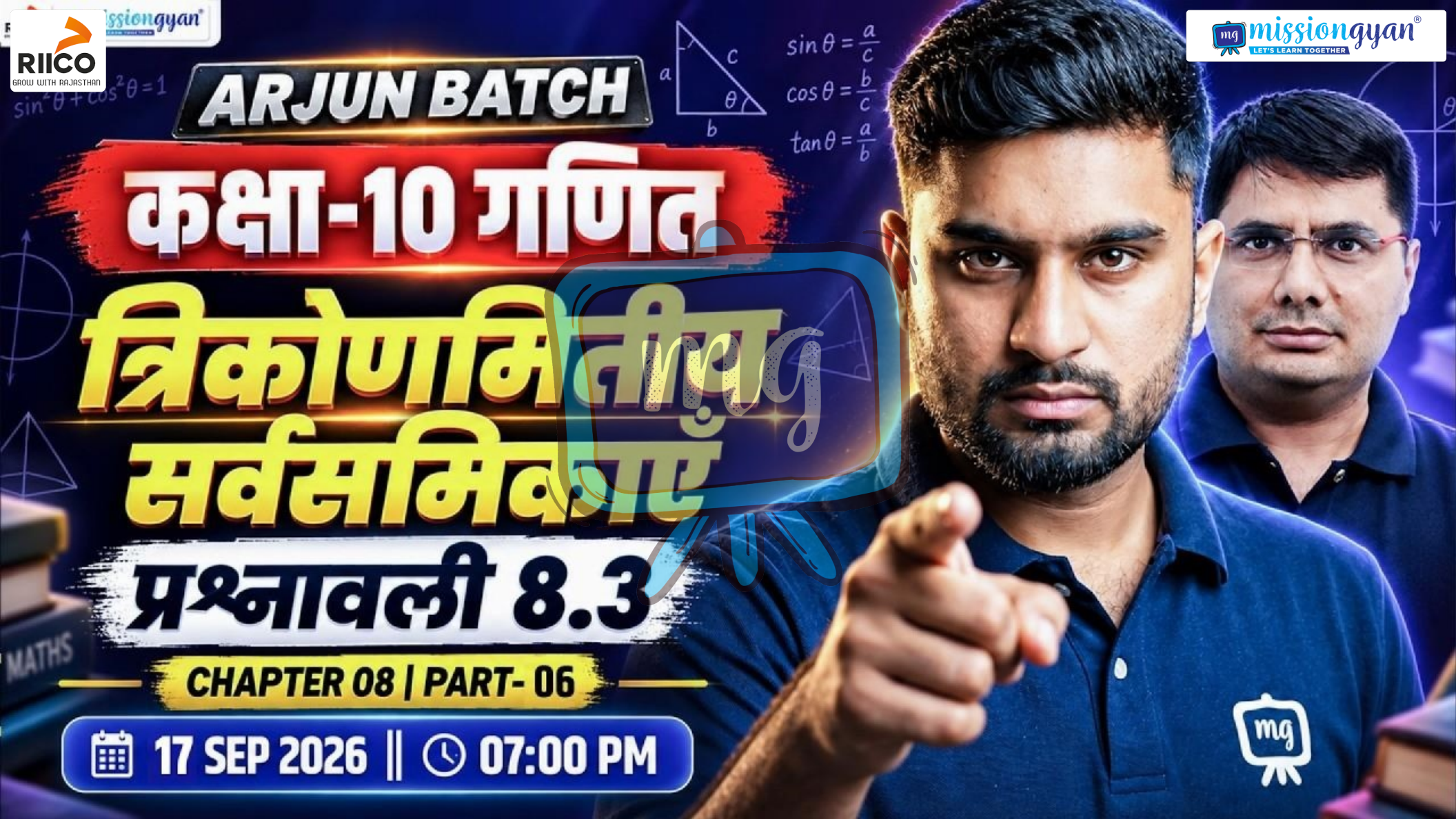

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ARJUN BATCH
कक्षा-10 गणित
त्रिकोणमिति
सर्वसमिकाएँ
प्रश्नावली 8.3
CHAPTER 08 | PART- 06
17 SEP 2026 || 07:00 PM
MATHS

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आज क्या पढेंगे ?

1 प्रश्नावली 8.3



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

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

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

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

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

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

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

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

① $\sin^2\theta + \cos^2\theta = 1$

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

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

② $\sec^2\theta - \tan^2\theta = 1$

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

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

③ $\operatorname{cosec}^2\theta - \cot^2\theta = 1$

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

$\operatorname{cosec}^2\theta - 1 = \cot^2\theta$

बड़े भाई → tanθ/cotθ/secθ/cosecθ

छोटे भाई → sinθ/cosθ



प्रश्नावली 8.3

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

प्रश्नावली 8.3

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

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

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

हल :- LHS

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

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

$= (\text{cosec}\theta - \cot\theta)^2$

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

$\left\{\text{cosec}\theta = \dfrac{1}{\sin\theta}\right.$

$\left.\cot\theta = \dfrac{\cos\theta}{\sin\theta}\right\}$

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

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

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

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

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

$$1^2-\cos^2\theta = (1+\cos\theta)(1-\cos\theta)$$

$$= \frac{1-\cos\theta}{1+\cos\theta} = RHS$$

इति सिद्धम

प्रश्नावली 8.3

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

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

Sol:- LHS.

$$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A}$$

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

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

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

$$= \frac{\cos^2 A + 1^2 + \sin^2 A + 2\times 1 \times \sin A}{(1+\sin A)(\cos A)}$$

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

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

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

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

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

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

$$= 2\sec A = \text{RHS}$$

"H.P."

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

हल – LHS

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

$=\dfrac{\frac{\sin\theta}{\cos\theta}\left(\frac{a}{b}\right)}{\frac{\sin\theta-\cos\theta}{\sin\theta}\left(\frac{c}{d}\right)}+\dfrac{\frac{\cos\theta}{\sin\theta}}{\frac{\cos\theta-\sin\theta}{\cos\theta}}$

$=\dfrac{\tan\theta}{1-\cot\theta}+\dfrac{\cot\theta}{1-\tan\theta}$

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

$\left\{\tan\theta=\dfrac{\sin\theta}{\cos\theta},\ \cot\theta=\dfrac{\cos\theta}{\sin\theta}\right\}$

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

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

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

$$= \frac{1}{\sin\theta-\cos\theta}\left(\frac{\sin^3\theta-\cos^3\theta}{\sin\theta\cos\theta}\right)$$

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$$\{a^3-b^3=(a-b)(a^2+b^2+ab)\}$$

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

$$=\frac{1+\sin\theta\cos\theta}{\sin\theta\cos\theta}$$

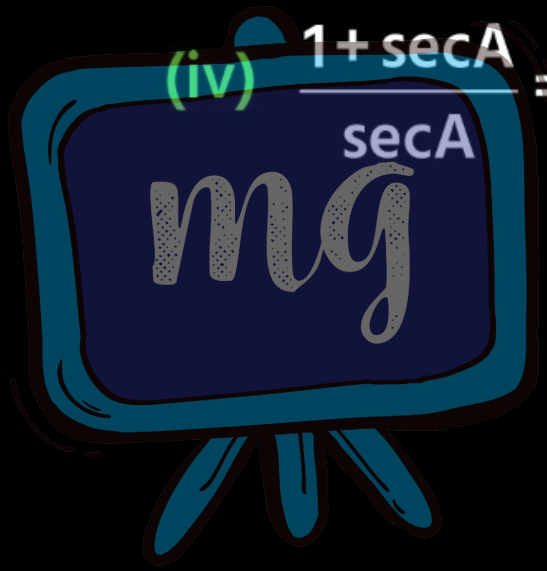
$$=\frac{1}{\sin\theta\cos\theta}+\frac{\sin\theta\cos\theta}{\sin\theta\cos\theta}$$

$$=1+\operatorname{cosec}\theta\sec\theta$$

$$\left\{\frac{1}{\sin\theta}=\operatorname{cosec}\theta,\ \frac{1}{\cos\theta}=\sec\theta\right\}$$

प्रश्नावली 8.3

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

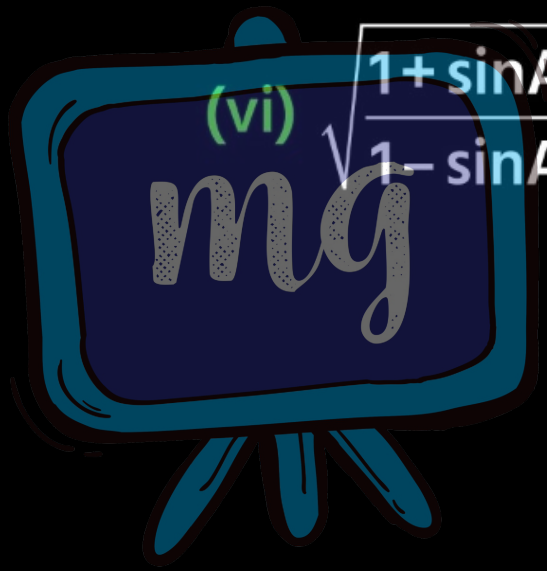


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(v) $\dfrac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$

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