

कक्षा - 10

गणित

अध्याय - 8

त्रिकोणमिति का परिचय

भाग - 6

केशव शर्मा

रिवीजन

$$\frac{LAL}{KKA}$$

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

$$\operatorname{cosec}\theta = \frac{K}{L}$$

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

$$\sec\theta = \frac{K}{A}$$

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

$$\cot\theta = \frac{A}{L}$$

$$\sin\theta = \frac{1}{\operatorname{cosec}\theta}, \operatorname{cosec}\theta = \frac{1}{\sin\theta}$$

$$\tan\theta = \frac{1}{\cot\theta},$$

$$\cos\theta = \frac{1}{\sec\theta},$$

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

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

$$\tan\theta = \frac{\sin\theta}{\cos\theta},$$

$$\cot\theta = \frac{\cos\theta}{\sin\theta}$$

त्रिकोणमितीय सर्वसमिकाएँ

$$1 = \sin^2\theta + \cos^2\theta \quad ① \quad \sin^2\theta + \cos^2\theta = 1$$

mg

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

दोनों तरफ K^2 से भाग करें।

$$\frac{K^2}{K^2} = \frac{L^2}{K^2} + \frac{A^2}{K^2}$$

$$\sin^2\theta + \cos^2\theta = 1$$

$$\sin^2\theta = 1 - \cos^2\theta$$

$$\cos^2\theta = 1 - \sin^2\theta$$

$$= 1^2 - \sin^2\theta$$

$$\cos^2\theta = \underline{(1+\sin\theta)(1-\sin\theta)}$$

$$\begin{aligned}a^2 - b^2 \\=(a+b)(a-b)\end{aligned}$$

mg

सिंह की जगत -

LHS

$$\frac{\frac{\theta}{\cos^2 \theta}}{1 - \sin \theta} = 1 + \sin \theta$$
$$\frac{\cos^2 \theta}{1 - \sin \theta}$$
$$= \frac{1 - \sin^2 \theta}{1 - \sin \theta} = \frac{(1 + \sin \theta)(1 - \sin \theta)}{1 - \sin \theta}$$
$$= 1 + \sin \theta$$

$$\sqrt{\sec^2 \theta - \tan^2 \theta} = 1$$

$$\frac{\sec^2 \theta}{\tan^2 \theta} = \frac{1 + \tan^2 \theta}{\tan^2 \theta}$$

$$\sec^2 \theta - 1 = \frac{\tan^2 \theta}{\tan^2 \theta}$$

(ii) $\sec^2 \theta - \tan^2 \theta = 1$

$$k^2 = l^2 + A^2$$

A^2 का आगा देनपर

$$\frac{k^2}{A^2} = \frac{l^2}{A^2} + \frac{A^2}{A^2}$$

$$\sec^2 \theta = \tan^2 \theta + 1$$

$$\boxed{\sec^2 \theta - \tan^2 \theta = 1}$$

$$\# \sec^2\theta - \tan^2\theta = 1$$

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

$$(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$$

$$\sec\theta + \tan\theta = \frac{1}{\sec\theta - \tan\theta}$$

$$\sec\theta - \tan\theta = \frac{1}{\sec\theta + \tan\theta}$$

$$\theta \cdot 2\pi \sec \theta + \tan \theta = 2p \text{ का, तो}$$

(i) $\sec \theta - \tan \theta$

(ii) $\tan \theta$

(iii) $\sec \theta$ का मान ज्ञात कीजिए।

हल-

$$\sec \theta + \tan \theta = 2p \quad -(i)$$

$$\therefore \sec \theta - \tan \theta = \frac{1}{\sec \theta + \tan \theta}$$

$$\sec \theta - \tan \theta = \frac{1}{2p} \quad -(ii)$$

समी. (i) व (ii) को जोड़ने पर

$$\cancel{\sec \theta + \tan \theta} = 2p$$

$$\cancel{\sec \theta - \tan \theta} = \frac{1}{2}p$$

समी. (i) से समी. (ii)
को घटाने पर

$$\cancel{\sec \theta + \tan \theta} = 2p$$

$$-\cancel{\sec \theta} + \cancel{\tan \theta} = \frac{1}{-2p}$$

$$2\sec \theta = \frac{2p}{1} + \frac{1}{2p}$$

$$2\sec \theta = \frac{4p^2 + 1}{2p}$$

$$\sec \theta = \frac{4p^2 + 1}{4p}$$

$$2\tan \theta = \frac{2p}{1} - \frac{1}{2p}$$

$$2\tan \theta = \frac{4p^2 - 1}{2p}$$

A blue book with a yellow cover is shown. On the cover, there is handwritten text: $k^2 = l^2 + r^2$ and l^2 . To the right of the book, there is a yellow box containing handwritten text:

(3) $\csc^2 \theta - \cot^2 \theta = 1$

$\csc^2 \theta = 1 + \cot^2 \theta$

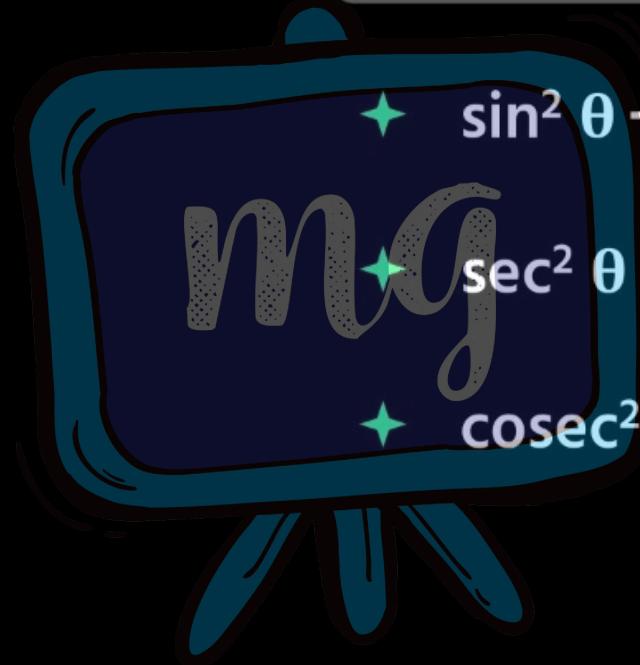
$\csc^2 \theta - 1 = \cot^2 \theta$

$(\csc \theta - \cot \theta)(\csc \theta + \cot \theta) = 1$

$\csc \theta - \cot \theta = \frac{1}{\csc \theta + \cot \theta}$



त्रिकोणमितीय सर्वसमिकाएँ



प्रश्नावली 8.3

Q.1 त्रिकोणमितीय अनुपातों $\sin A$, $\sec A$ और $\tan A$ को $\cot A$ के पदों में व्यक्त कीजिए।

$$\sec^2 A = 1 + \frac{1}{\cot^2 A}$$

$$\sec^2 A = \frac{\cot^2 A + 1}{\cot^2 A}$$

$$\sec A = \sqrt{\frac{1 + \cot^2 A}{\cot^2 A}}$$

$$\sec A = \frac{\sqrt{1 + \cot^2 A}}{\cot A}$$

हल:-

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

$$\sec^2 A - \tan^2 A = 1$$

$$\sec^2 A = 1 + \tan^2 A$$

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

$$\cos A = \frac{1}{\sqrt{1 + \cot^2 A}}$$

$$\cos A = \frac{\cot A}{\sqrt{1 + \cot^2 A}}$$

$$\sin^2 A + \cos^2 A = 1$$

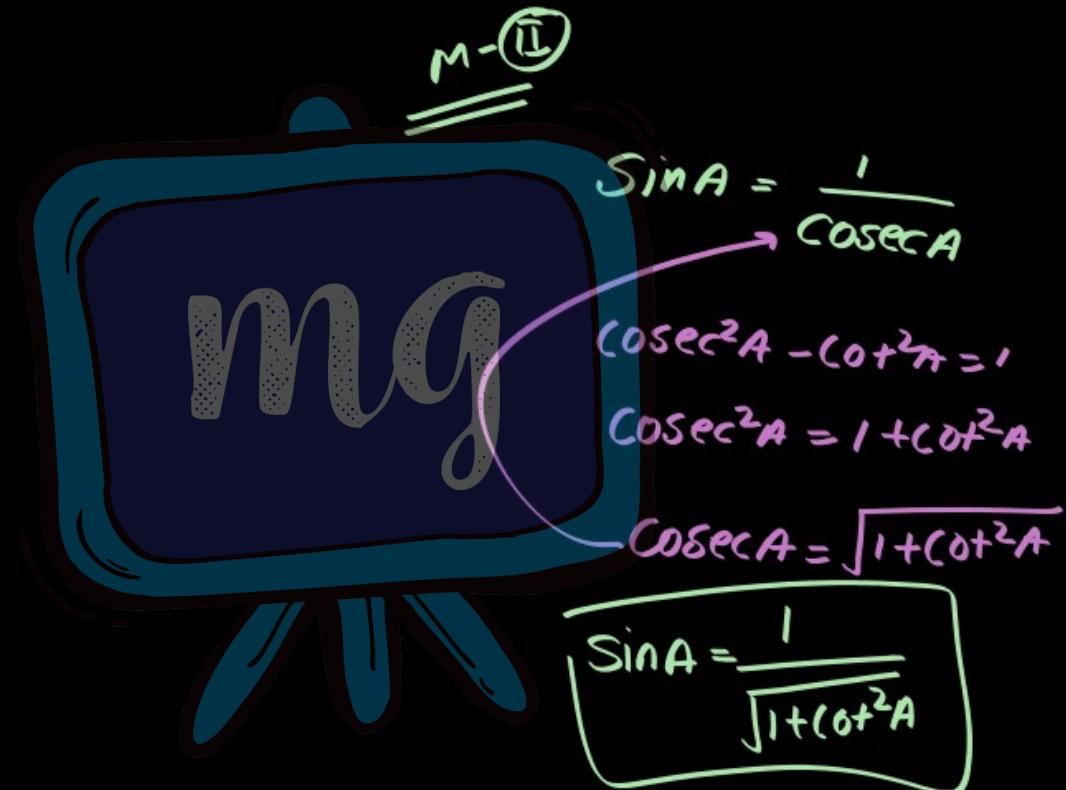
$$\begin{aligned}\sin^2 A &= \frac{1 - \cot^2 A}{1 + \cot^2 A} \\ &= \frac{1 + \cot^2 A - \cot^2 A}{1 + \cot^2 A}\end{aligned}$$

$$\sin^2 A = \frac{1}{1 + \cot^2 A}$$

$$\sin A = \sqrt{\frac{1}{1 + \cot^2 A}} = \frac{1}{\sqrt{1 + \cot^2 A}}$$

$$\sin^2 A = 1 - \cos^2 A$$

$$= 1 - \left(\frac{\cot A}{\sqrt{1 + \cot^2 A}} \right)^2$$



Q.2 $\angle A$ के अन्य सभी त्रिकोणमितीय

अनुपातों को $\sec A$ के पदों में
लिखिए।

उत्तर -

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

$$\sec^2 A = 1 + \tan^2 A$$

$$\sec^2 A - 1 = \tan^2 A$$

$$\sqrt{\sec^2 A - 1} = \tan A$$

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

$$\cot A = \frac{1}{\sqrt{\sec^2 A - 1}}$$

$$\sin A = \frac{\sqrt{\sec^2 A - 1}}{\sec A}$$

$$\sin A = \frac{\sqrt{\sec^2 A - 1}}{\sec A}$$

$$\csc A = \frac{1}{\sin A}$$

$$\csc A = \frac{\sec A}{\sqrt{\sec^2 A - 1}}$$

$$\sin^2 A = 1 - \cos^2 A$$

$$\sin^2 A = 1 - \left(\frac{1}{\sec A} \right)^2$$

$$= 1 - \frac{1}{\sec^2 A}$$

$$\sin^2 A = \frac{\sec^2 A - 1}{\sec^2 A}$$

Q1. $\angle B$ के लिए अन्य समस्ति को
निची दर्शाया गया है को $\cos B$ के
केवल ने लिखिए।

Q2. $\frac{2\sqrt{6}}{3}$ $\sec A - \tan A = \frac{1}{3}$ तो

(i) $\sec A + \tan A$

(ii) $2\sec A$

(iii) $3\tan A$ के मान बताएं।

$$\sin = \frac{1}{\csc}$$

$$\checkmark \sin^2 \theta + \cos^2 \theta = 1$$

$$\sin^2 \theta = 1 - \cos^2 \theta$$

$$\sec^2 \theta = 1 + \tan^2 \theta$$

$$\sec^2 \theta - 1 = \tan^2 \theta$$