कक्षा - 10

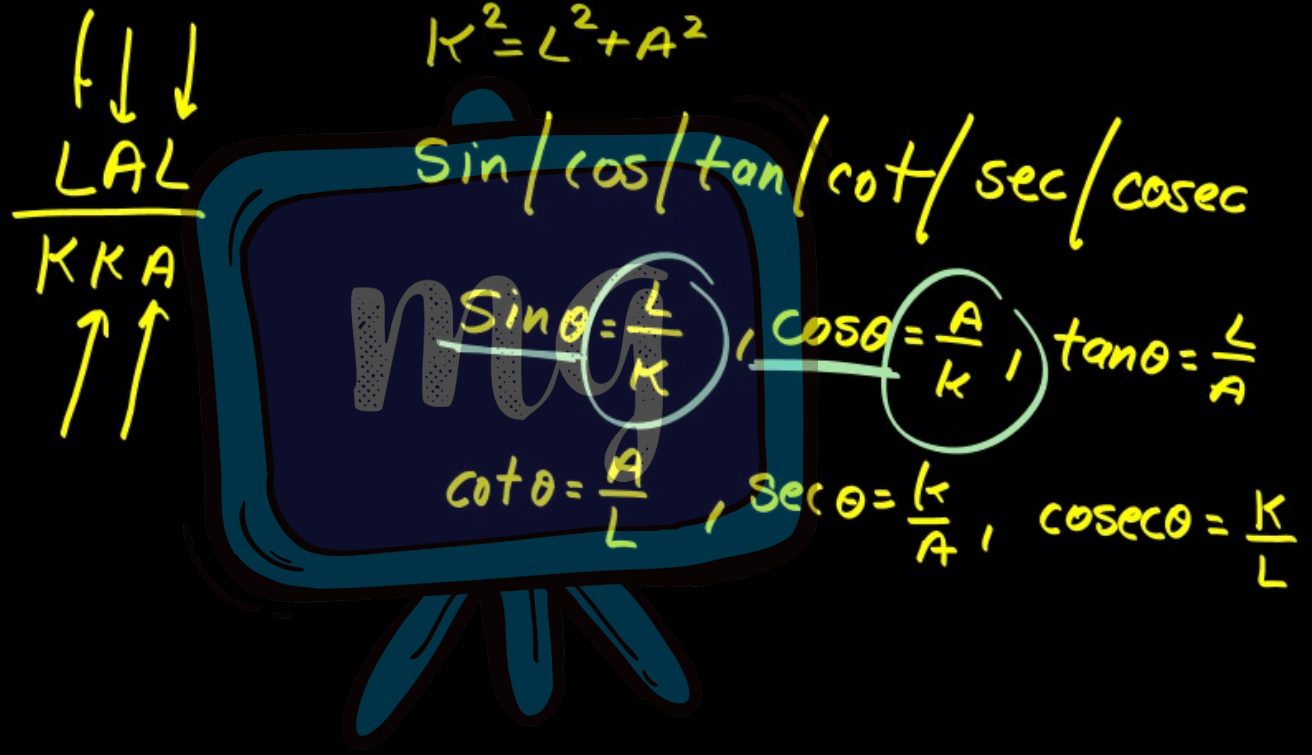
गणित

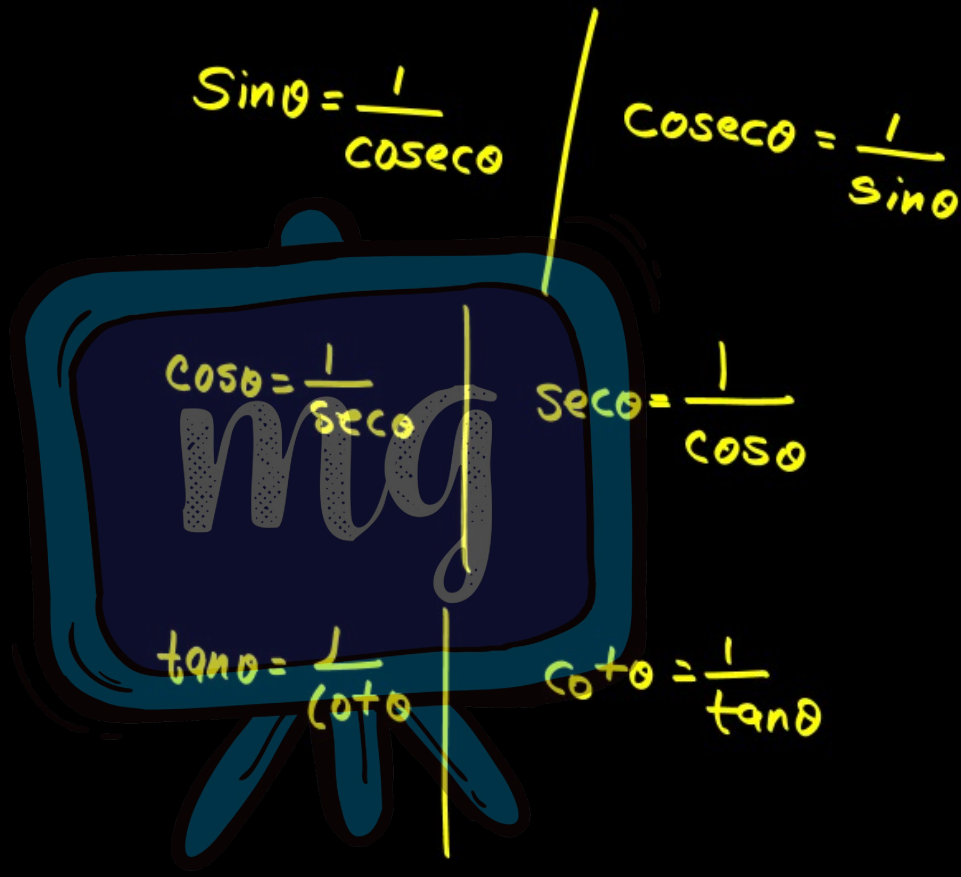
अध्याय - 8

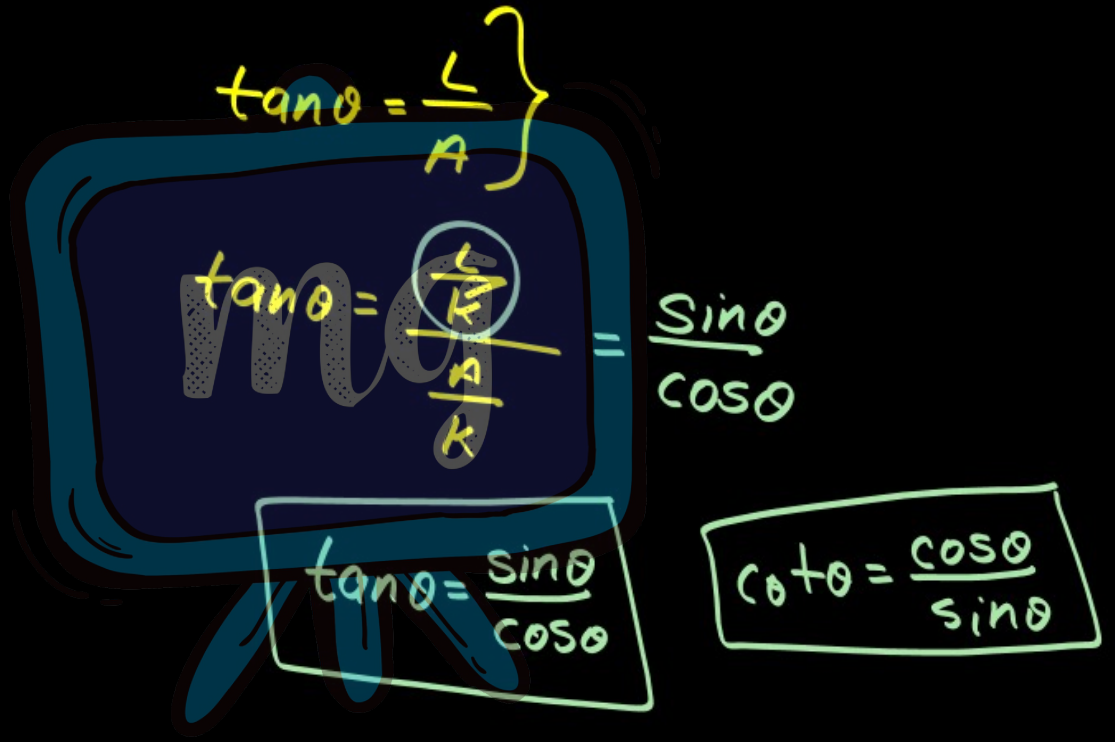
त्रिकोणमिति का परिचय

भाग - 2

केशव शर्मा







प्रश्नावली 8.1

Q. 1

ΔABC में, जिसका कोण B समकोण है, AB = 24 cm और BC = 7 cm है। निम्नलिखित का मान ज्ञात कीजिए :

(i) $\sin A, \cos A$

कोण

Capital letter

$\alpha, \beta, \gamma, \theta$

↓

LAL

KKA

$\sin A = \frac{L}{K}$

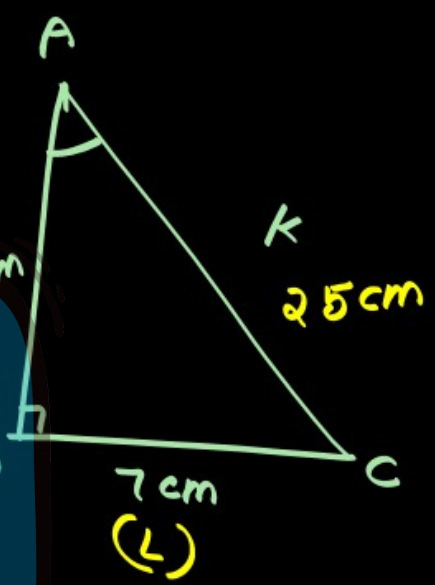
$\sin A = \frac{BC}{AC}$

$\sin A = \frac{7}{25}$

$\cos A = \frac{A}{K}$

$\cos A = \frac{AB}{AC}$

$\cos A = \frac{24}{25}$



(A) 24cm

$K^2 = L^2 + A^2$

$= 7^2 + 24^2$

$= 49 + 576$

$K^2 = 625$

$K = \sqrt{625}$

$K = 25$

$\sec A = \frac{1}{\cos A}$

$\sec A = \frac{1}{\frac{24}{25}}$

$\sec A = \frac{25}{24}$

$\tan A = \frac{L}{A}$

$\tan A = \frac{7}{24}$

$\cot A = \frac{1}{\tan A}$

$\cot A = \frac{1}{\frac{7}{24}}$

$\cot A = \frac{24}{7}$

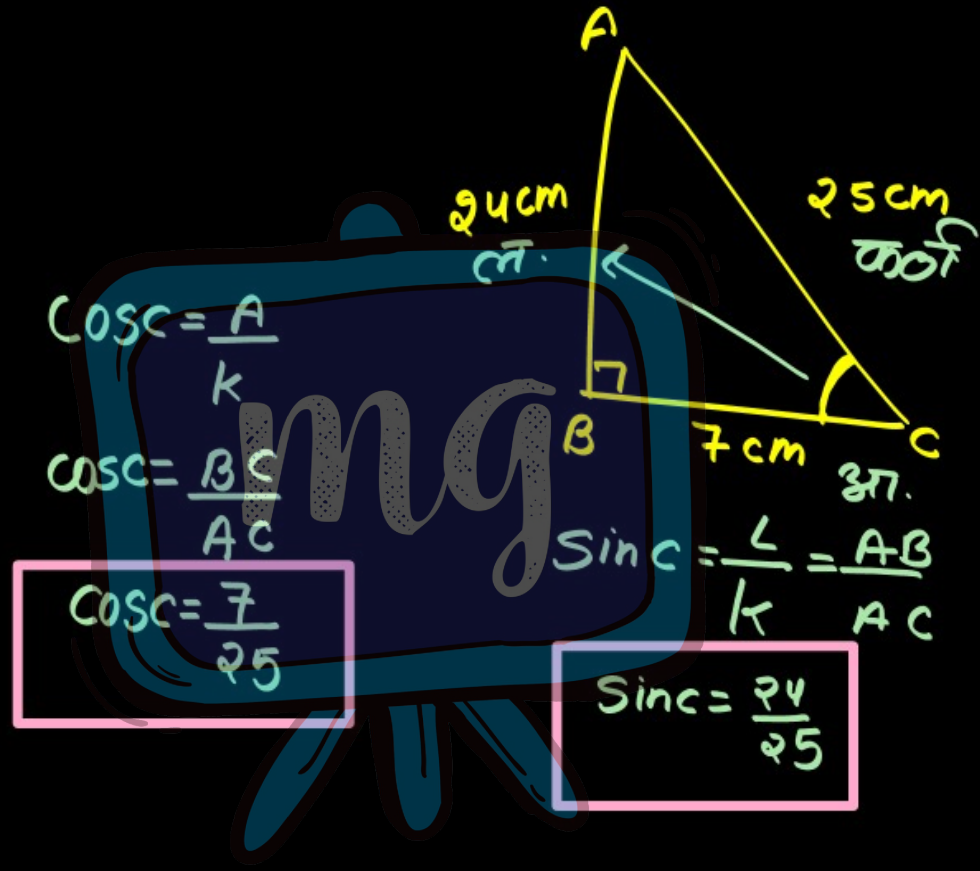
$\tan A = \frac{\sin A}{\cos A}$

$\tan A = \frac{\frac{7}{25}}{\frac{24}{25}} = \frac{7}{24}$

Q. 1

ΔABC में, जिसका कोण B समकोण है, AB = 24 cm और BC = 7 cm है। निम्नलिखित का मान ज्ञात कीजिए :

(ii) sin C, cos C



$$\cos C = \frac{A}{k}$$

$$\cos C = \frac{BC}{AC}$$

$$\cos C = \frac{7}{25}$$

$$\sin C = \frac{L}{k} = \frac{AB}{AC}$$

$$\sin C = \frac{24}{25}$$

Q. 2

आकृति में, tanP – cotR का मान ज्ञात कीजिए।

(i) $\tan P - \cot R$

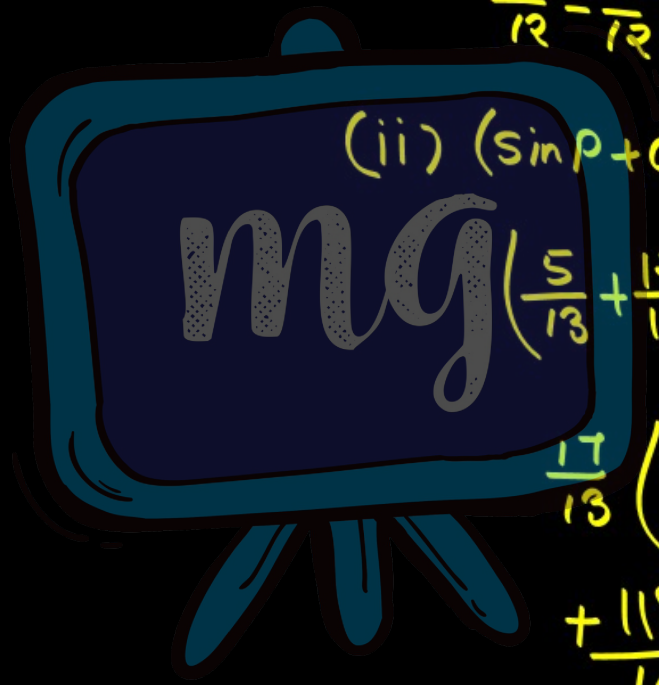
(ii) $(\sin P + \cos P)(\sin R - \cos R)$

(iii) $\sin^2 P + \cos^2 P$

(iv) $\frac{1}{\tan P} - \frac{1}{\cot R}$

(i) $\tan P - \cot R$

$\frac{5}{12} - \frac{5}{12} = 0$



(ii) $(\sin P + \cos P)(\sin R - \cos R)$

$\left(\frac{5}{13} + \frac{12}{13}\right)\left(\frac{12}{13} - \frac{5}{13}\right)$

$\frac{17}{13}\left(\frac{+7}{13}\right)$

$\frac{+119}{169}$

$\tan P - \cot R$

$\sin P = \frac{L}{K} = \frac{QR}{PR}$

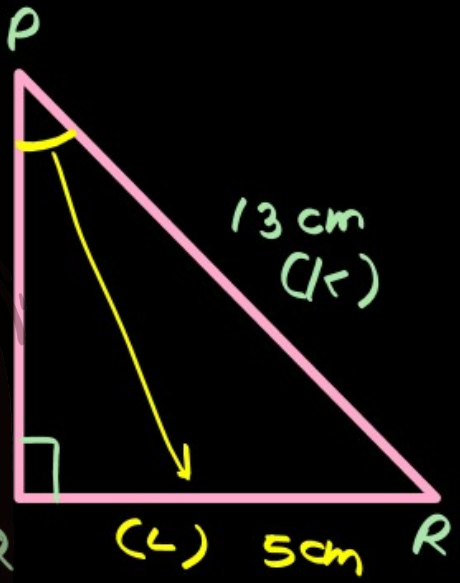
$\sin P = \frac{5}{13}$

$\cos P = \frac{A}{K} = \frac{PQ}{PR}$

$\cos P = \frac{12}{13}$

$\tan P = \frac{L}{A}$

$\tan P = \frac{5}{12}$



$K^2 = L^2 + A^2$

$13^2 = 12^2 + A^2$

$169 - 144 = A^2$

$25 = A^2$

$A = 5\text{cm}$

(iii) $\sin^2 p + \cos^2 p$

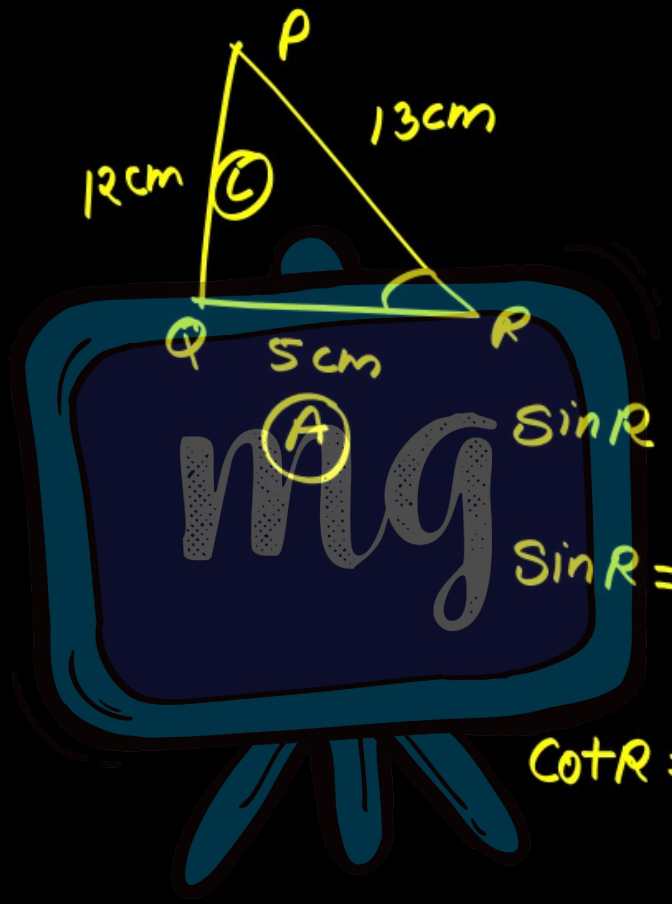
$\left(\frac{5}{13}\right)^2 + \left(\frac{12}{13}\right)^2$

$\frac{25}{169} + \frac{144}{169} = \frac{169}{169} = 1$

$\frac{12}{5} - \frac{12}{5} = 0$

(iv) $\frac{1}{\tan p} - \frac{1}{\cot R}$

$\frac{1}{\frac{5}{12}} - \frac{1}{\frac{5}{12}}$



$$\sin R = \frac{L}{K} \quad \Big| \quad \cos R = \frac{A}{K}$$

$$\sin R = \frac{12}{13} \quad \Big| \quad \cos R = \frac{5}{13}$$

$$\cot R = \frac{A}{L} = \frac{5}{12}$$

Q. 3

यदि $\sin A = \frac{3}{4}$ तो cos A और tan A का मान परिकलित कीजिए।

कर्ण^2 = ल०^2 + आ.^{2}

$(4k)^2 = (3k)^2 + \text{आ.}^2$

$16k^2 - 9k^2 = \text{आ}^2$

$7k^2 = \text{आ.}^2$

$\sqrt{7k^2} = \text{आ}$

$\sqrt{7}k = \text{आ.}$

$4\sin A = 3$

$\sin A = \frac{3}{4} = \frac{L}{k}$

लम्ब = 3k

कर्ण = 4k

$\cos A = \frac{\text{आधार}}{\text{कर्ण}}$

$= \frac{\sqrt{7}K}{4K}$

$\cos A = \frac{\sqrt{7}}{4}$

$\tan A = \frac{3}{\sqrt{7}}$

$\tan A = \frac{\text{लं.}}{\text{आ.}}$

$\tan A = \frac{3K}{\sqrt{7}K}$

Q. 4

यदि 15 cot A = 8 हो तो sin A और और sec A का मान ज्ञात कीजिए।

$\frac{L}{K}$

$15\cot A - 8 = 0$

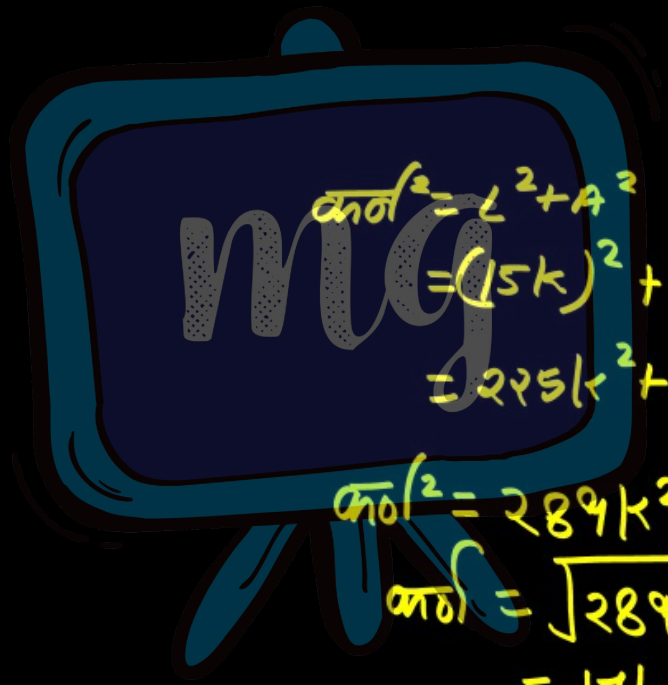
$15\cot A = 8$

$\frac{K}{A}$

$15\cot A = 8$

$\cot A = \frac{8}{15} = \frac{A}{L}$

$A = 8k, L = 15k$



$$\text{कर्ण}^2 = L^2 + A^2$$

$$= (15k)^2 + (8k)^2$$

$$= 225k^2 + 64k^2$$

$$\text{कर्ण}^2 = 289k^2$$

$$\text{कर्ण} = \sqrt{289k^2}$$

$$= \underline{17k}$$

Aim-100

Q. 5

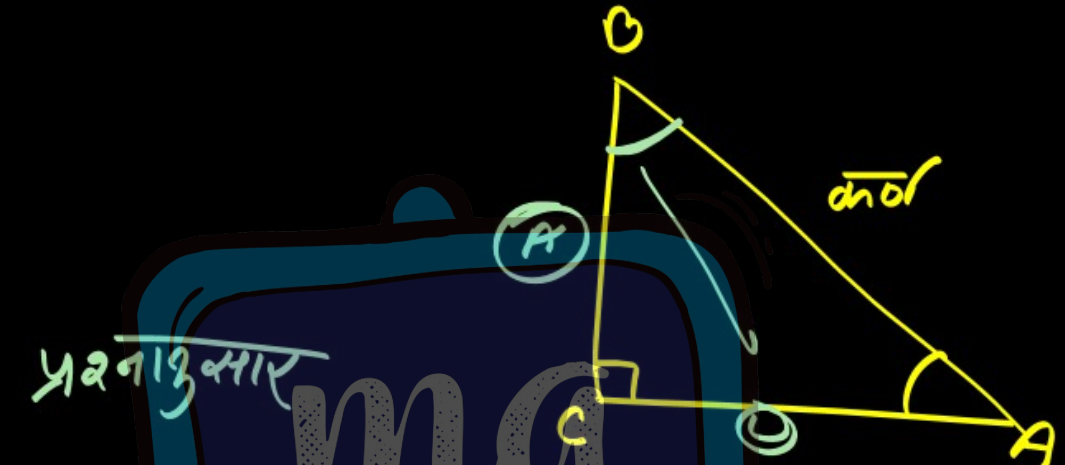
यदि $\sec\theta = \frac{13}{12}$ हो तो अन्य सभी त्रिकोणमितीय अनुपात परिकलित कीजिए।

$\sec\theta = \frac{13}{12} = \frac{k}{A}$

$l = 5$

Q. 6

यदि $\angle A$ और $\angle B$ न्यून कोण हो, जहाँ $\cos A = \cos B$, तो दिखाइए कि $\angle A = \angle B$



कर्ण

प्रश्नानुसार

$\cos A = \cos B$

$\frac{AC}{AB} = \frac{BC}{AB}$

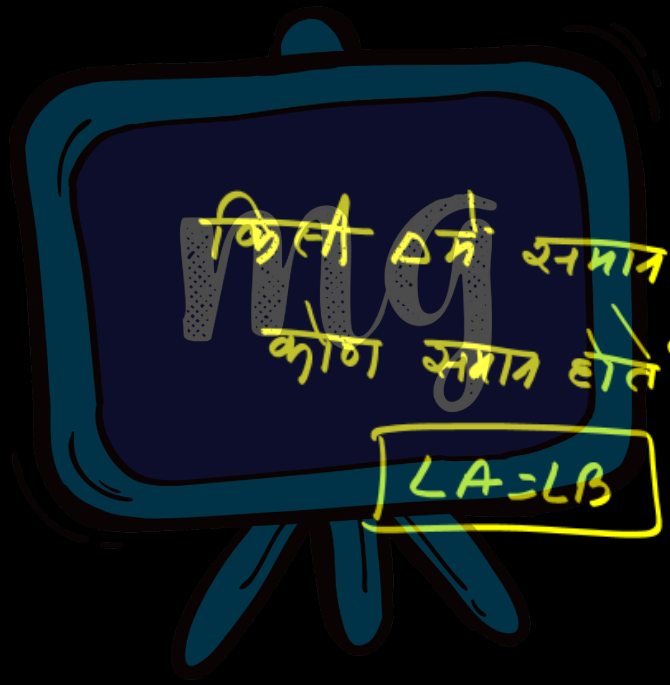
$AC = BC$

$\cos A = \frac{A}{K}$

$\cos A = \frac{AC}{AB}$

$\cos B = \frac{A}{K}$

$\cos B = \frac{BC}{AB}$



किसी Δ में समान भुजाओं के सम्मुख कोण समान होते हैं।

$\angle A = \angle B$

Q. 7

यदि $\cot\theta = \frac{7}{8}$, तो

(i) $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$

(ii) $\cot 2\theta$

का मान निकालिए?