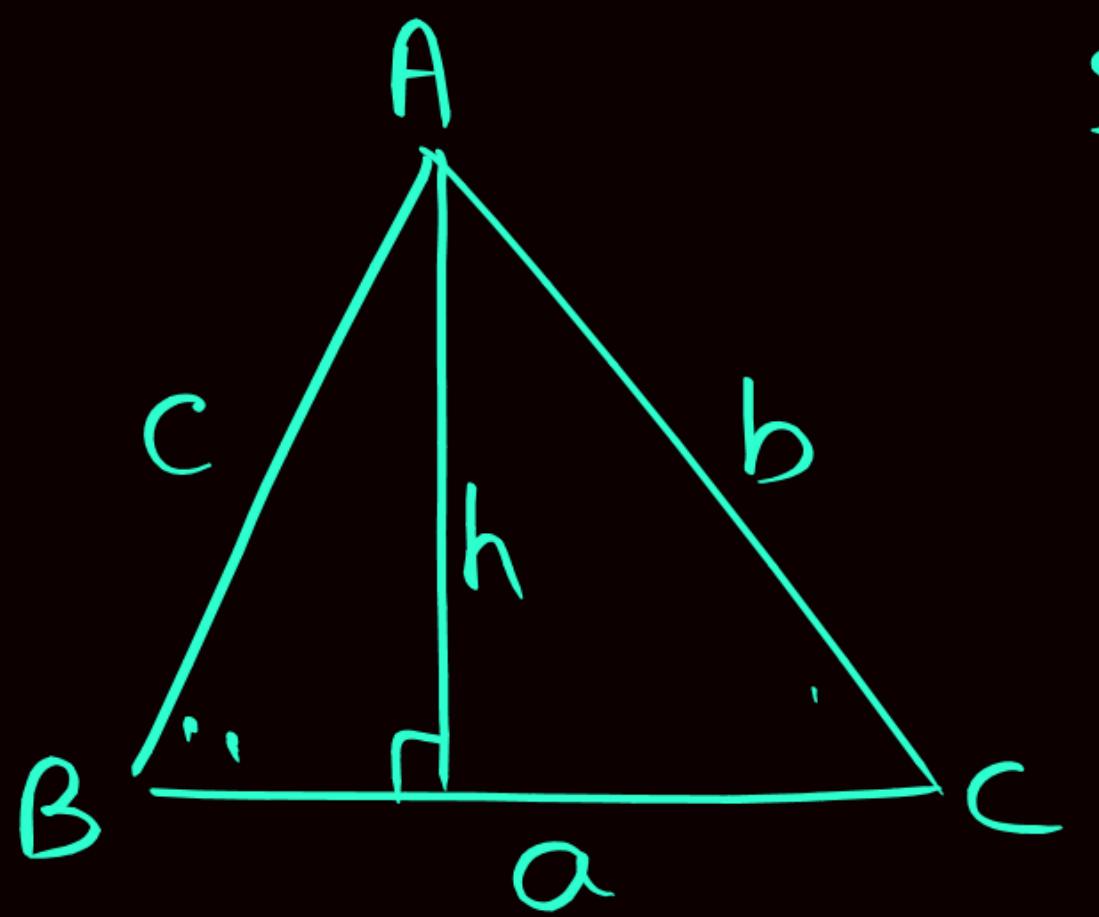


$$\text{area} = \frac{1}{2}xy\sin\theta$$



$$\sin B = \frac{h}{c}$$

$$\sin C = \frac{h}{b}$$

$$h - c \sin B = b \sin C$$

$$\underline{a:b:c = \sin A : \sin B : \sin C}$$

$$\left(\frac{\sin B}{b} = \frac{\sin C}{c} = \frac{\sin A}{a} \right) \text{ (Similarly)}$$

Sine rule

In the triangle ABC we have $AB = 5\text{cm}$, $AC = 6\text{cm}$, $\angle A = 60^\circ$. Find the length of the side BC.

त्रिभुज ABC में हमारे पास $AB = 5\text{cm}$, $AC = 6\text{cm}$, $\angle A = 60^\circ$ है। BC भुजा की लंबाई ज्ञात कीजिए।

- (a) 27cm
- (b) $\sqrt{91}\text{cm}$
- (c) $\sqrt{39}\text{cm}$
- (d) $\sqrt{31}\text{cm}$

$$BC^2 = S^2 + 6^2 - S \times 6$$

$$= 25 + 36 - 30$$

$$BC = \sqrt{31}$$

In ΔABC , $\angle A = 60^\circ$ and side AB = 5cm,
AC = 6cm then, BC =?

ΔABC इस प्रकार है कि $\angle A = 60^\circ$ और मुजा AB
= 5cm, AC = 6cm है, तब BC की माप होगी?

- (a) $\sqrt{21}$ (b) $\sqrt{24}$
(c) $\sqrt{31}$ (d) $\sqrt{26}$

Rw

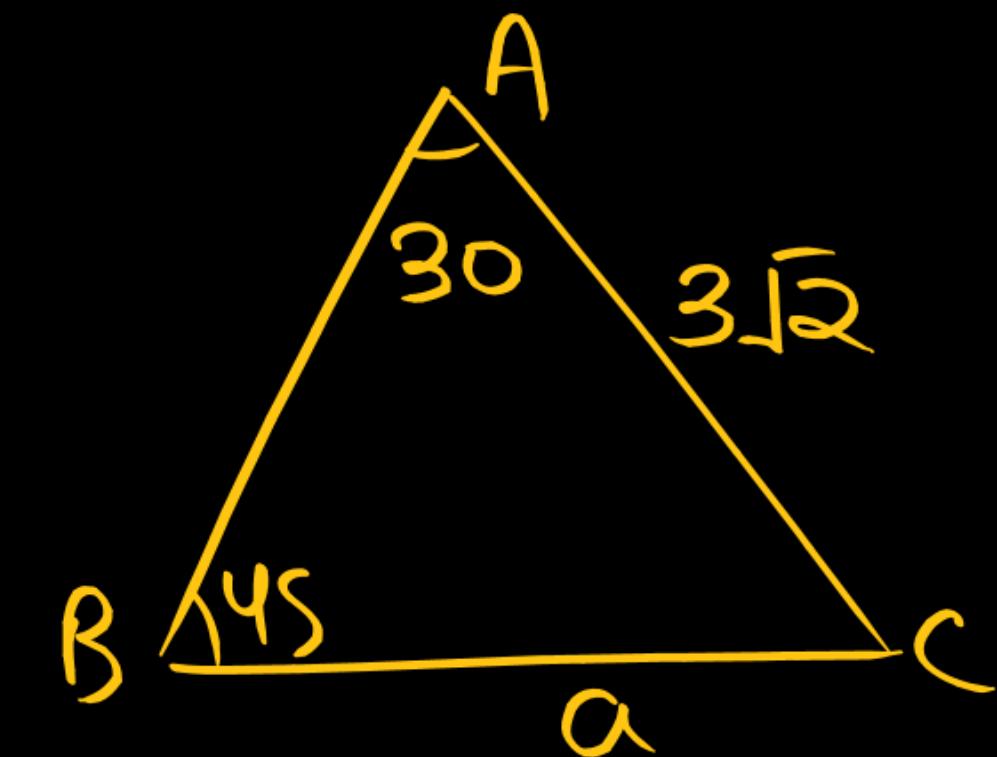
In ΔABC , $\angle A = 30^\circ$, $\angle B = 45^\circ$ side $AC = 3\sqrt{2}$ and $BC = a$, then find $a = ?$

ΔABC इस प्रकार है कि $\angle A = 30^\circ$, $\angle B = 45^\circ$ मुझा $AC = 3\sqrt{2}$ और $BC = a$, तब a का मान क्या होगा?

- (a) 3
- (b) 2
- (c) 1
- (d) 0

$$\frac{1}{\sin 30} = \frac{\sin 45}{3\sqrt{2}} = \frac{\sin 30}{a} = \frac{1}{\sqrt{2}a}$$

$$a = 3$$



In ΔABC , $\angle A = 45^\circ$, $\angle B = 60^\circ$ side $AC = 4\sqrt{3}$ and $BC = a$, then find $a = ?$

ΔABC इस प्रकार है कि $\angle A = 45^\circ$, $\angle B = 60^\circ$
मुजा $AC = 4\sqrt{3}$ और $BC = a$, तब a का मान क्या
होगा?

- (a) $4\sqrt{2}$ (b) $\sqrt{5}$
(c) $4\sqrt{3}$ (d) $\sqrt{2}$

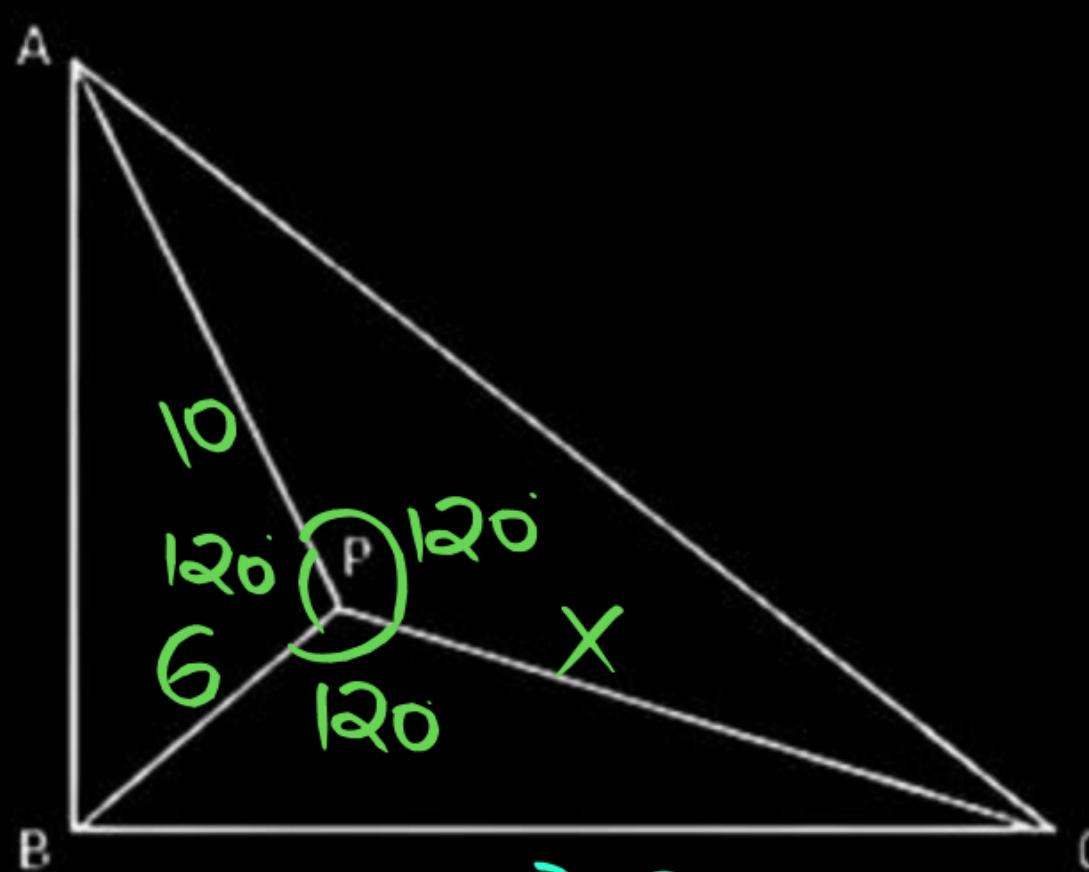
RW

In ΔABC , $AC = 4\text{cm}$, $BC = 5\text{cm}$, $\angle A = 90^\circ$,
then the value of $\sin B = ?$

ΔABC इस प्रकार है कि $AC = 4\text{cm}$, भुजा $BC = 5\text{cm}$,
 $\angle A = 90^\circ$, तब $\sin B$ का मान है?

- (a) $\frac{4}{5}$
- (b) $\frac{4}{3}$
- (c) $\frac{4}{7}$
- (d) $\frac{4}{9}$

QW



$$BC^2 = 6^2 + x^2 + 6x$$

$$AC^2 = 10^2 + x^2 + 10x$$

$$AB^2 = 10^2 + 6^2 + 10 \cdot 6$$

In the given figure below, $\angle APB = \angle BPC = \angle APC$, $AP = 10$ and $BP = 6$. Find CP ?

नीचे दी गई आकृति में, $\angle APB = \angle BPC = \angle APC$, $AP = 10$ और $BP = 6$ है। CP ज्ञात कीजिए।

- (a) 35
- (b) 36
- (c) 30
- (d) 33

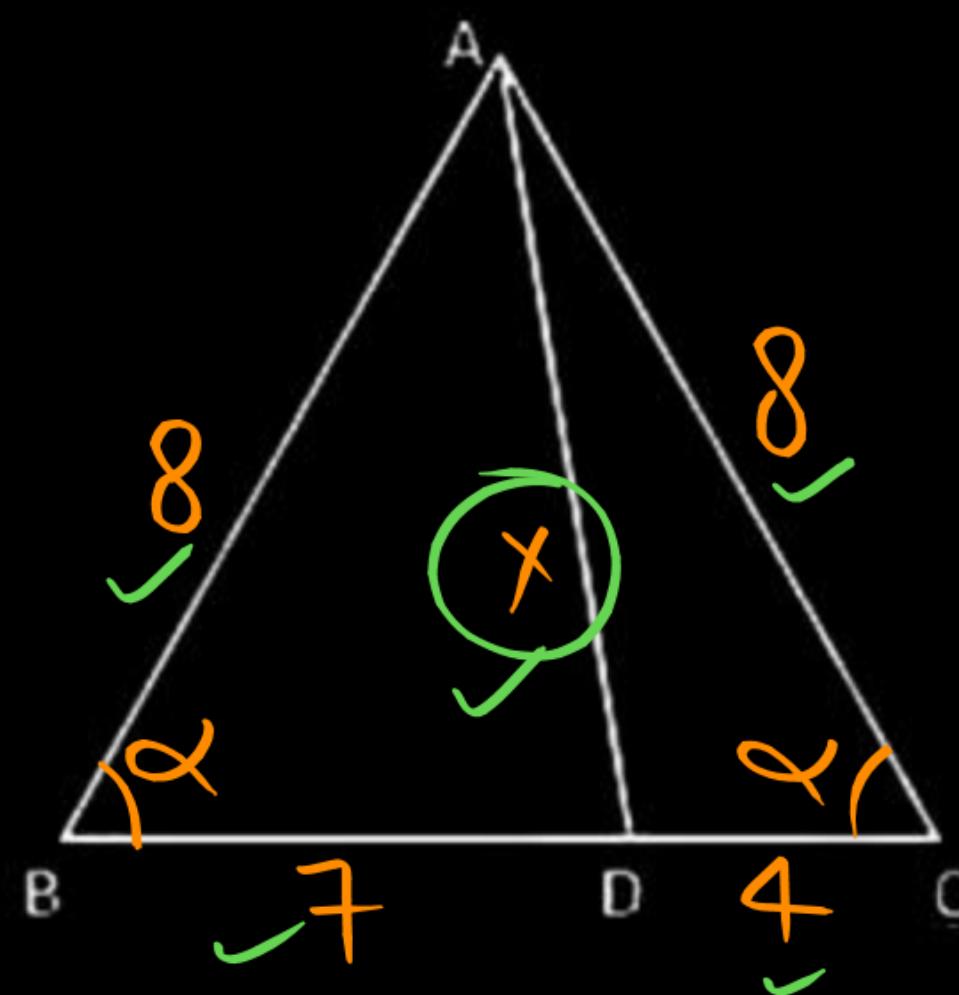
$\angle B = 90^\circ$ (Given)

$$AC^2 = BC^2 + AB^2 \quad (\text{पाइथागो}$$

$$\cancel{10^2 + x^2 + 10x} + \cancel{10^2 + 6^2 + 60}$$

$$4x = 132$$

$x = 33$ am



In the given figure, if $AB=AC=8\text{cm}$,
 $BC=11\text{cm}$, $BD=7\text{cm}$, find AD ?
दिए गए आकृति में, यदि $AB = AC =$
 8cm , $BC = 11\text{cm}$, $BD = 7\text{cm}$, AD ज्ञात
करें?

- (a) 4
- (b) 5.5
- (c) 6
- (d) 7

Cancelling in $\triangle ABD \sim \triangle ADC$

$$\frac{8^2 + 7^2 - x^2}{2 \cdot 8 \cdot 7} = \frac{8^2 + 4^2 - x^2}{2 \cdot 8 \cdot 4}$$

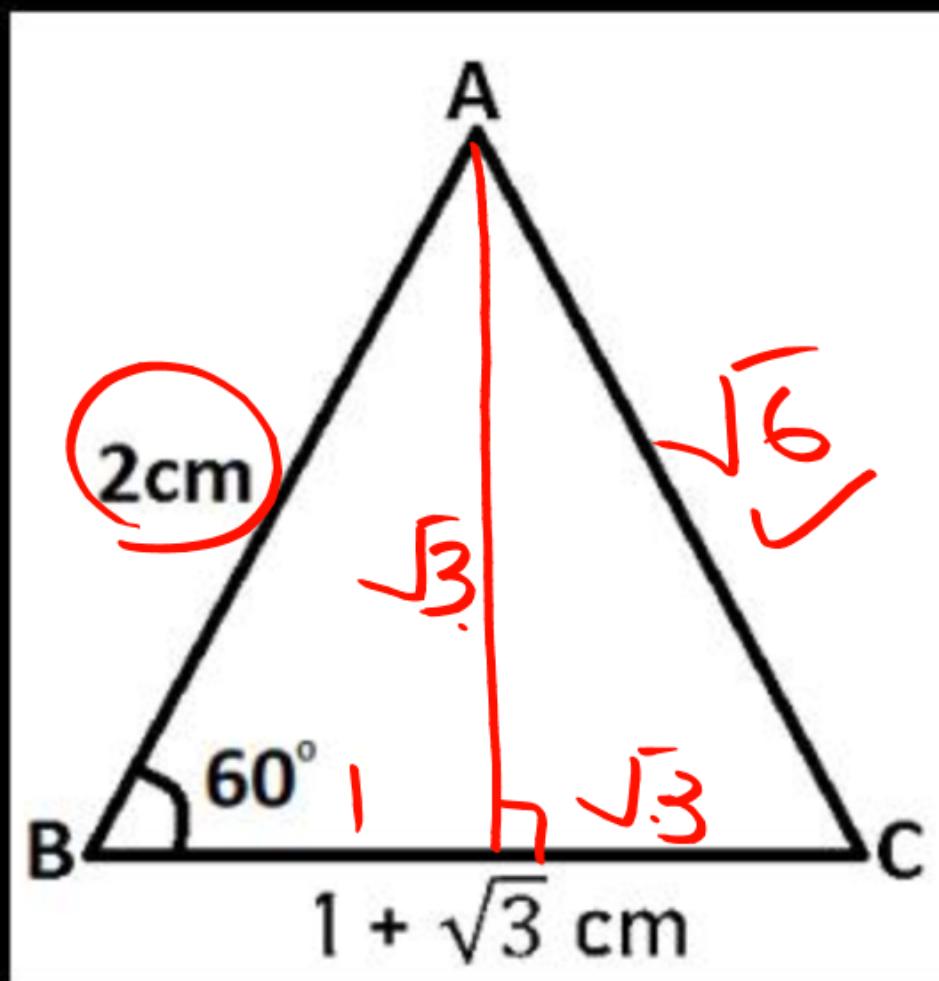
$$4 \cdot (113 - x^2) = 7 \cdot (80 - x^2)$$

$$3x^2 = 560 - 452 = 108$$

$$x = 6$$

In the given figure, find the value of AC?
दिए गए चित्र में भुजा AC का मान जात
कीजिए ?

- a) $2\sqrt{3}$ cm
- b) $4\sqrt{3}$ cm
- c) $5\sqrt{3}$ cm
- d) $\sqrt{6}$ cm

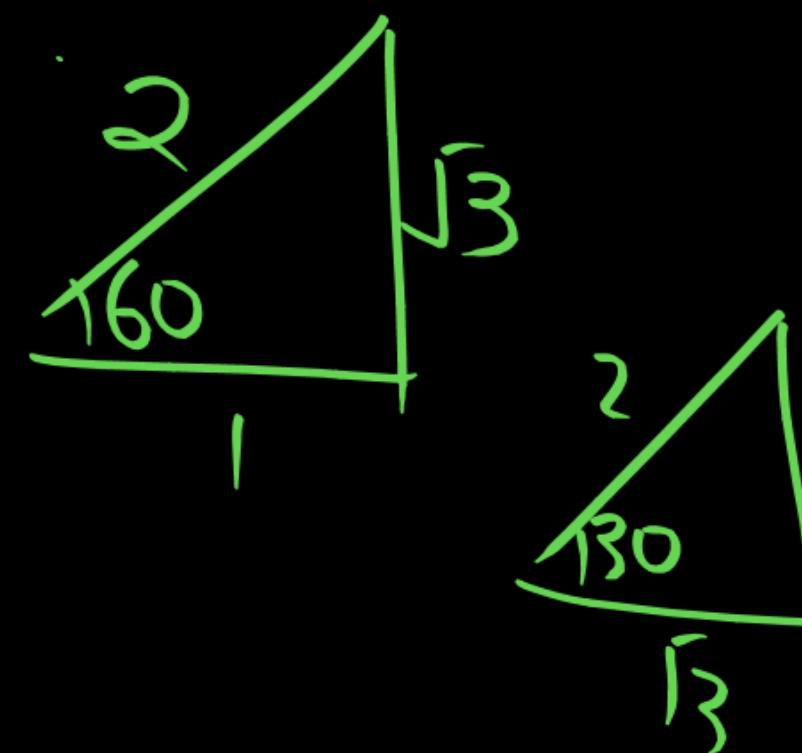


$$AC = \sqrt{2 + (1 + \sqrt{3})^2 - 2 \cdot (1 + \sqrt{3})}$$

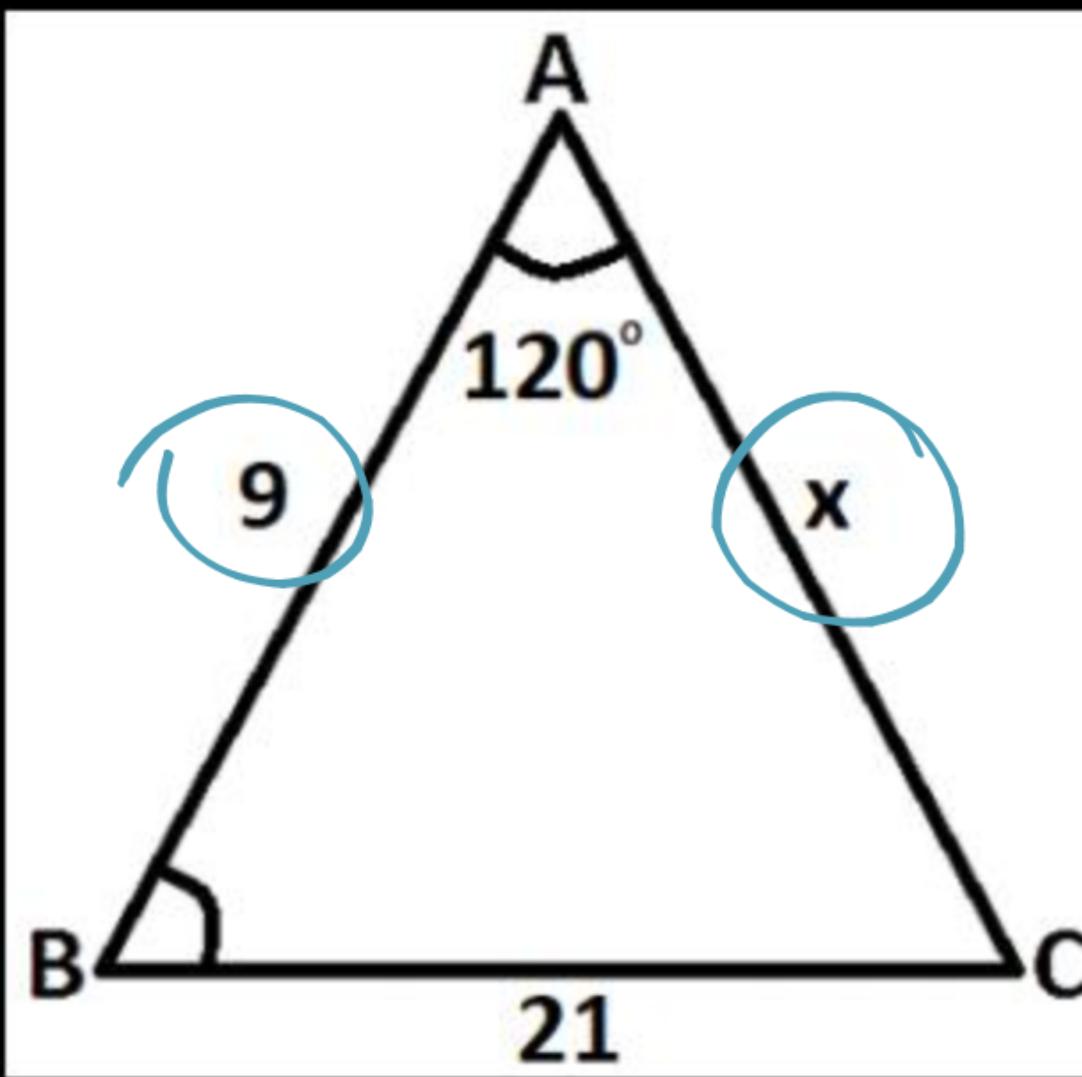
$$= 4 + 4 + 2\sqrt{3} - 2 - 2\sqrt{3}$$

$$= 6$$

$$\underline{AC = \sqrt{6}}$$



$$a^2 - b^2 = (a+b)(a-b)$$



In the given figure, find the area ?
दिए गए चित्र में त्रिभुज का क्षेत्रफल ज्ञात कीजिए ?

- a) $\frac{135\sqrt{3}}{4}$ b) $\frac{145\sqrt{3}}{4}$
 c) $\frac{120\sqrt{3}}{7}$ d) $\frac{145\sqrt{5}}{7}$

$X=15$

$$\frac{1}{2} \cdot 9 \cdot x \sin 120^\circ$$

$$= \frac{9x \cdot \sqrt{3}}{4} = \frac{135\sqrt{3}}{4}$$

$$21^2 = 9^2 + x^2 + 9 \cdot x$$

$$(21^2 - 9^2) = x(x+9) = 30 \cdot 12 = 15 \times 24$$

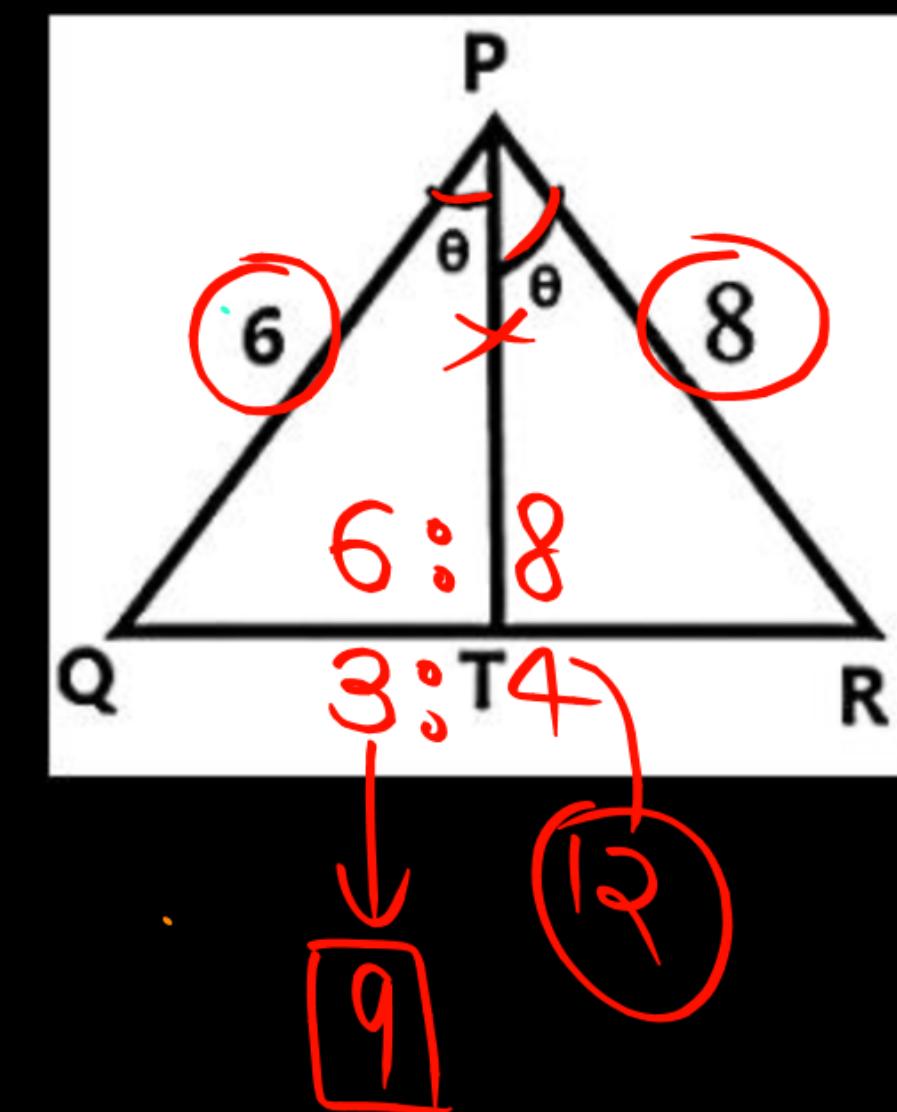
In $\triangle PQR$, $PQ = 6$ cm and $PR = 8$ cm and PT is the angle bisector of $\angle QPR$. Find the length of QT ? $\boxed{RT=12}$

$\triangle PQR$ में, $PQ = 6$ सेमी और $PR = 8$ सेमी और PT , $\angle QPR$ का कोण द्विभाजक है। ~~PT~~ की लंबाई ज्ञात कीजिये?

$$\boxed{RT=12}$$

- a) 5
- b) 6
- c) 8
- d) 7

e) 9



In a triangle ABC, if the three sides are $a = 5$, $b = 7$ and $c = 3$, what is angle B?

एक त्रिभुज ABC में, यदि तीन भुजाएँ हैं
 $a = 5$, $b = 7$ और $c = 3$, कोण B क्या है?

- (a) 120°
- (b) 90°
- (c) 60°
- (d) 150°

QW

SSC CHSL 24.05.2022

In ΔABC , $AB = AC = 17$, D is a point on BC, $CD = 4$, $AD = 15$, then find the value of BD?

ΔABC में, $AB = AC = 17$, D, BC पर एक बिंदु है, $CD = 4$, $AD = 15$, तो BD का मान ज्ञात करें?

- (a) 8 (b) 12
- (c) 24 (d) 16

RW

The perimeter of $\triangle LMN$ is 32 cm. NX is the angle bisector of angle N, LX = 3 cm, XM = 5 cm. Find LN and MN.

$\triangle LMN$ का परिमाप 32 सेमी है। NX कोण N, LX = 3 सेमी, XM = 5 सेमी का कोण द्विभाजक है। (LN + MN) ज्ञात किजिए।

- a) 12
- b) 24
- c) 36
- d) 48

Qw

In a ΔABC , AD is the bisector of $\angle BAC$. If AB = 8 cm, AC = 6 cm & BD = 4 cm. The length of the side AD.

एक ΔABC में, AD, $\angle BAC$ का समद्विभाजक है। यदि AB = 8 सेमी, AC = 6 सेमी और BD = 4 सेमी। भुजा AD की लंबाई।

- a) 3
- b) 18
- c) 6
- d) 36

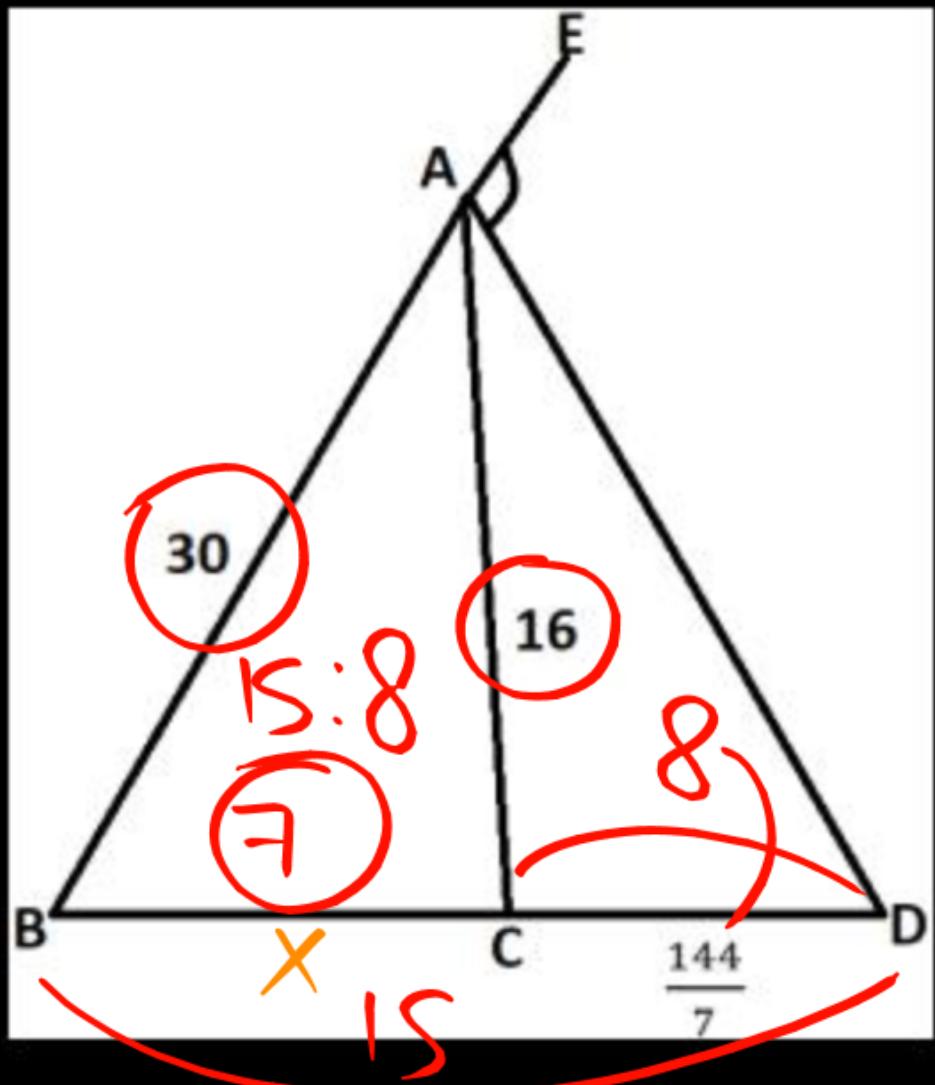
Qw

$\triangle ABC$, $\angle ABC = 90^\circ$ and CD is angle bisector of $\angle ACB$. Which meets side AB at D . If $AD = 4\text{cm}$, $BD = 3\text{cm}$, Find the CD .

$\triangle ABC$, $\angle ABC = 90^\circ$ और CD , $\angle ACB$ का कोण समद्विभाजक है। जो भुजा AB को D पर मिलती है। यदि $AD = 4\text{cm}$, $BD = 3\text{cm}$, तो CD ज्ञात कीजिए।

- a) $7\sqrt{2}$
- b) $10\sqrt{2}$
- c) $5\sqrt{2}$
- d) $6\sqrt{2}$





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

In $\triangle ABC$, AD is the external bisector of $\angle EAC$, Intersects BC produced to D. If $AB = 30$ cm, $AC = 16$ cm and $CD = \frac{144}{7}$ cm, Find BC.

$\triangle ABC$ में, AD, $\angle EAC$ का बाह्य समद्विभाजक है, जो BC को बढ़ाकर D को प्रतिच्छेद करता है। यदि $AB = 30$ सेमी, $AC = 16$ सेमी और $CD = \frac{144}{7}$ सेमी है, तो BC ज्ञात कीजिए।

a) $\frac{136}{7}$

b) $\frac{126}{7}$

c) $\frac{146}{7}$

d) None

$$8 - \frac{144}{7}$$

$$1 - \frac{18}{7}$$

$$7 - \frac{126}{7}$$

30:16

15:8

BD:CD

Cosine rule

$$b^2 = c^2 - x^2 = b^2 - (a-x)^2 \\ = b^2 - a^2 + x^2 + 2ax$$

$$a^2 + c^2 - b^2 = 2ax$$

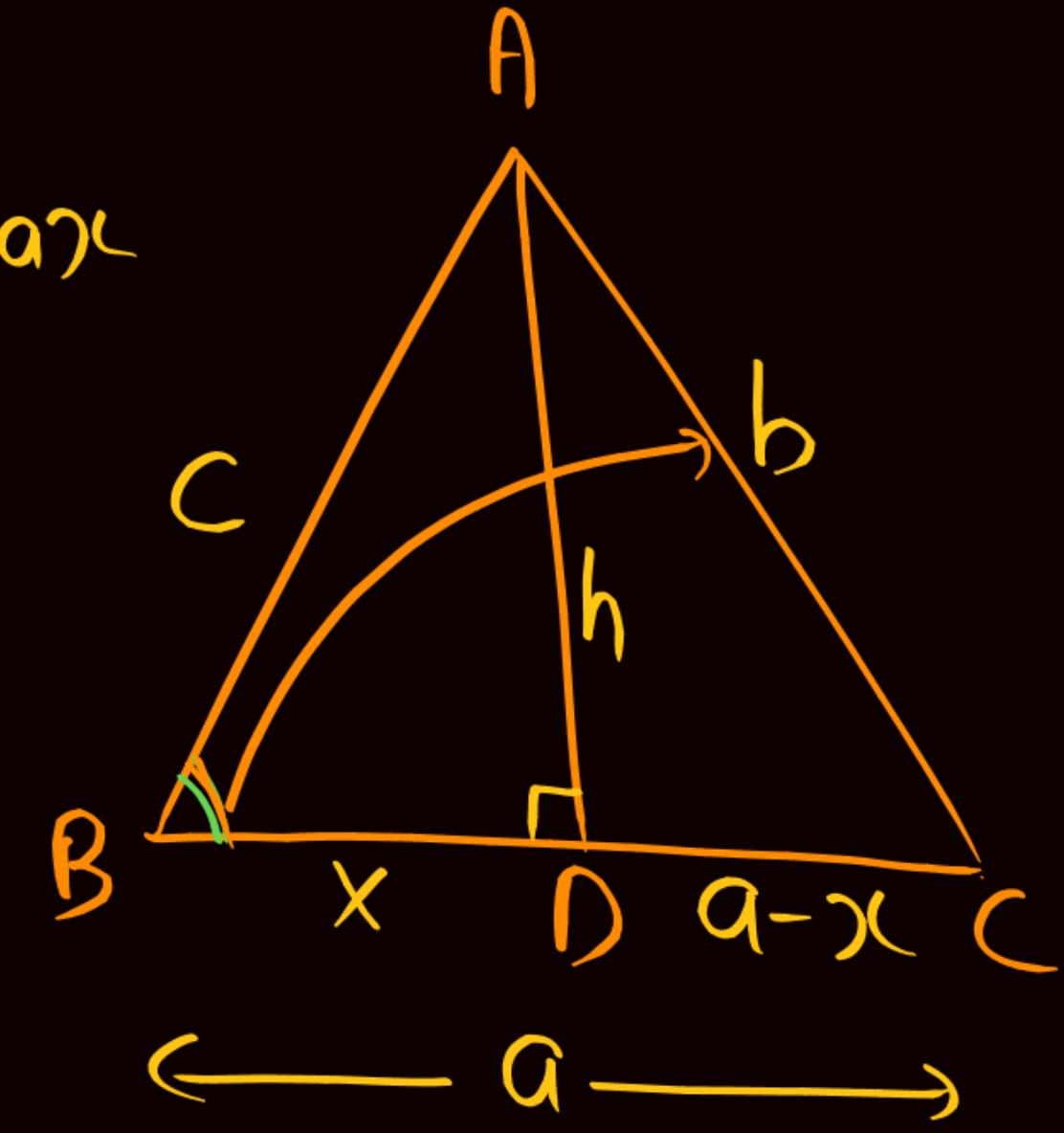
$$= 2acc \cos B$$

$$\cos B = \frac{c^2 + a^2 - b^2}{2ac}$$

Similarly,

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

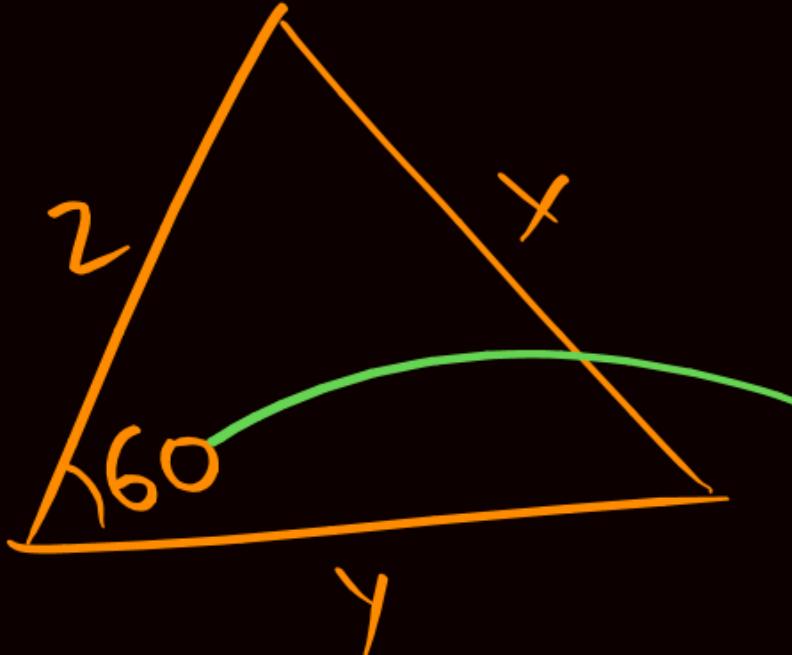
$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$



ΔABD , $\cos B = \frac{x}{c}$

$x = c \cos B$

(i)

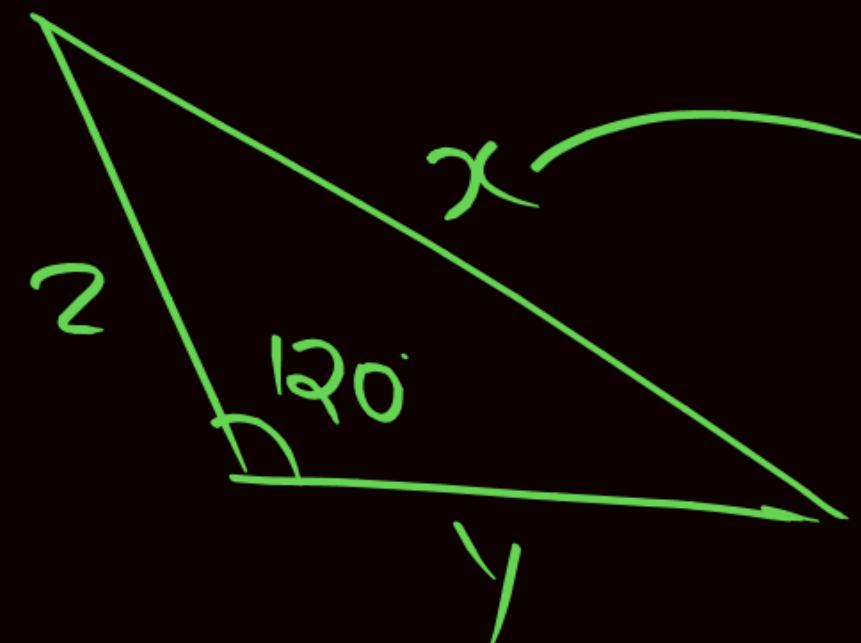


$$\cos 60^\circ = \frac{1}{2} = \frac{z^2 + y^2 - x^2}{2zy}$$

$$2zy = z^2 + y^2 - x^2$$

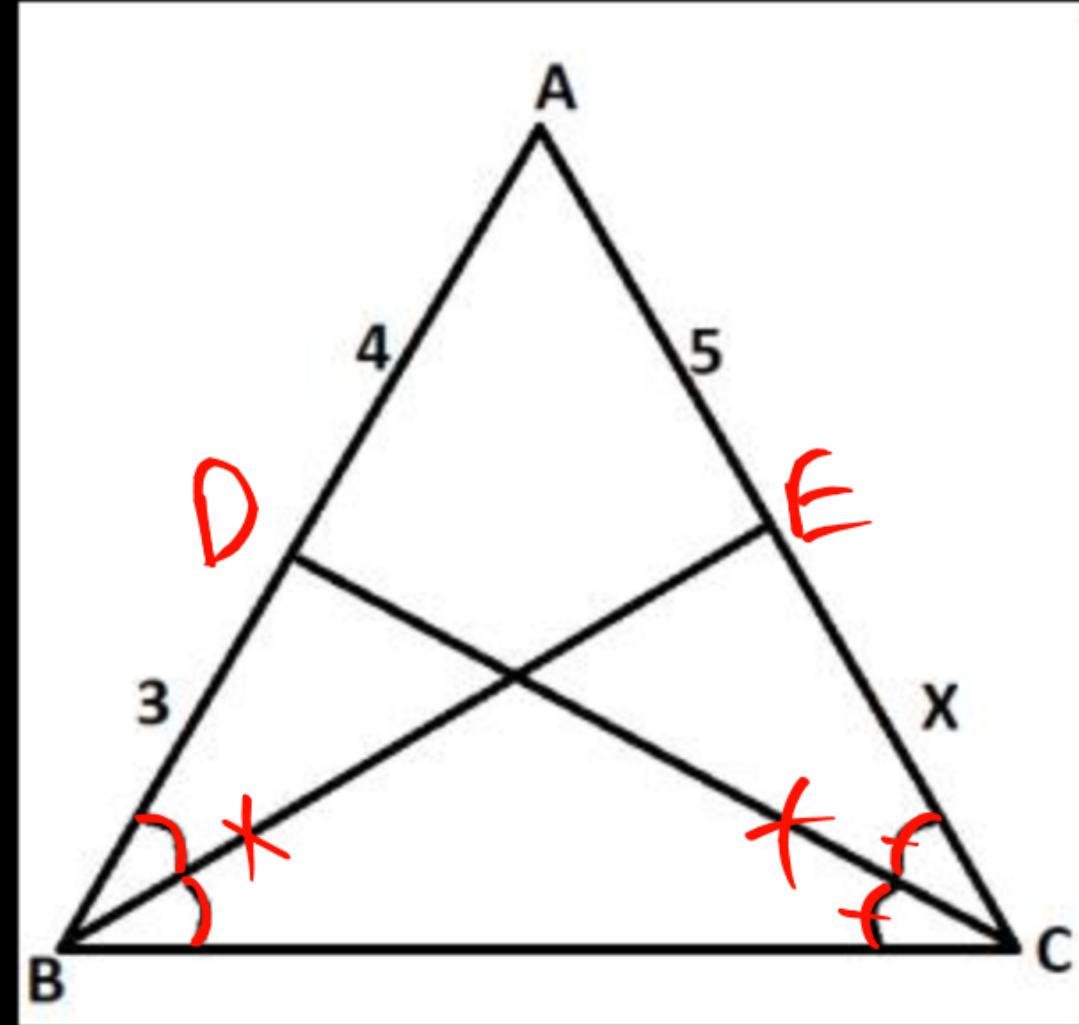
$$x^2 = z^2 + y^2 - 2zy$$

(ii)



$$x^2 = z^2 + y^2 + 2zy$$

Apply,
angle bisector
theorem
twice



$\angle DAB$, $\angle EBC$ are angle bisector

$$\frac{7x}{5} = \frac{3(S+x)}{4}$$

$$13x = 7S$$

$$x = \frac{7S}{13}$$

Find the value of $x = ?$

- a) $\frac{75}{13}$
 b) $\frac{70}{13}$
 c) $\frac{85}{13}$.
 d) None

BE-angle bisector

$$\frac{AE}{EC} = \frac{AB}{BC}$$

$$\frac{S}{x} = \frac{7}{BC}$$

$$BC = \frac{7x}{5}$$

CD-angle bisector

$$\frac{AC}{CB} = \frac{AD}{DB}$$

$$\frac{S+x}{BC} = \frac{4}{3}$$

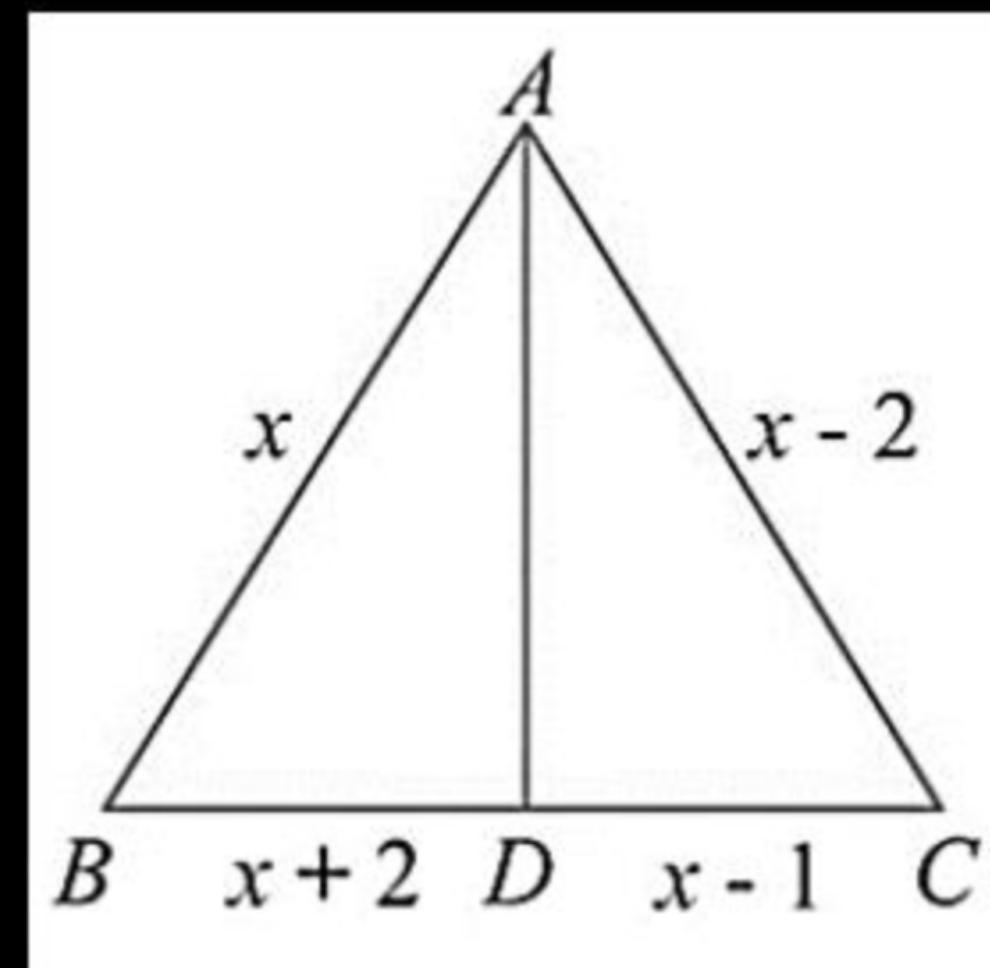
$$BC = \frac{3(S+x)}{4}$$

In $\triangle ABC$, if AD bisects $\angle BAC$. Find the value of x ?

$\triangle ABC$ में, यदि AD $\angle BAC$ को समद्विभाजित करता है। x का मान जात करें ?

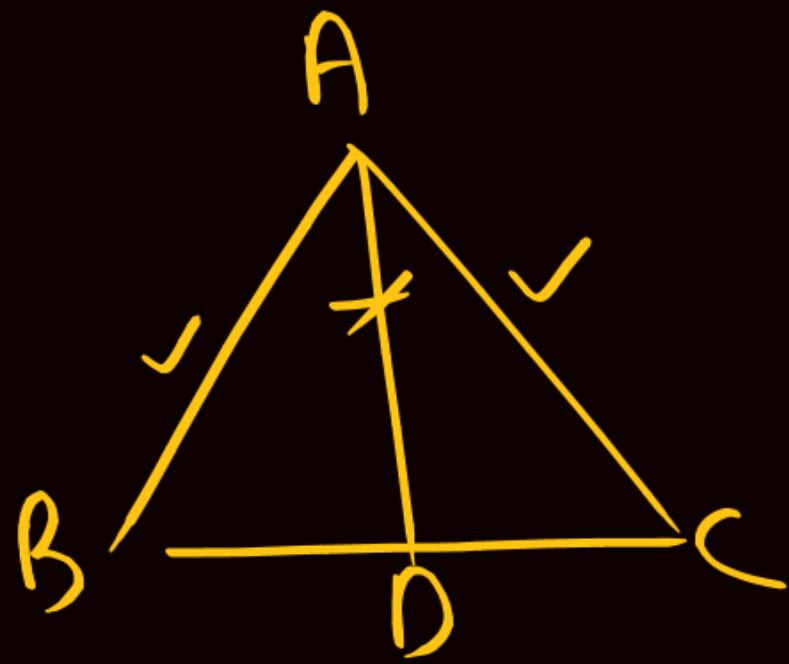
- (a) 8
- (b) 7
- (c) 6
- (d) 4

R.W.

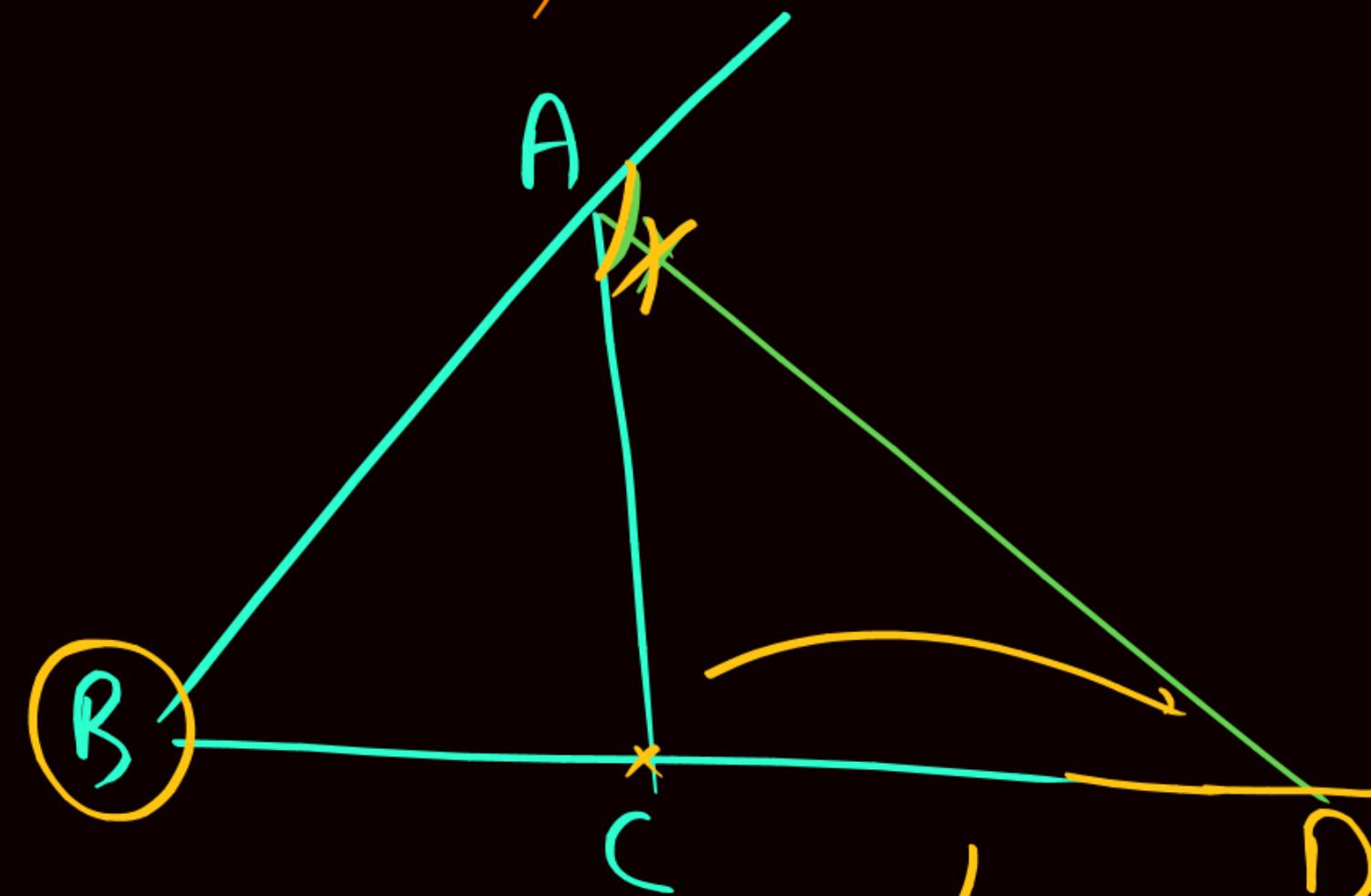


exterior angle bisector theorem.

(आदृप कोण समान्तरालक प्रमेय)



$$\left(\frac{AB}{AC} = \frac{BD}{DC} \right)$$



If the angles of a triangle are 90° , 60° and 30° , then what the ratio of the sides opposite to these angles?

यदि एक त्रिभुज के कोण 90° , 60° और 30° हैं, तो इन कोणों के विपरीत भुजाओं का अनुपात क्या है?

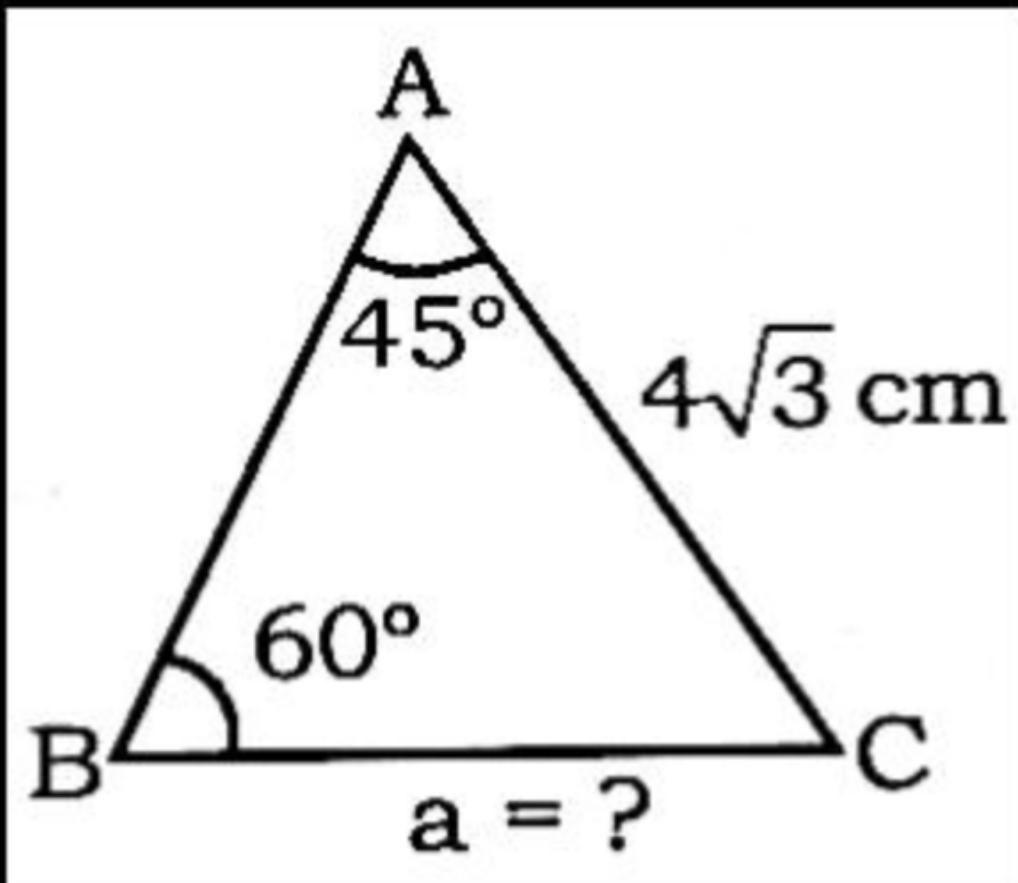
- (a) $\sqrt{3} : \sqrt{2} : 1$
- (b) $1 : \sqrt{2} : 2$
- (c) $2 : \sqrt{3} : 1$
- (d) $3 : 2 : 1$

Q^w

In the given figure, find the value of a ?

दी गई आकृति में a का मान ज्ञात कीजिए।

- (a) 4 cm
- (b) $4\sqrt{2}$ cm
- (c) $2\sqrt{3}$ cm
- (d) 2 cm

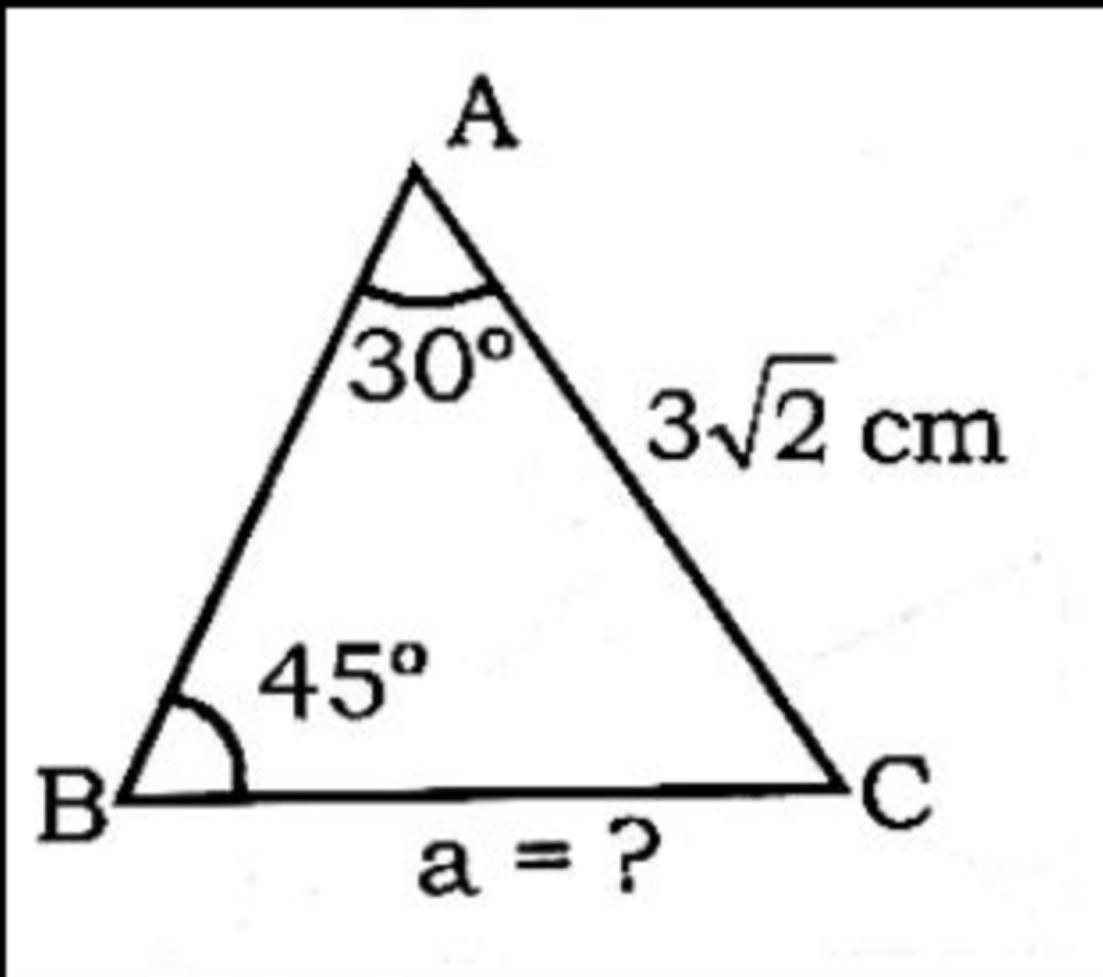


Q.~

In the given figure, find the value of a ?

दी गई आकृति में a का मान ज्ञात कीजिए।

- (a) 3 cm
- (b) $3\sqrt{3}$ cm
- (c) 4 cm
- (d) $4\sqrt{2}$ cm



Rω

In $\triangle ABC$, $\angle B = 60^\circ$, $\angle C = 45^\circ$ and AD divides BC in the ratio 1 : 3, then find

$$\frac{\sin \angle BAD}{\sin \angle CAD}$$
 ?

$\triangle ABC$ में, $\angle B = 60^\circ$, $\angle C = 45^\circ$ और AD , BC को 1:3 के अनुपात में विभाजित करता है, तो $\frac{\sin \angle BAD}{\sin \angle CAD}$ ज्ञात कीजिए?

(a) $\frac{1}{\sqrt{3}} \Delta ABD$ में,

$$\frac{\sin \alpha}{1} = \frac{\sin 60}{AD} \Rightarrow AD \sin \alpha = 1 \cdot \sin 60$$

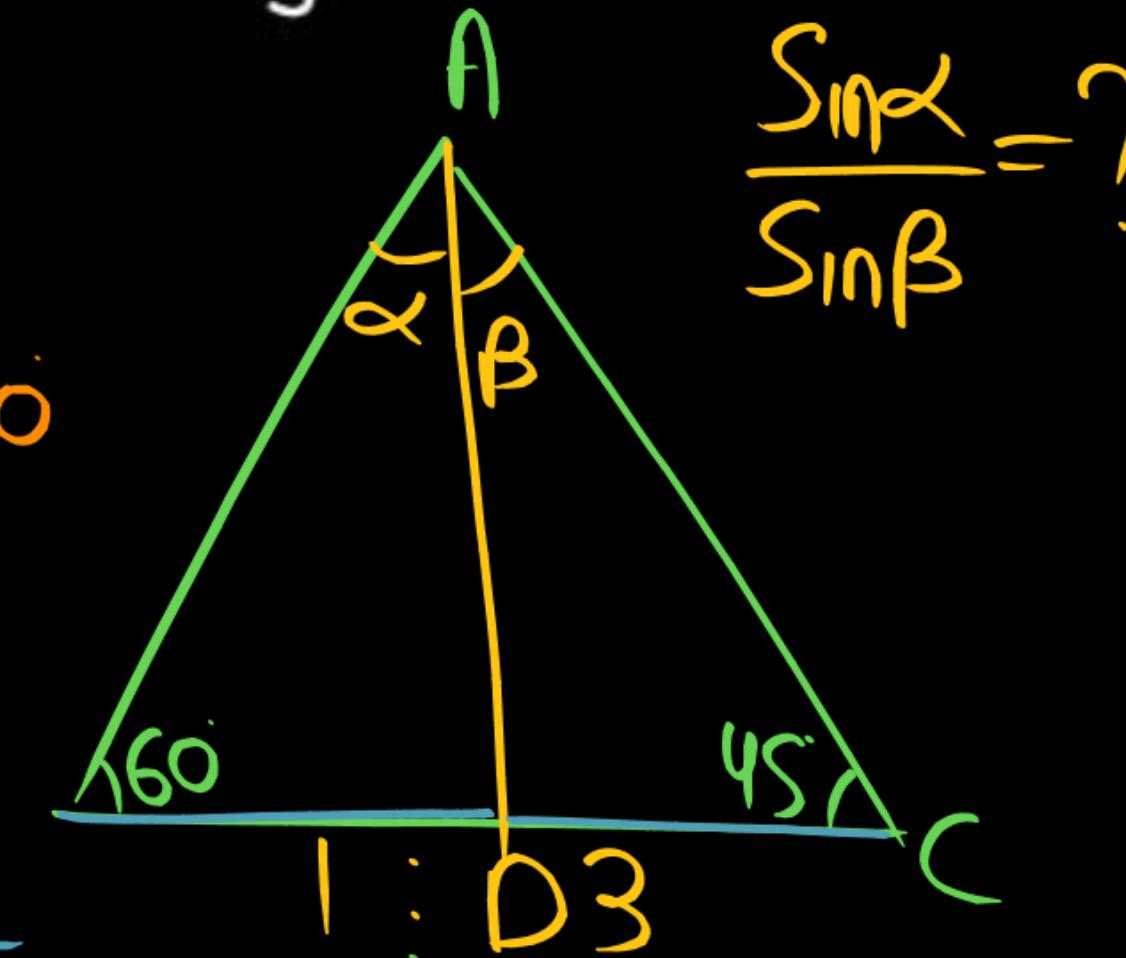
(b) $\frac{1}{\sqrt{5}}$

(c) $\frac{1}{\sqrt{6}} \Delta ACD$ में,

$$\frac{\sin \beta}{3} = \frac{\sin 45}{AD} \Rightarrow AD \sin \beta = 3 \sin 45 \beta$$

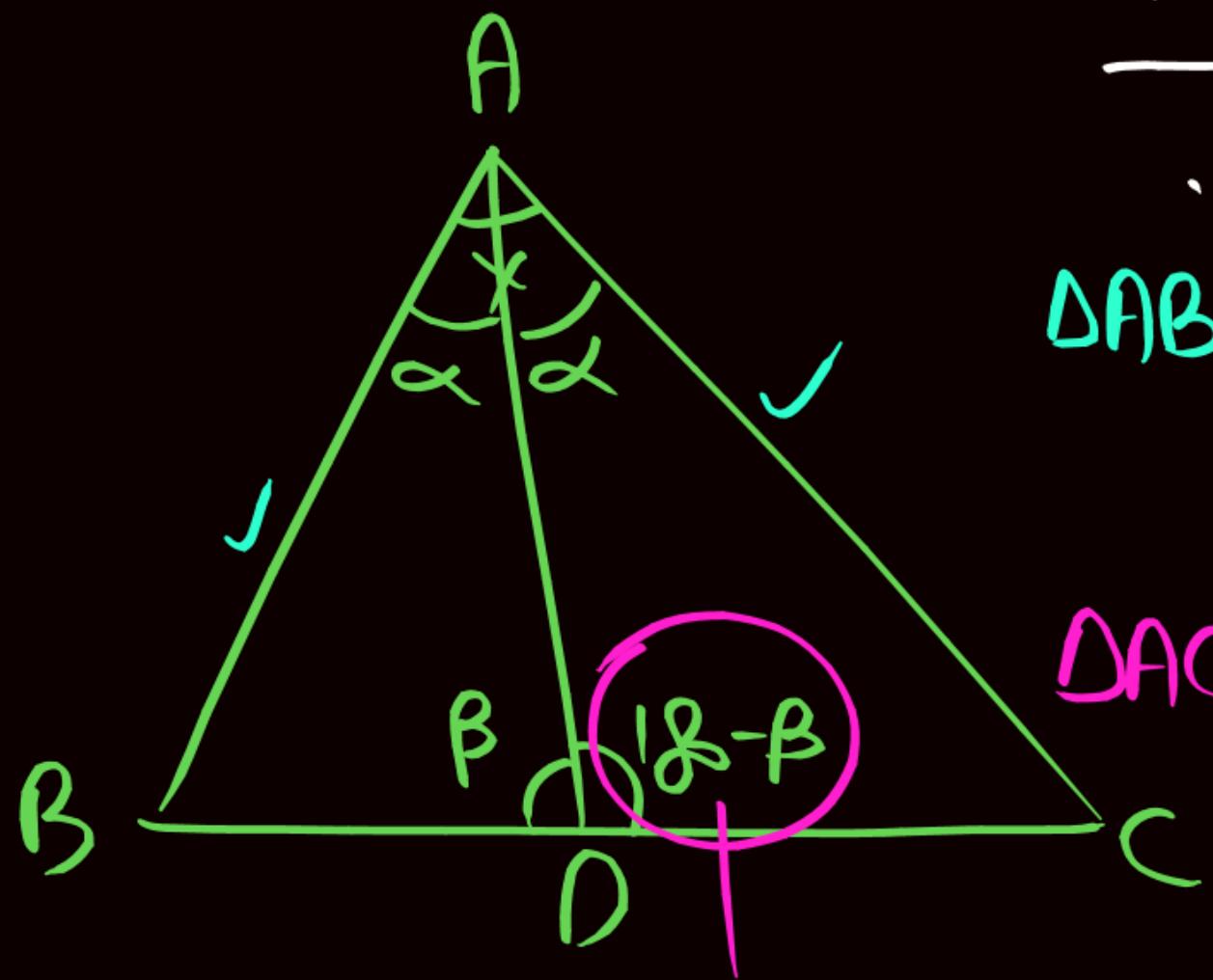
(d) $\sqrt{3}$

$$\frac{\sin \alpha}{\sin \beta} = \frac{\sqrt{3}/2}{3/\sqrt{2}} = \frac{1}{\sqrt{3} \cdot \sqrt{2}} = \frac{1}{\sqrt{6}}$$



Internal angle bisector theorem

. अन्तःकोण समद्विभाजक प्रमेय



$$\sin(180 - \beta) = \sin \beta$$

$\triangle ABD$ में, $\frac{\sin \alpha}{BD} = \frac{\sin \beta}{AB} \Rightarrow AB \sin \alpha = BD \sin \beta$

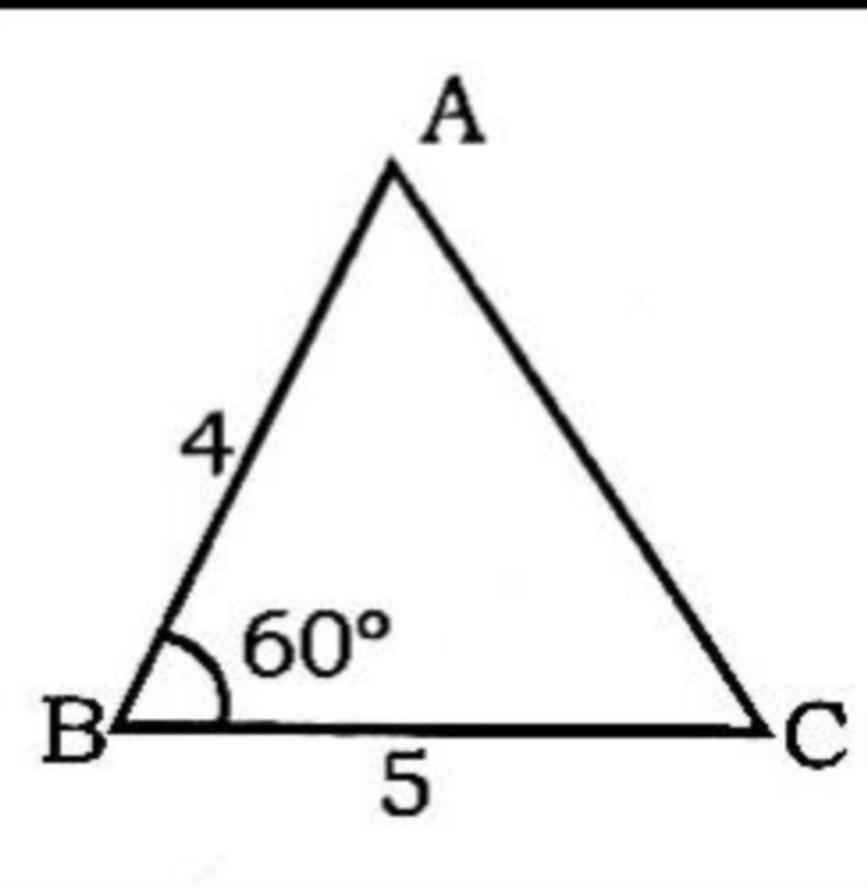
$\triangle ACD$ में, $\frac{\sin \alpha}{CD} = \frac{\sin \beta}{AC} \Rightarrow AC \sin \alpha = CD \sin \beta$

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

In the given figure, find the length of AC ?

दी गई आकृति में, AC की लंबाई ज्ञात कीजिए?

- (a) 5
- (b) $\sqrt{21}$
- (c) $2\sqrt{5}$
- (d) None of these



Rw

In $\triangle ABC$, $\angle ABC = 120^\circ$, then relation between sides is :

$\triangle ABC$ में, $\angle ABC = 120^\circ$ है, तो भुजाओं के बीच संबंध है :

- (a) $b^2 = a^2 + c^2 + ac$
- (b) $b^2 = a^2 + c^2 - ac$
- (c) $b^2 = a^2 + c^2 - 2ac$
- (d) $b^2 = a^2 + c^2 + 2ac$

Q^w

Three sides of a triangle are 7 cm , $4\sqrt{3} \text{ cm}$ and $\sqrt{13} \text{ cm}$, then find the smallest angle ?

एक त्रिभुज की तीन भुजाएँ 7 सेमी, $4\sqrt{3}$ सेमी और $\sqrt{13}$ सेमी हैं, तो सबसे छोटा कोण ज्ञात कीजिए?

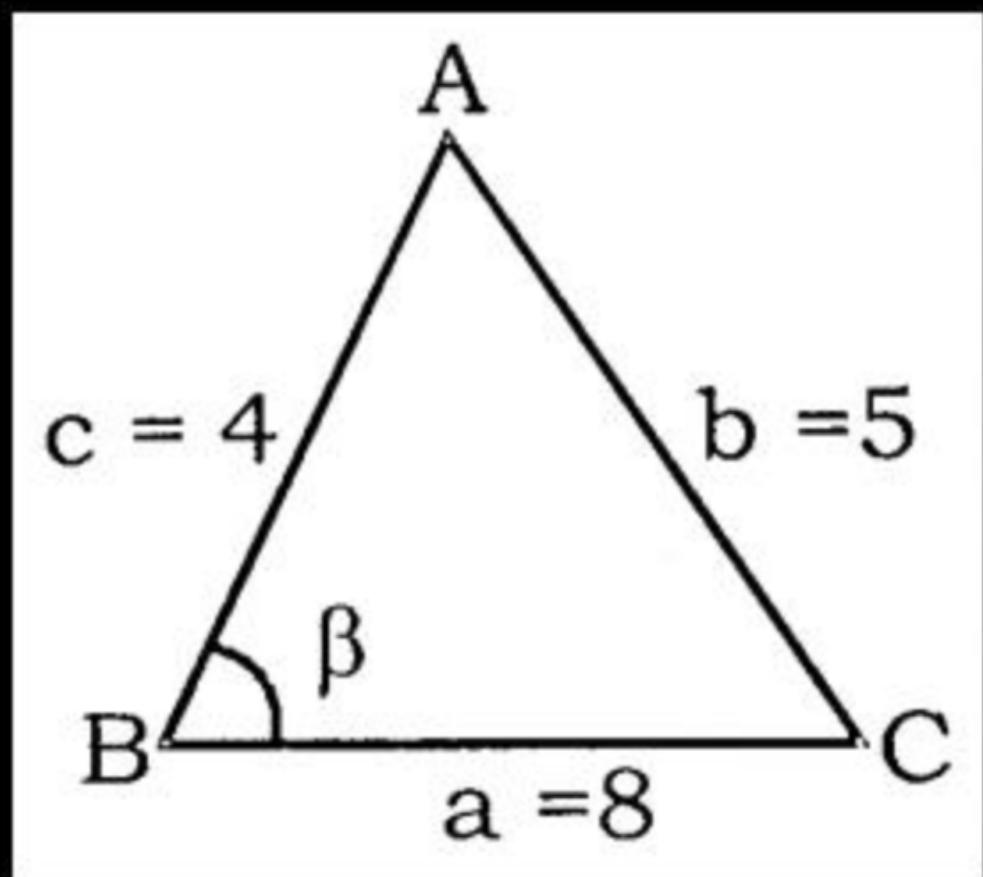
- (a) 15°
- (b) 30°
- (c) 45°
- (d) 60°

Rω

In $\triangle ABC$, $AB = 4 \text{ cm}$, $BC = 8 \text{ cm}$ and $AC = 5 \text{ cm}$, then find $\cos\beta$?

$\triangle ABC$ में, $AB = 4 \text{ सेमी}$, $BC = 8 \text{ सेमी}$ और $AC = 5 \text{ सेमी}$, तो $\cos\beta$ ज्ञात कीजिए।

- (a) $\frac{64}{55}$
- (b) $\frac{55}{64}$
- (c) 120
- (d) 60



QW