Under CSR Support by RIICO Foundation missiongyan

RIICO GROW WITH RAJASTHAN

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कक्षा-10 गणित | हिंदी माध्यम

ARJUN BATCH

त्रिकोणमिति का परिचय

अध्याय-8, भाग-7



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आज क्या पढेंगे ?

1 प्रश्नावली 8.3



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

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

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

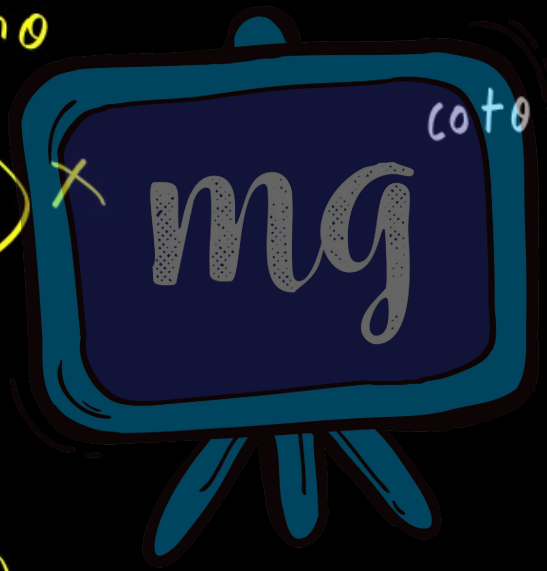
$\cos\theta = \frac{1}{\sec\theta}$

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

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

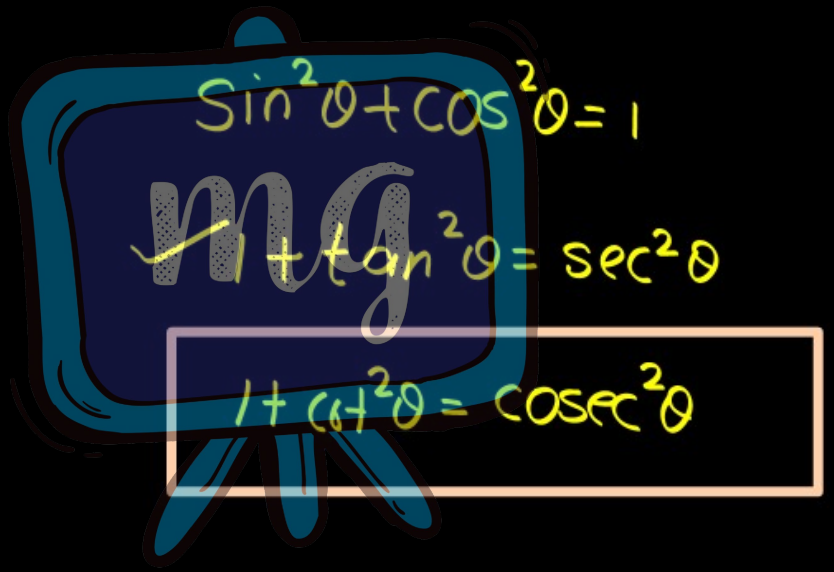
$\tan\theta = \frac{\sin\theta}{\cos\theta}$ ✓

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



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

हल :-

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

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

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

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

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

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

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

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

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

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

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

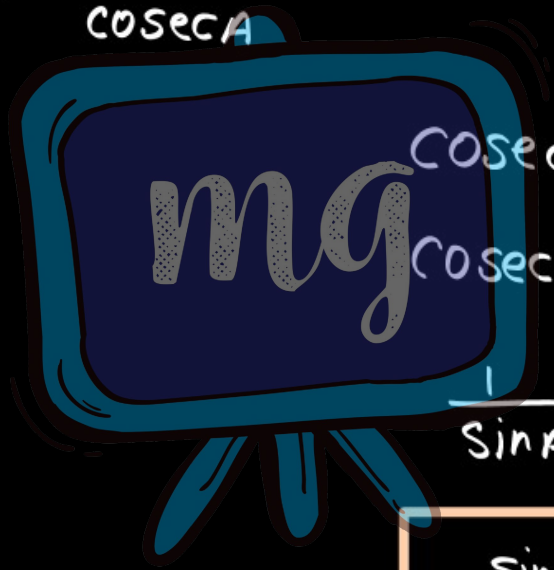
$$\sin A = \frac{1}{\sqrt{1+\cot^2 A}}$$

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

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$$\sin A = \frac{1}{\operatorname{cosec} A}$$



$$\operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$\operatorname{cosec} A = \sqrt{1 + \cot^2 A}$$

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

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

प्रश्नावली 8.3

Q.2 $\angle A$ के अन्य सभी त्रिकोणमितीय अनुपातों को sec A के पदों में लिखिए।

हल :-

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

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

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

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

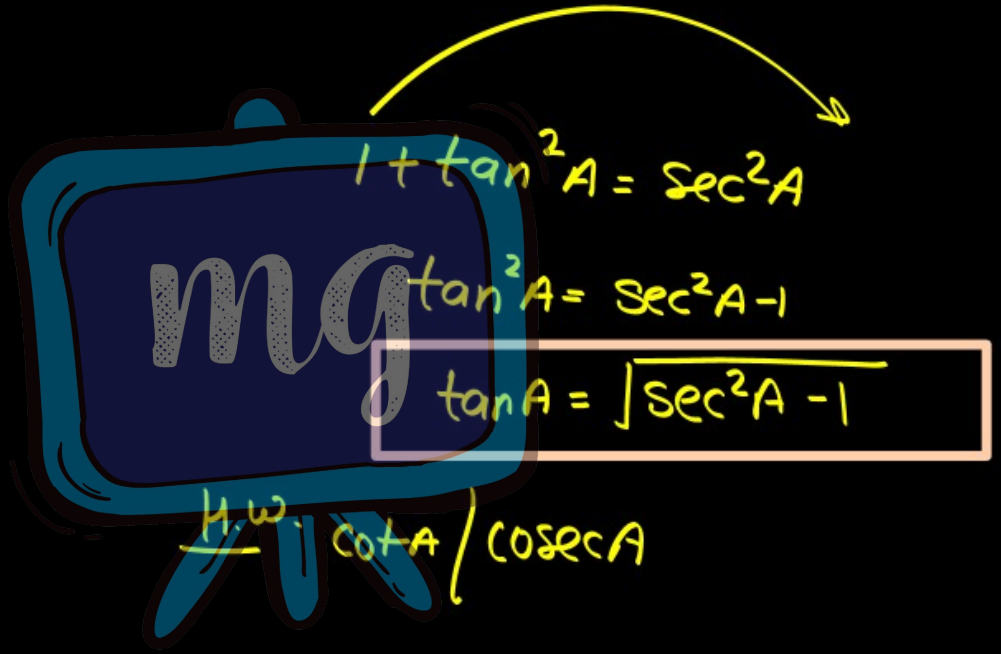
$\sin^2 A = \frac{\sec^2 A - 1}{\sec^2 A}$

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

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

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

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

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

H.W. $\cot A$ / $\operatorname{cosec} A$

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

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

प्रश्नावली 8.3

$9\sec^2 A - 9\tan^2 A$

$9(\sec^2 A - \tan^2 A)$

$9 \times 1 = 9$

Q.3 सही विकल्प चुनिए और अपने विकल्प की पुष्टि कीजिए :

(i) $9\sec^2 A - 9\tan^2 A$ बराबर है :

(अ) 1 (ब) 9

(स) 8 (द) 10

प्रश्नावली 8.3

(ii) $(1 + \tan\theta + \sec 0)(1 + \cot\theta - \operatorname{cosec}\theta)$ बराबर है :

(अ) 1 (ब) 2

(स) -1 (द) 0

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

$= \dfrac{1+2\sin\theta\cos\theta-1}{\sin\theta\cos\theta}$

$= \dfrac{2\sin\theta\cos\theta}{\sin\theta\cos\theta}$

$= 2$

$(1+\tan\theta+\sec\theta)(1+\cot\theta-\operatorname{cosec}\theta)$

$\left(\dfrac{1}{1}+\dfrac{\sin\theta}{\cos\theta}+\dfrac{1}{\cos\theta}\right)\left(\dfrac{1}{1}+\dfrac{\cos\theta}{\sin\theta}-\dfrac{1}{\sin\theta}\right)$

$\left(\dfrac{\cos\theta+\sin\theta+1}{\cos\theta}\right)\left(\dfrac{\sin\theta+\cos\theta-1}{\sin\theta}\right)$

$\dfrac{(\underbrace{\sin\theta+\cos\theta}_{a}+\underbrace{1}_{b})(\underbrace{\sin\theta+\cos\theta}_{a}-\underbrace{1}_{b})}{\sin\theta\cos\theta}$

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

$= \dfrac{\sin^2\theta+\cos^2\theta+2\sin\theta\cos\theta-1}{\sin\theta\cos\theta}$

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

$$= \sin\theta(\sin\theta+\cos\theta-1)+\cos\theta(\sin\theta+\cos\theta-1)+1(\sin\theta+\cos\theta-1)$$

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

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

प्रश्नावली 8.3

(iii) (sec A+ tan A) (1 – sin A)

बराबर है :

(अ) sec A (ब) sin A

(स) cosec A (द) cos A

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$$(\sec A + \tan A)(1 - \sin A)$$

$$\left(\frac{1}{\cos A} + \frac{\sin A}{\cos A}\right)(1 - \sin A)$$

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

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

$$= \frac{(1 + \sin A)(1 - \sin A)}{\cos A}$$

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

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

$$= \frac{\cos^2 A}{\cos A} = \cos A$$

प्रश्नावली 8.3

(iv) $\dfrac{1+\tan^2 A}{1+\cot^2 A}$ बराबर है :

$\left\{\cot A = \dfrac{1}{\tan A}\right\}$

(अ) $\sec^2 A$ (ब) -1

(स) $\cot^2 A$ (द) $\tan^2 A$

$$= \frac{1+\tan^2 A}{1+\left(\frac{1}{\tan A}\right)^2}$$

$$= \frac{1+\tan^2 A}{\frac{1}{1}+\frac{1}{\tan^2 A}} = \frac{1+\tan^2 A}{\frac{\tan^2 A+1}{\tan^2 A}} = \tan^2 A$$

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$\sin A/\cos A$

$$\frac{1+\tan^2 A}{1+\cot^2 A}$$

$\cos A/\sin A$

$$\begin{cases} \sec A = \frac{1}{\cos A} \\ \operatorname{cosec} A = \frac{1}{\sin A} \end{cases}$$

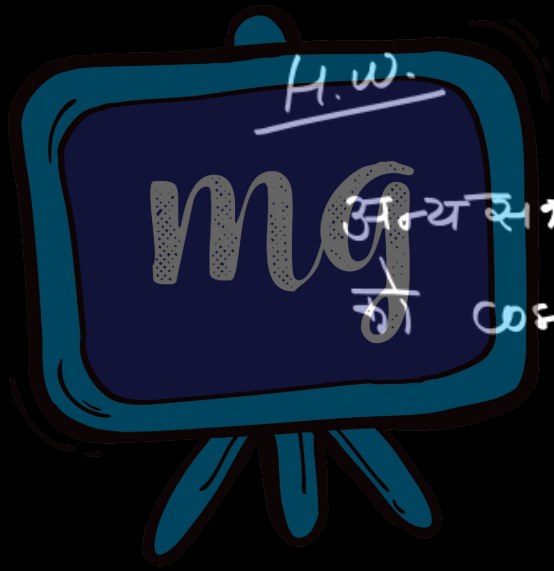
$$\frac{1+\tan^2 A}{1+\cot^2 A} = \frac{\sec^2 A}{\operatorname{cosec}^2 A}$$

$$= \frac{\frac{1}{\cos^2 A}}{\frac{1}{\sin^2 A}}$$

$$\frac{\sin^2 A}{\cos^2 A} = \tan^2 A$$

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अन्य राज्यों की कोचिंग की उपलब्धता
को COSECA के पदों में विश्लेषित

प्रश्नावली 8.3

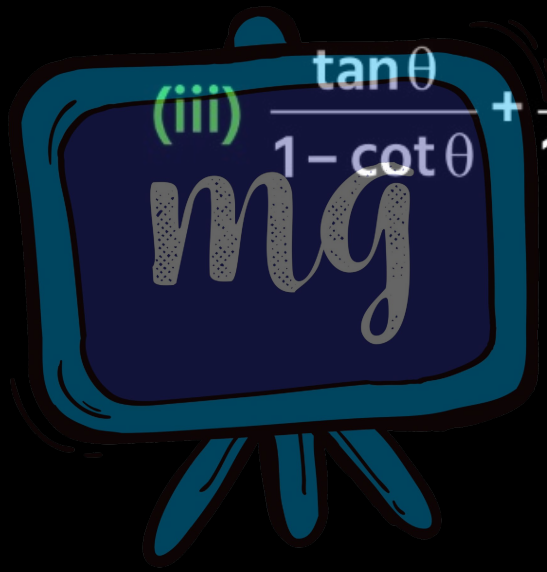
Q.4 निम्नलिखित सर्वसमिकाएँ सिद्ध कीजिए, जहाँ वे कोण, जिनके लिए व्यंजक परिभाषित है, न्यून कोण है :

(i) $(\text{cosec}\,\theta - \cot\theta)^2 = \dfrac{1-\cos\theta}{1+\cos\theta}$

प्रश्नावली 8.3

(ii) $\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$

प्रश्नावली 8.3



(iii) $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta\,\mathrm{cosec}\,\theta$

प्रश्नावली 8.3

Q.4 निम्नलिखित सर्वसमिकाएँ सिद्ध कीजिए, जहाँ वे कोण, जिनके लिए व्यंजक परिभाषित है, न्यून कोण है :

(iv) $\frac{1+\sec A}{\sec A} = \frac{\sin^2 A}{1-\cos A}$

प्रश्नावली 8.3

(v) $\dfrac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$

प्रश्नावली 8.3

(vi) $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

प्रश्नावली 8.3

(vii) $\dfrac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$

प्रश्नावली 8.3

(viii) $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2$

$= 7 + \tan^2 A + \cot^2 A$

प्रश्नावली 8.3

(ix) $(\text{cosec}A - \sin A)(\sec A - \cos A) = \dfrac{1}{\tan A + \cot A}$

प्रश्नावली 8.3

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