

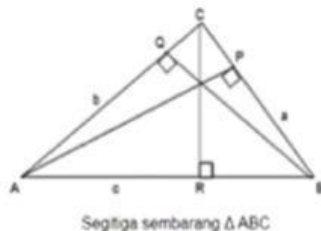
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Kelas: A

Materi: menggunakan aturan sinus dan cosinus dalam segitiga sembarang.

Aturan Sinus



Keterangan:

a = panjang sisi a

A = besar sudut di hadapan sisi a

b = panjang sisi b

B = besar sudut di hadapan sisi b

c = panjang sisi c

C = besar sudut di hadapan sisi c

$$\triangle ACR \quad \sin A = \frac{CR}{b} \rightarrow CR = b \cdot \sin A \dots \dots \dots (1)$$

$$\triangle BCR \quad \sin B = \frac{CR}{a} \rightarrow CR = a \cdot \sin B \dots \dots \dots (2)$$

(1) dan (2)

$$b \cdot \sin A = a \cdot \sin B \rightarrow \frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\Delta APC \rightarrow \frac{a}{\sin A} = \frac{c}{\sin C}$$

ΔABC sembarang berlaku

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

Contoh :

Sebuah segitiga diketahui memiliki sudut $A = 30^\circ$, sisi $a = 3$ dan sisi $b = 4$. Hitung besar sudut B , besar sudut C dan panjang sisi c !

Penyelesaian:

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

$$\frac{b}{\sin B} = \frac{a}{\sin A}$$

$$\frac{b}{\sin B} = \frac{b \cdot \sin A}{a} = \frac{4 \cdot \sin 30}{3} = \frac{4 \cdot \frac{1}{2}}{3} = \frac{2}{3}$$

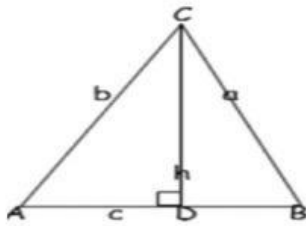
$$B = \arcsin \frac{2}{3} = 41,80 \dots \dots \dots (1)$$

$$B = (180 - 41,8) = 138,2^\circ \dots \dots \dots (2)$$

$$C = 180 - (A + B) = 180 - (30 + 41,8) = 108,2^\circ$$

$$C = 180 - (4 + B) = 180 - (30 + 138,2) = 11,8^\circ$$

Aturan kosinus:



Segitiga sembarang $\triangle ABC$

Keterangan:

a = panjang sisi a

A = besar sudut di hadapan sisi a

b = panjang sisi b

B = besar sudut di hadapan sisi b

c = panjang sisi c

C = besar sudut di hadapan sisi c

$\triangle DBC$

$$\sin B = \frac{h}{a} \rightarrow h = a \cdot \sin B$$

$$\cos B = \frac{DB}{a} \rightarrow DB = a \cos B$$

$$AD = AB - DB = c - a \cos B$$

$\triangle ADC$. LA

$$b^2 = AD^2 + CD^2 = (c - a \cos B)^2 + (a \sin B)^2$$

$$= c^2 - 2ac \cos B + a^2 \cos^2 B + a^2 \sin^2 B$$

$$= c^2 - 2ac \cos B + a^2 \frac{(\cos^2 B + \sin^2 B)}{2}$$

$$= c^2 - 2ac \cos B + a^2$$

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

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

$$b^2 = c^2 + a^2 - 2ca \cos B$$

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

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

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

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

Contoh soal:

Diketahui Segitiga ABC panjang sisi a = 5 cm, panjang sisi c = 6 cm dan besar sudut B = 60°. Tentukan panjang sisi b!

Penyelesaian:

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

$$= 5^2 + 6^2 - 2 \cdot 5 \cdot 6 \cos 60^\circ$$

$$= 25 + 36 - 60 \left(\frac{1}{2}\right)$$

$$= 61 - 30$$

$$= 31$$

$$b = \sqrt{31}$$

