Under CSR Support by ipca Foundation

missiongyan LET'S LEARN TOGETHER

कक्षा - 10

गणित

अध्याय - 8

त्रिकोणमिति का परिचय

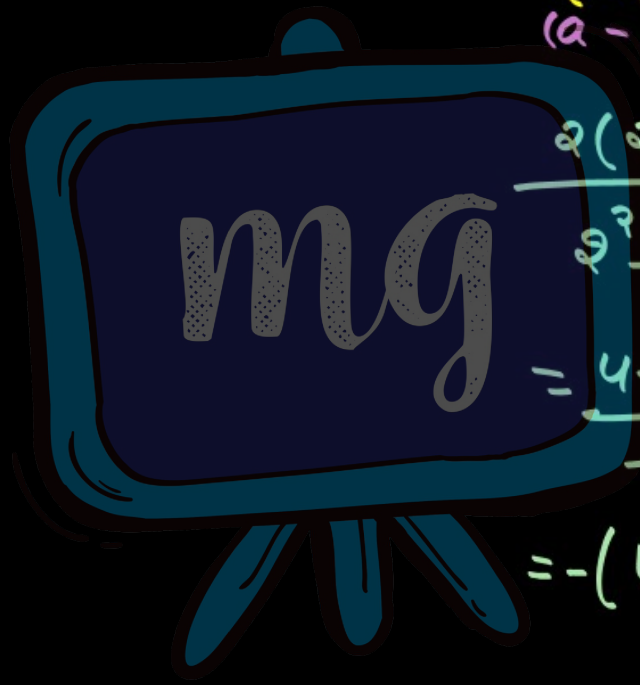
भाग - 5

केशव शर्मा

(1) $\frac{1}{7\sqrt{5}}$

$\frac{1}{7\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$

$\frac{\sqrt{5}}{7 \times 5} = \frac{\sqrt{5}}{35}$



(2) $\frac{2}{2-\sqrt{5}} \times \frac{2+\sqrt{5}}{2+\sqrt{5}}$

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

$$\frac{2(2+\sqrt{5})}{2^2-(\sqrt{5})^2} = \frac{4+2\sqrt{5}}{4-5}$$

$$= \frac{4+2\sqrt{5}}{-1}$$

$$= -(4+2\sqrt{5})$$

(3) $\dfrac{\sqrt{3}+2}{\sqrt{3}-2} \times \dfrac{\sqrt{3}+2}{\sqrt{3}+2}$

$(a-b)$ $(a+b)$

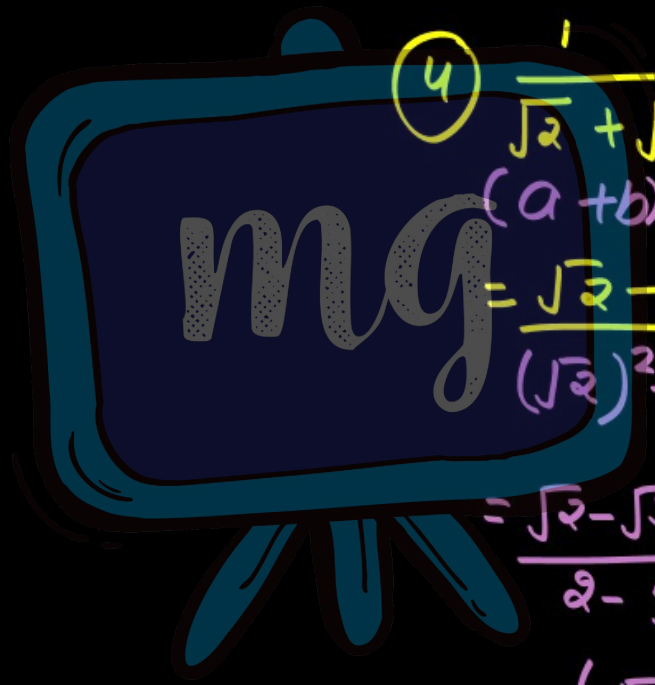
$(a+b)^2 = a^2+b^2+2ab$

$= \dfrac{(\sqrt{3}+2)^2}{(\sqrt{3})^2 - 2^2}$

$= \dfrac{(\sqrt{3})^2+2^2+2\times\sqrt{3}\times 2}{3-4}$

$= \dfrac{3+4+4\sqrt{3}}{-1}$

$= -(7+4\sqrt{3})$



(4) $\dfrac{1}{\sqrt{2}+\sqrt{3}} \times \dfrac{\sqrt{2}-\sqrt{3}}{\sqrt{2}-\sqrt{3}}$

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

$= \dfrac{\sqrt{2}-\sqrt{3}}{(\sqrt{2})^2 - (\sqrt{3})^2}$

$= \dfrac{\sqrt{2}-\sqrt{3}}{2-3} = \dfrac{\sqrt{2}-\sqrt{3}}{-1}$

$= -(\sqrt{2}-\sqrt{3})$

5 $\frac{1}{1-2\sqrt{3}}$

$\sin 60° = \frac{\sqrt{3}}{2}$ $\sin 30° = \frac{1}{2}$

$\operatorname{cosec} 60° = \frac{2}{\sqrt{3}}$ $\tan 45° = 1$

$\cos 30° = \frac{\sqrt{3}}{2}$ $\cos 60° = \frac{1}{2}$

$\sec 30° = \frac{2}{\sqrt{3}}$ $\cot 45° = 1$

प्रश्नावली 8.2

Q.1 निम्नलिखित के मान ज्ञात कीजिए

(iv) $\dfrac{\sin 30° + \tan 45° - \operatorname{cosec} 60°}{\sec 30° + \cos 60° + \cot 45°}$

हल :-

$$= \frac{\frac{1}{2} + 1 - \frac{2}{\sqrt{3}}}{\frac{2}{\sqrt{3}} + \frac{1}{2} + 1} = \frac{\frac{3}{2} - \frac{2}{\sqrt{3}}}{\frac{2}{\sqrt{3}} + \frac{3}{2}}$$

$$= \frac{\frac{3\sqrt{3} - 4}{2\sqrt{3}}}{\frac{4 + 3\sqrt{3}}{2\sqrt{3}}}$$

$$= \frac{3\sqrt{3} - 4}{4 + 3\sqrt{3}}$$

$$= \frac{(3\sqrt{3})^2 + 4^2 - 2 \times 3\sqrt{3} \times 4}{9 \times 3 - 16}$$

$$= \frac{9 \times 3 + 16 - 24\sqrt{3}}{27 - 16}$$

$$= \frac{27 + 16 - 24\sqrt{3}}{11}$$

$$= \frac{43 - 24\sqrt{3}}{11}$$

$$= \frac{3\sqrt{3} - 4}{3\sqrt{3} + 4}$$

परिमेय करण

$$= \frac{3\sqrt{3} - 4}{3\sqrt{3} + 4} \times \frac{3\sqrt{3} - 4}{3\sqrt{3} - 4}$$

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

$$= \frac{(3\sqrt{3} - 4)^2}{(3\sqrt{3})^2 - (4)^2}$$

$$\frac{}{9 \times 3}$$

$\cos 60^\circ = \frac{1}{2}$

$\cos 30^\circ = \frac{\sqrt{3}}{2}$

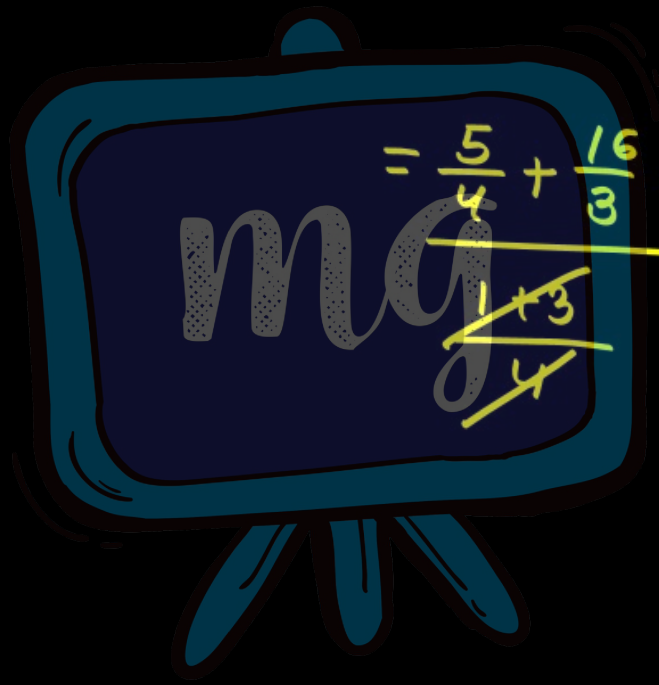
$\sec 30^\circ = \frac{2}{\sqrt{3}}$

$\sin 30^\circ = \frac{1}{2}$

(v) $$\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

हल :- $$\frac{5\left(\frac{1}{2}\right)^2 + 4\left(\frac{2}{\sqrt{3}}\right)^2 - 1^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2}$$

$$= \frac{\frac{5}{4} + 4 \cdot \frac{4}{3} - 1}{\frac{1}{4} + \frac{3}{4}}$$



$$= \frac{5}{4} + \frac{16}{3} - \frac{1}{1} = \frac{15+64-12}{12}$$

$$\frac{1+3}{4}$$

$$= \frac{79-12}{12}$$

$$= \frac{67}{12}$$

$$\frac{2\tan 30^\circ}{1+\tan^2 30^\circ}$$

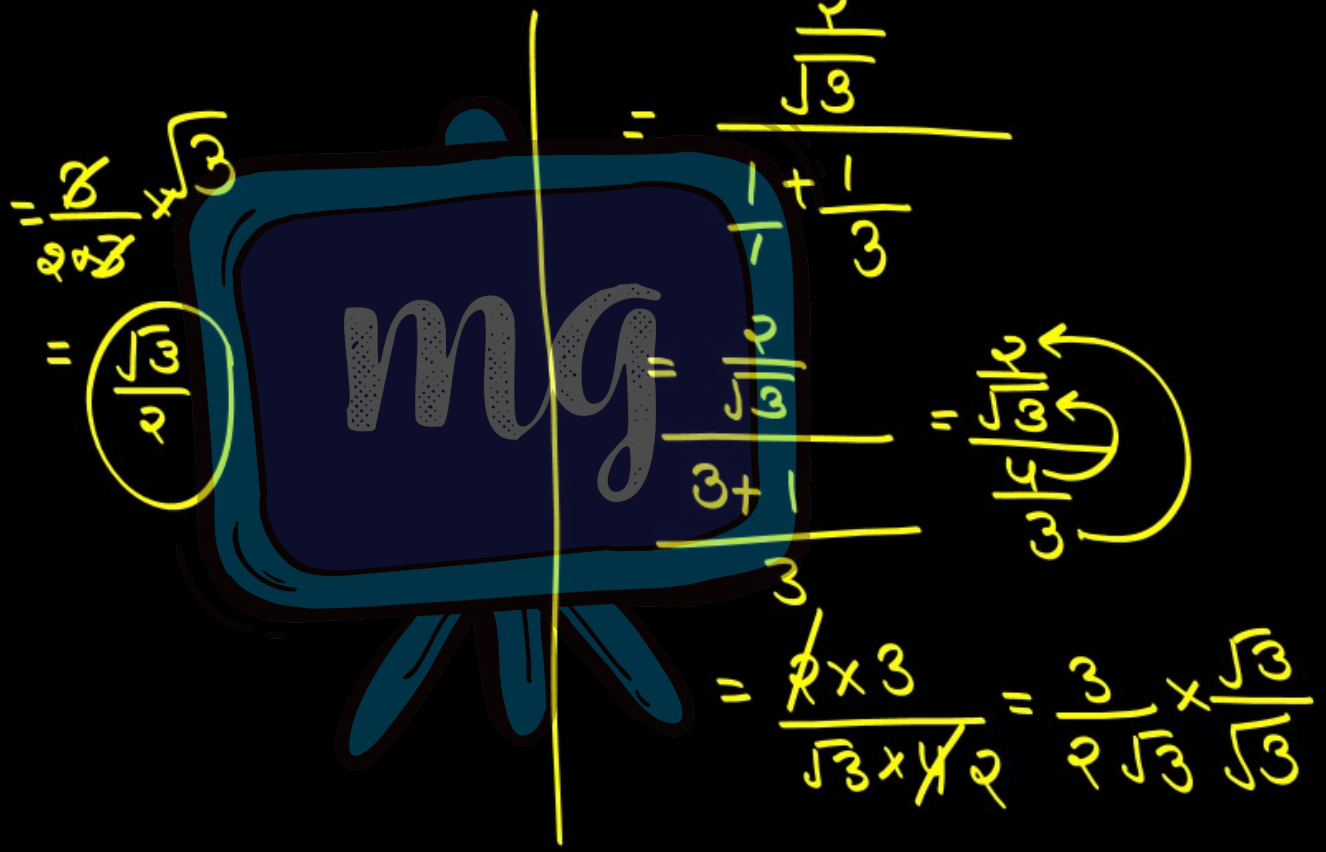
$$\frac{2\left(\frac{1}{\sqrt{3}}\right)}{1+\left(\frac{1}{\sqrt{3}}\right)^2}$$

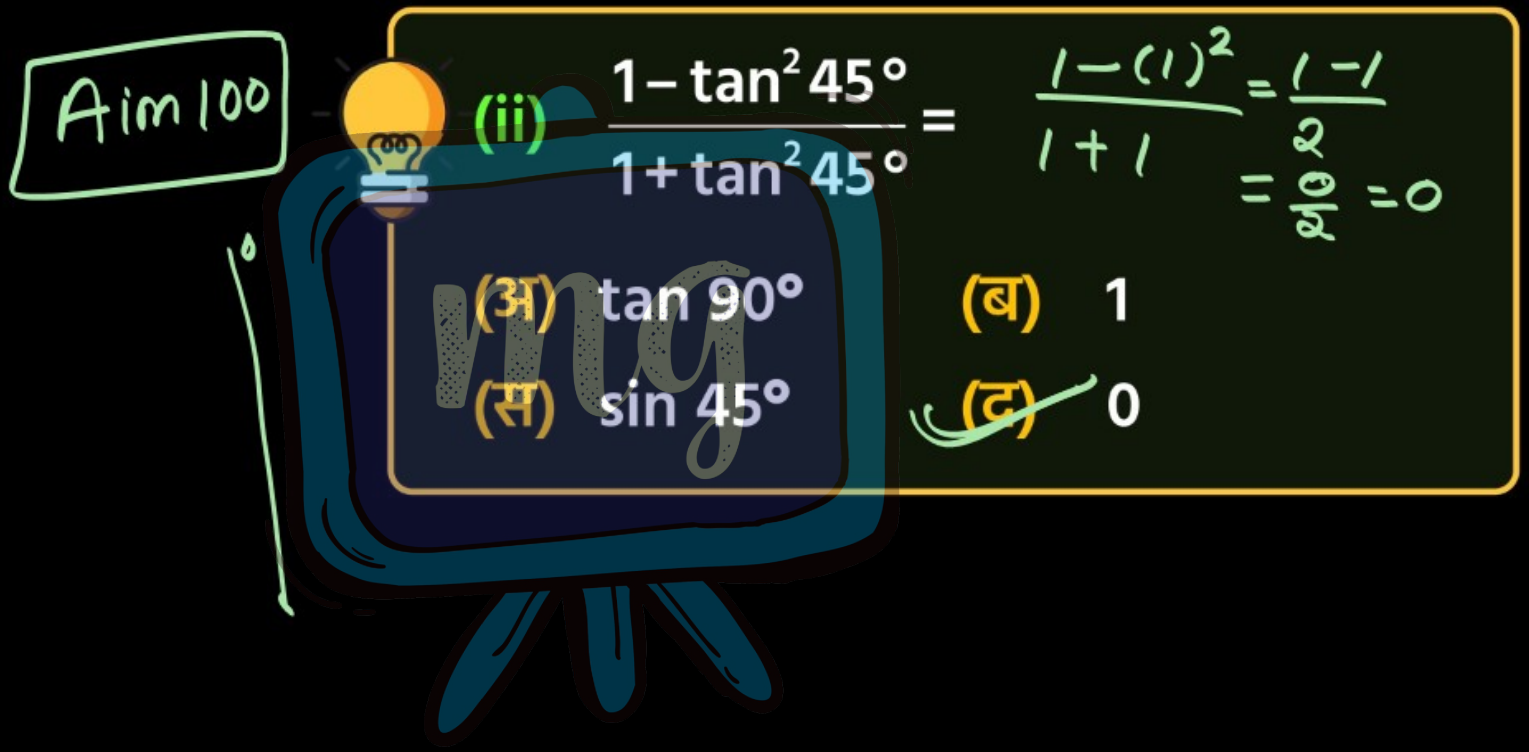
Q.2 सही विकल्प चुनिए और अपने विकल्प का औचित्य दीजिए :

(i) $\frac{2\tan 30^\circ}{1+\tan^2 30^\circ}$ =

(अ) $\sin 60^\circ$ $\frac{\sqrt{3}}{2}$ (ब) $\cos 60^\circ$

(स) $\tan 60^\circ$ (द) $\sin 30^\circ$





(iii) sin 2A = 2sinA तब सत्य होता है,

जबकि A बराबर है :

(अ) 0° (ब) 30°

(स) 45° (द) 60°

$A = 45°$

$\sin 2A = \sin 2 \cdot 45°$

$= \sin 90°$

$= 1$

$2 \sin A = 2 \sin 45°$

$= 2 \cdot \frac{1}{\sqrt{2}}$

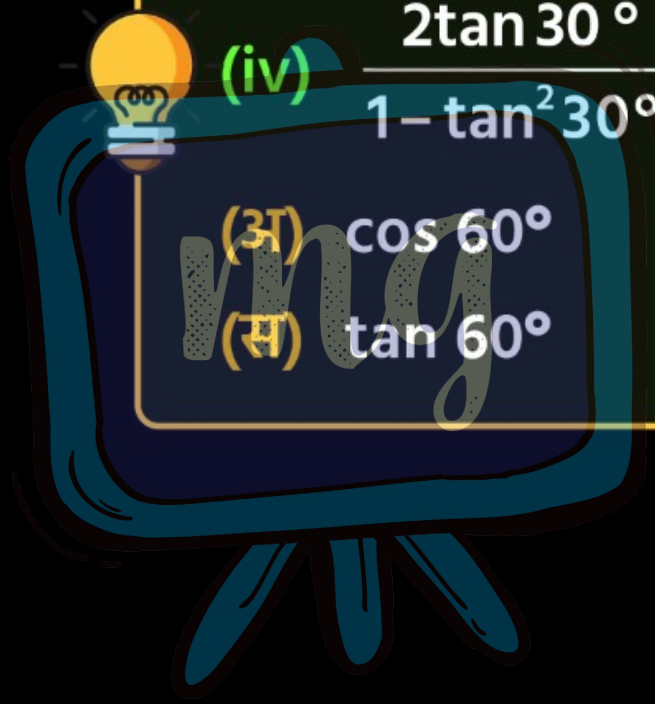
$\sin 2A = 2 \sin A$

$A = 0°$

$\sin 2A = \sin 2 \cdot 0 = \sin 0° = 0$

$2 \sin A = 2 \sin 0° = 2 \cdot 0 = 0$

H.W.



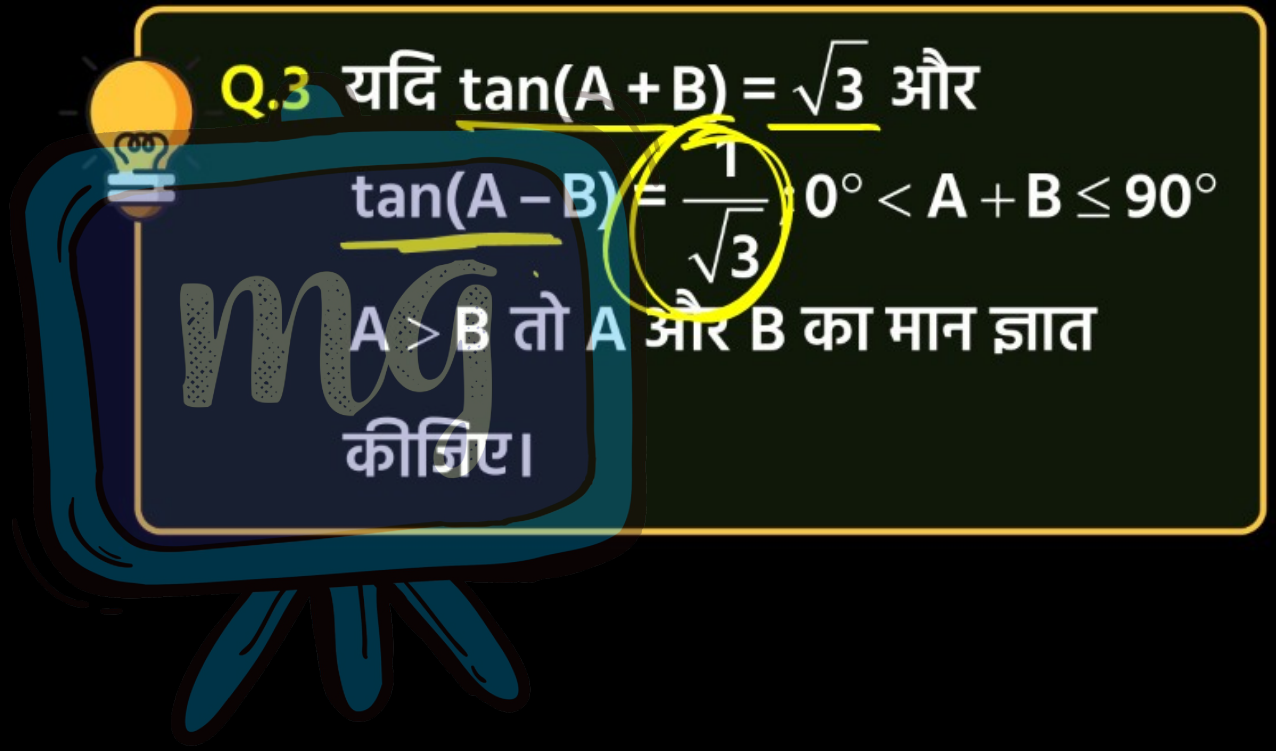
(iv) $\frac{2\tan 30°}{1-\tan^2 30°} =$

(अ) $\cos 60°$

(ब) $\sin 60°$

(स) $\tan 60°$

(द) $\sin 30°$



$\tan(A+B) = \sqrt{3}$

$\tan(A+B) = \tan 60^\circ$

$A + B = 60^\circ$ — (i)

$\tan(A-B) = \frac{1}{\sqrt{3}}$

$\tan(A-B) = \tan 30^\circ$

$A - B = 30^\circ$ — (ii)

समी. (i) व (ii) को जोड़ने पर

$A + B = 60^\circ$

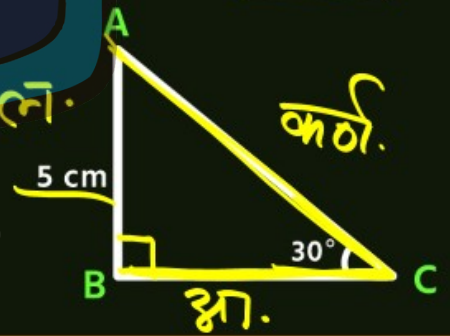
$A - B = 30^\circ$

$2A = 90^\circ$

$A = 45^\circ$ ✓

उदाहरण–6

$\triangle ABC$ में जिसका कोण B समकोण है, $AB = 5$ cm और $\angle ACB = 30°$ (देखिए आकृति)। भुजाओं BC और AC की लंबाइयाँ ज्ञात करें।



$\cos C = \frac{\text{आ.}}{\text{कर्ण}}$

$\cos 30^\circ = \frac{BC}{AC}$

$\frac{\sqrt{3}}{2} = \frac{BC}{10}$ 5

$BC = 5\sqrt{3}$ cm

$\triangle ABC$ में

$\angle B = 90^\circ$, $AB = 5$ cm

$\sin C = \frac{\text{सा.}}{\text{कर्ण}}$

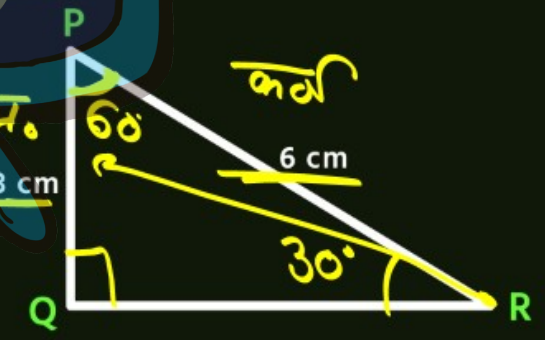
$\sin 30^\circ = \frac{AB}{AC}$

$\frac{1}{2} = \frac{5}{AC}$

$AC = 10$ cm

उदाहरण–7

△PQR में, जिसका कोण Q समकोण है (देखिए आकृति), PQ = 3 cm और PR = 6 cm है। ∠QPR और ∠PRQ ज्ञात कीजिए।



$\angle Q = 90^\circ$

$PQ = 3\,cm$

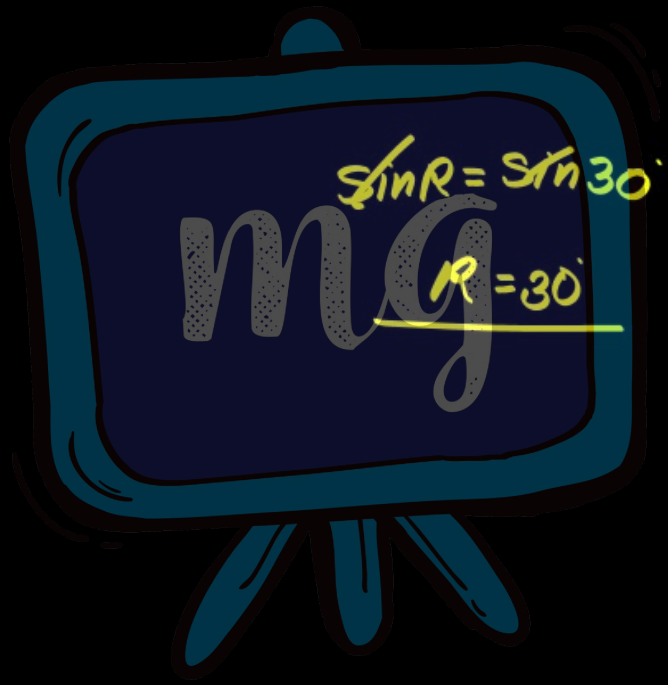
$PR = 6\,cm$

$\sin R = \frac{\text{लं.}}{\text{कर्ण}}$

$\sin R = \frac{PQ}{PR}$

$\sin R = \frac{3}{6_2}$

$\sin R = \frac{1}{2}$



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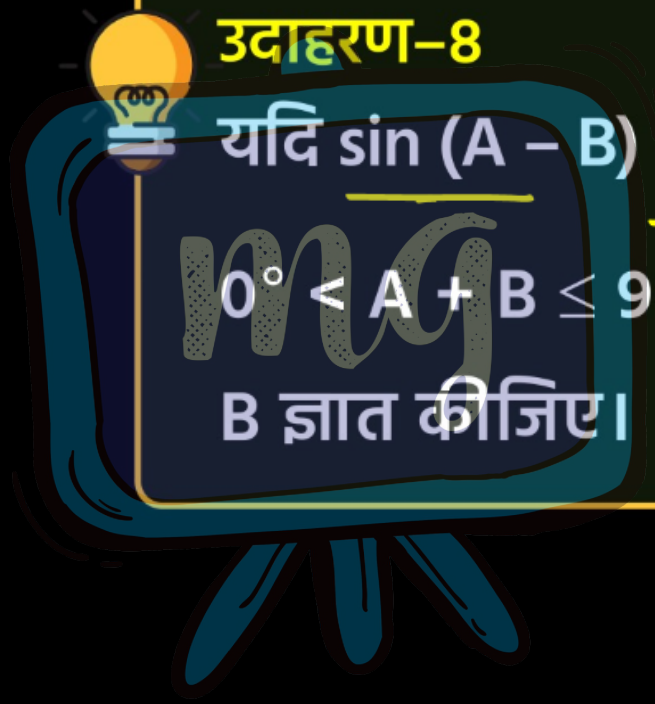

उदाहरण–8

यदि $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$, $0° < A + B \leq 90°$, $A > B$, तो A और B ज्ञात कीजिए।

sin 30°

cos 60°