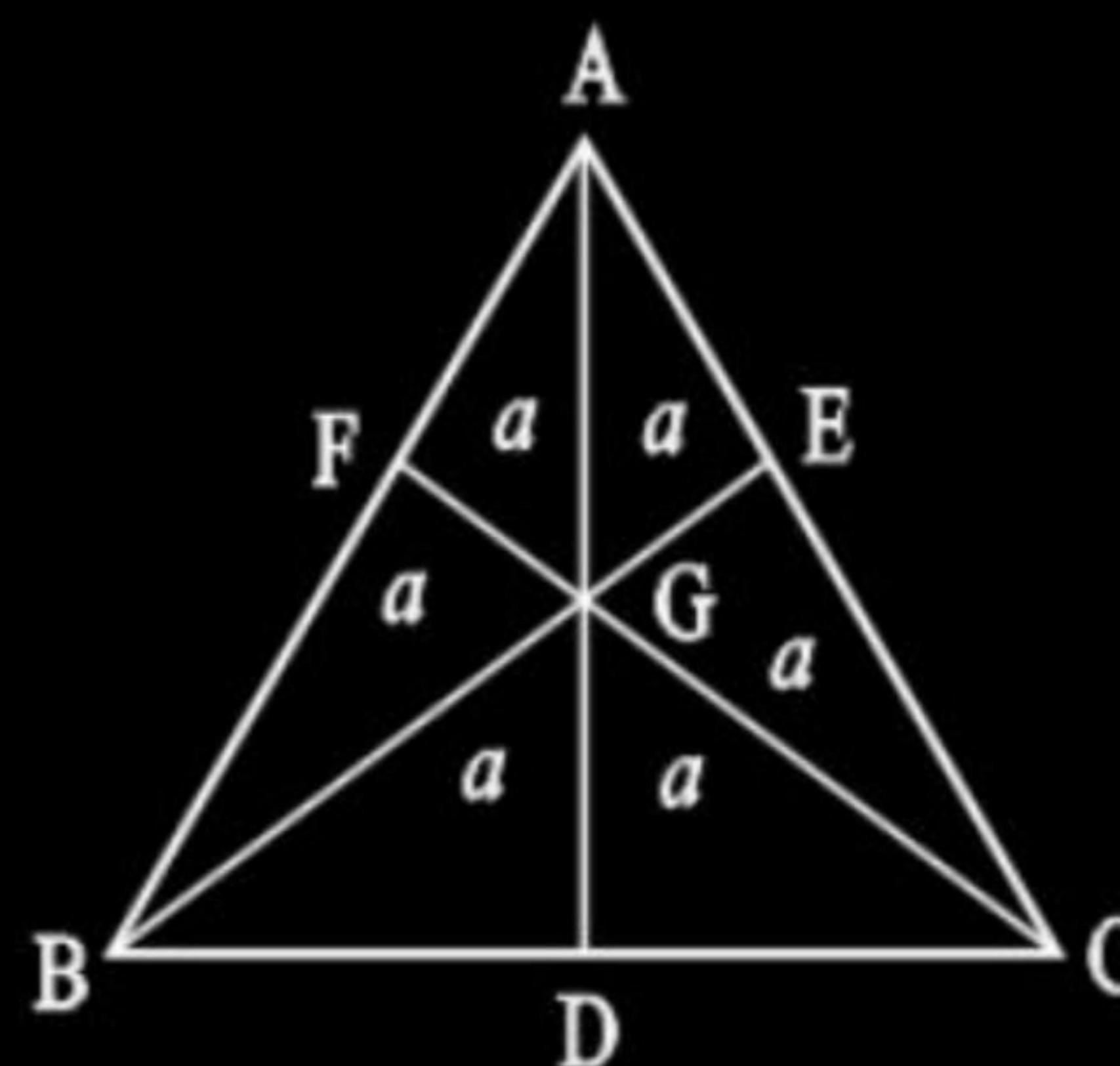
Area of quadrilateral CFGE



1 : 1 : 1



- * **Centroid divides the triangle in 6 small triangles whose area is equal.**



$$ar(\triangle BGD) = \frac{1}{6} ar(\triangle ABC)$$



25. In a ΔABC , AD is median and E is the midpoint of AD. If $Ar(\Delta ABC) = 40 \text{ cm}^2$, Find $ar(\Delta BED)$.

एक ΔABC में, AD माध्यिका है और E, AD का मध्य बिन्दु है। यदि $Ar(\Delta ABC) = 40 \text{ cm}^2$, $ar(\Delta BED)$ ज्ञात करों।



26. In a ΔABC , G is the centroid in which $AG = BC$, then find $\angle BGC$.

एक ΔABC में, G केन्द्रक है जिसमें $AG = BC$, $\angle BGC$ ज्ञात करों।



Mid Point Theorem:

27. In a ΔABC , D and F are the midpoints of AB and AC. If side BC is extended upto a point P, then find $\text{ar}(\Delta ABC) : \text{ar}(\Delta DPF)$.

एक ΔABC में, D तथा F भुजा AB और AC के मध्य बिन्दु हैं। यदि भुजा BC, P बिन्दु तक बढ़ाई जाय, तो $\text{ar}(\Delta ABC) : \text{ar}(\Delta DPF)$ ज्ञात करों



28. In ΔABC , D is a point on side AC and P, Q, X, Y, are the midpoints of AB, BC, AD, DC then $PX : QY$.

एक ΔABC में, D भुजा AC पर एक बिन्दु है और P, Q, X, Y भुजाओं AB, BC, AD, DC के मध्य बिन्दु हैं तो $PX : QY$ होगा:



Relation between sides and medians:

Which option is correct?

- (i) $(AD + BE + CF) = (AB + BC + CA)$
- (ii) $3(AD + BE + CF) > 4(AB + BC + CA)$
- (iii) $4(AD + BE + CF) > 3(AB + BC + CA)$
- (iv) $4(AD + BE + CF) < 3(AB + BC + CA)$



29. In ΔABC , D is midpoint of BC. If $AB = 15$, $BC = 18$, $CA = 25$,
 $AD = ?$

ΔABC में, D, BC का मध्यबिंदु है। यदि $AB = 15$, $BC = 18$, $CA = 25$, $AD = ?$



30. The sum of the squares of the sides of the triangle is 96° .

Find the sum of the squares of medians.

त्रिभुज की भुजाओं के वर्गों का योग 96° होता है। माध्यकाओं के वर्गों का योग ज्ञात कीजिए।



31. In ΔABC , $\angle A = 90^\circ$ in which BL and CM are medians.

If $BC = 5$, $BL = \frac{3\sqrt{5}}{2}$. Find CM ?

ΔABC में, $\angle A = 90^\circ$ जिसमें BL और CM माध्यिका हैं। यदि

$BC = 5$, $BL = \frac{3\sqrt{5}}{2}$ तो CM ज्ञात कीजिए?



32. In a ΔABC , BE and CF are the median and they intersects each other at 90° .

$$AB^2 + AC^2 = 5BC^2$$

ΔABC में, BE और CF माध्यकाएँ हैं और ये एक दूसरे को 90° पर प्रतिच्छेद करती हैं।

$$AB^2 + AC^2 = 5BC^2$$



33. In a ΔABC , BE and CF are the medians and they intersects at 90° . If $AB = 6$, $AC = 8$, find BC ?

ΔABC में, BE और CF माध्यिकाएँ हैं और वे 90° पर प्रतिच्छेद करती हैं। यदि $AB = 6$, $AC = 8$, तो BC ज्ञात कीजिए।



34. If Medians are 9, 12, 15. Find area(ABC).

यदि माध्यकाएँ 9, 12, 15 हैं। ABC का क्षेत्रफल ज्ञात कीजिए।



35. The sides of a triangle are 8 cm, 10 cm, 12 cm, Find the ratio of their side and altitudes.

एक त्रिभुज की भुजाएँ 8 सेमी, 10 सेमी, 12 सेमी हैं, उनकी भुजाओं और ऊँचाई का अनुपात ज्ञात कीजिए।



36. Find the ratio of radii of incircle and circumcircle of an equilateral triangle.

एक समबाहु त्रिभुज के अन्तःवृत्त और परिवृत्त की त्रिज्याओं का अनुपात ज्ञात कीजिए।



37. The radius of incircle of an equilateral triangle is $2\sqrt{3}$.

Then find :

एक समबाहु त्रिभुज के अंतःवृत्त की त्रिज्या $2\sqrt{3}$ है। तो ज्ञात कीजिए -

- (i) Radius of circumcircle = ?
- (ii) Height of triangle = ?
- (iii) Side of triangle = ?
- (iv) Area of triangle = ?



38. In an equilateral triangle, circumcentre is 3.2 cm from the base of that triangle, then find the length of each altitude.

एक समबाहु त्रिभुज में, परिकेन्द्र उस त्रिभुज के आधार से 3.2 सेमी. की दूरी पर है, तो प्रत्यक्ष ऊँचाई की लम्बाई ज्ञात कीजिए।



39. In an equilateral ΔABC , AD , BE and CF are the altitudes then which one is true.

एक समबाहु ΔABC में, AD , BE और CF ऊँचाई हैं, तो कौन-सा सत्य है।

- (a) $2AB^2 = 3AD^2$ (b) $3AC^2 = 4BE^2$
- (c) $7AB^2 = 9AD^2$ (d) $4AC^2 = 5BE^2$



40. In an equilateral triangle ABC, a point D lies on BC and $BD = \frac{1}{3} BC$. Find $AD^2 : AB^2$.

एक समबाहु त्रिभुज ABC में, एक बिंदु D भुजा, BC पर है और $BD = \frac{1}{3} BC$ पर स्थित है। तो $AD^2 : AB^2$ ज्ञात कीजिए।



41. In an equilateral ΔABC , $BD : DC = 3 : 5$. Find $AD : DC$.

समबाहु ΔABC में $BD : DC = 3 : 5$ है। तो $AD : DC$ ज्ञात कीजिए।



42. In a ΔABC , $\angle B = 90^\circ$, $AB = a$, $BC = b$, $BD = p$, $BD \perp AC$,
Find the relation between a , b and p .

ΔABC में, $\angle B = 90^\circ$, $AB = a$, $BC = b$, $BD = p$ और $BD \perp AC$
तो a , b और p के बीच संबंध ज्ञात कीजिए।



43. In a right angled ΔABC , $\angle B = 90^\circ$, $BD \perp AC$, $AB = 6$, $BC = 8$. Find BD .

एक समकोण ΔABC में, $\angle B = 90^\circ$, $BD \perp AC$, $AB = 6$, $BC = 8$ तो BD ज्ञात कीजिए।