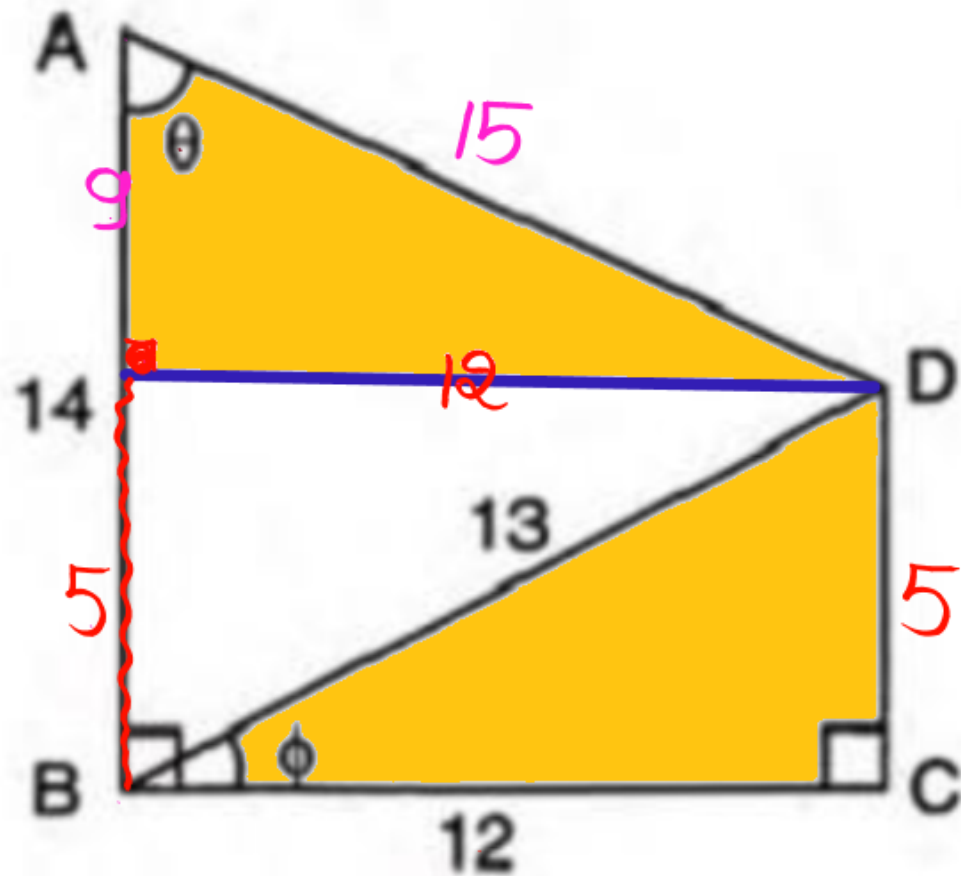


MISC.



112. Using the measurements given in the following figure, the value of $\frac{\sin\phi + \tan\theta}{\sin\phi - \tan\theta}$ is _____.
 नीचे दिए गए चित्र में दिए गए मापों का उपयोग करते हुए, $\frac{\sin\phi + \tan\theta}{\sin\phi - \tan\theta}$ का मान _____ है।



[A] $6/35$
 [C] $-7/32$

[B] $-67/37$
 [D] $7/3$

$$\frac{\frac{5}{13} + \frac{4}{3}}{\frac{5}{13} - \frac{4}{3}} = \frac{67}{-37}$$

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

$$\tan\theta = \frac{12}{9} = \frac{4}{3}$$



113. $\frac{\tan 70^\circ - \tan 20^\circ - 2\tan 40^\circ}{\tan 10^\circ} = ?$

[A] 4

[C] 2

[B] $2\sqrt{3}$

[D] 1

$$\frac{(\tan 70^\circ - \tan 20^\circ) - 2\tan 40^\circ}{\tan 10^\circ}$$

$$\tan 70^\circ - \tan 20^\circ = 2\tan 40^\circ$$

$$= \frac{2(\tan 40^\circ - \tan 40^\circ)}{\tan 10^\circ}$$

$$= \frac{2 \times 0}{\tan 10^\circ} = 0$$



114. $\tan \alpha + 2 \tan 2\alpha + 4 \tan 4\alpha + 8 \cot 8\alpha = ?$

[A] $\tan \alpha$

[B] $\cot \alpha$

[C] $\cot 2\alpha$

[D] $\tan 3\alpha$

put $\alpha = 15^\circ$

$-\frac{6}{\sqrt{3}}$

$$(2-\sqrt{3}) + \frac{2}{\sqrt{3}} + 4\sqrt{3} - \frac{8}{\sqrt{3}}$$

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

$$\begin{aligned} \cot 120^\circ &= \cot(180^\circ - 60^\circ) \\ &= -\cot 60^\circ \\ &= -\frac{1}{\sqrt{3}} \end{aligned}$$



ADVANCE LEVEL IDENTITY

$\cos^2\theta + \cos^2(60^\circ - \theta) + \cos^2(60^\circ + \theta) = \frac{3}{2}$

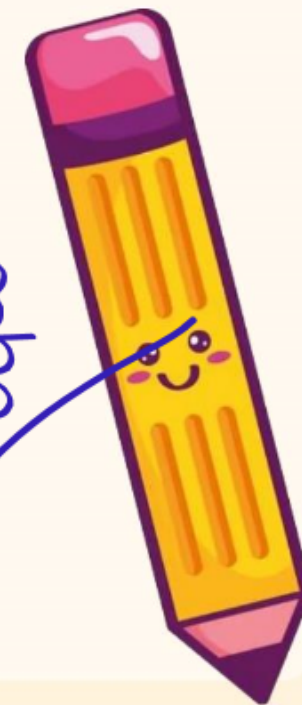
$\cos^3\theta + \cos^3(120^\circ - \theta) + \cos^3(120^\circ + \theta) = \frac{3}{4} \cos 3\theta$

$\cos^2 18^\circ + \cos^2 42^\circ + \cos^2 78^\circ = \frac{3}{2}$
 $\theta = 18^\circ$

$\cos^3 30^\circ - \cos^3 40^\circ + \cos^3 100^\circ =$

$\frac{3}{4} \times \cos 60^\circ = \frac{3}{4}$

$\cos 40^\circ = -\cos 140^\circ$



115. $\cos^2 10^\circ + \cos^2 50^\circ + \cos^2 70^\circ = ?$

[A] $\frac{1}{2}$
[C] $\frac{5}{2}$

[B] $\frac{3}{2}$
[D] 1



116. $\cos^3 10^\circ + \cos^3 110^\circ + \cos^3 130^\circ = ?$

[A] $\frac{3}{4}$

[B] $\frac{3}{8}$

[C] $\frac{3\sqrt{3}}{8}$

[D] $\frac{3\sqrt{3}}{4}$

$$= \frac{3}{4} \times 683^\circ$$

$$= \frac{3}{4} \times \frac{\sqrt{3}}{2}$$





$$\tan \theta - \tan (60^\circ - \theta) + \tan (60^\circ + \theta) = 3 \tan 3\theta$$

$$\cot \theta - \cot (60^\circ - \theta) + \cot (60^\circ + \theta) = 3 \cot 3\theta$$

Example: →

$$\tan 20^\circ - \tan 40^\circ + \tan 80^\circ = 3 \times \tan 60^\circ = 3\sqrt{3} \checkmark$$

(0)
(60-0)
(60+0)



117. $\tan 10^\circ - \tan 50^\circ + \tan 70^\circ = ?$

~~[A]~~ $\sqrt{3}$

[B] $\frac{1}{\sqrt{3}}$

[C] 3

[D] $\frac{4}{\sqrt{3}}$

$$= 3 \tan 30^\circ$$

$$= 3 \times \frac{1}{\sqrt{3}}$$



118. If $\tan 25^\circ + \tan 85^\circ + \tan 145^\circ = a + b\sqrt{c}$, where $a, b, c \in \mathbb{I}$ and c is prime number, then find $(a+b+c)$?

यदि $\tan 25^\circ + \tan 85^\circ + \tan 145^\circ = a + b\sqrt{c}$, जहाँ $a, b, c \in \mathbb{I}$ और c अभाज्य संख्या है, तो $(a+b+c)$ ज्ञात कीजिए?

[A] 12

[B] 5

[C] 6

[D] 10

$$\tan 25^\circ - \tan(60^\circ - 35^\circ) + \tan(60^\circ + 35^\circ) = 3 \tan 75^\circ = 3 \times (2 + \sqrt{3})$$
$$= 6 + 3\sqrt{3}$$

$$\tan 145^\circ = \tan(180^\circ - 35^\circ) = -\tan 35^\circ$$



119. $\cot 20^\circ - \cot 40^\circ + \cot 80^\circ = ?$

[A] $\sqrt{3}$

[B] $\frac{1}{\sqrt{3}}$

[C] 3

[D] $\frac{4}{\sqrt{3}}$

$$= 360^\circ$$

$$= 3 \times \frac{1}{\sqrt{3}}$$



$$\sin \theta . \sin (60^{\circ}-\theta) . \sin (60^{\circ}+\theta)=\frac{1}{4} \sin 3 \theta$$

$$\cos \theta . \cos (60^{\circ}-\theta) \cos (60^{\circ}+\theta)=\frac{1}{4} \cos 3 \theta$$

$$\tan \theta . \tan (60^{\circ}-\theta) . \tan (60^{\circ}+\theta)=\tan 3 \theta$$

$$\begin{aligned} \sin \theta . \sin (60^{\circ}-\theta) . \sin (60^{\circ}+\theta) &= \sin \theta \times \left(\frac{3}{4} - \sin^2 \theta \right) \\ &= \frac{3 \sin \theta - 4 \sin^3 \theta}{4} = \frac{\sin 3 \theta}{4} \end{aligned}$$

See



120. The value of $\sin 10^\circ \cdot \sin 50^\circ \cdot \sin 60^\circ \cdot \sin 70^\circ$ is:

$\sin 10^\circ \cdot \sin 50^\circ \cdot \sin 60^\circ \cdot \sin 70^\circ$ का मान क्या है?

[A] $\frac{\sqrt{3}}{16}$
[C] $\frac{\sqrt{3}}{4}$

[B] $\frac{\sqrt{3}}{15}$
[D] $\frac{\sqrt{3}}{2}$

$$= \frac{1}{4} \times \frac{1}{2} \times \frac{\sqrt{3}}{2}$$



121. $\sin 20^\circ \cdot \sin 40^\circ \cdot \sin 60^\circ \cdot \sin 80^\circ = ?$

[A] $\frac{1}{16}$

[C] $\frac{5}{16}$

[B] $\frac{3}{16}$

[D] $\frac{1}{8}$

$$= \frac{1}{4} \times \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}$$

$$= \frac{3}{16}$$



122. $\cos 10^\circ \cdot \cos 30^\circ \cdot \cos 50^\circ \cdot \cos 70^\circ = ?$

[A] $\frac{1}{16}$

[C] $\frac{5}{16}$

[B] $\frac{3}{16}$

[D] $\frac{1}{8}$

$$\frac{\sqrt{3}}{2} \times \frac{1}{4} \times \frac{\sqrt{3}}{2}$$



123. $\tan 20^\circ \cdot \tan 40^\circ \cdot \tan 60^\circ \cdot \tan 80^\circ = ?$

[A] 2

[C] 4

~~[B] 3~~

[D] 6

$$\tan 60^\circ \times \sqrt{3}$$



124. $\sin 12^\circ \cdot \sin 48^\circ \cdot \sin 54^\circ = ?$

[A] $\frac{1}{2}$

[B] $\frac{1}{4}$

[C] $\frac{1}{8}$

[D] $\frac{1}{16}$

(PO 20/9)

$$\frac{\sin 12^\circ \cdot \sin 48^\circ \times \sin 72^\circ}{\sin 72^\circ} \times \sin 54^\circ$$

$$= \frac{1}{4} \times \frac{\sin 36^\circ \cdot \sin 36^\circ}{\sin 72^\circ} = \frac{1}{8}$$



125. If the value of the expression $\sin 25^\circ \sin 35^\circ \sin 85^\circ$ can be expressed as $\frac{\sqrt{a} + \sqrt{b}}{c}$, where a, b, c are natural numbers and are in their lowest form. Find the value of $(a+b+c)$?

यदि व्यंजक $\sin 25^\circ \sin 35^\circ \sin 85^\circ$ का मान $\frac{\sqrt{a} + \sqrt{b}}{c}$ के रूप में व्यक्त किया जा सकता है, जहां a, b, c प्राकृत संख्याएं हैं और अपने निम्नतम रूप में हैं। $(a+b+c)$ का मान ज्ञात कीजिए?

[A] 23

[B] 24

[C] 25

[D] 26

$$\frac{1}{4} \times \sin 75^\circ = \frac{\sqrt{3} + 1}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$\frac{\sqrt{6} + \sqrt{2}}{16} = \frac{\sqrt{a} + \sqrt{b}}{c}$$



126. $\cos 42^\circ \cdot \cos 78^\circ \cdot \cos 36^\circ = ?$

[A] $\frac{1}{2}$

[B] $\frac{1}{4}$

[C] $\frac{1}{8}$

[D] $\frac{1}{16}$

$$\begin{aligned} & \frac{\cos 42^\circ \cdot \cos 78^\circ}{\cos 18^\circ} \times \cos 36^\circ \\ &= \frac{1}{4} \times \frac{\cos 54^\circ \times \cos 36^\circ}{\cos 18^\circ} = \frac{1}{4} \times \frac{\sin 36^\circ \times \cos 36^\circ}{\sin 72^\circ} = \frac{1}{8} \end{aligned}$$



127. $\sin 186^\circ \sin 222^\circ \sin 246^\circ \sin 258^\circ =$

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[A] $\frac{1}{625}$

[B] $\frac{1}{256}$

[C] $\frac{1}{81}$

[D] $\frac{1}{16}$

$\sin(180^\circ + \theta) = -\sin \theta$

$-\sin 6^\circ \times -\sin 42^\circ \times -\sin 66^\circ \times -\sin 78^\circ$

$= \frac{\sin 6^\circ \sin 54^\circ \sin 66^\circ}{\sin 54^\circ} \times \sin 42^\circ \sin 78^\circ$

$= \frac{1}{4} \times \frac{\sin 18^\circ \sin 42^\circ \sin 78^\circ}{\sin 54^\circ} = \frac{1}{4} \times \frac{1}{4} \frac{\sin 54^\circ}{\sin 54^\circ} = \frac{1}{16}$



128. $\tan 6^\circ \cdot \tan 42^\circ \cdot \tan 66^\circ \cdot \tan 78^\circ = ?$

[A] 1

[B] $\frac{1}{4}$

[C] $\frac{1}{16}$

[D] $\frac{1}{9}$



~~Advance~~



129. $\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ = ?$

[A] 6 [B] 2

[C] 3 [D] 4

$$\begin{aligned}
 & (\tan 9^\circ + \cot 9^\circ) - (\tan 27^\circ + \cot 27^\circ) \\
 &= \frac{2}{\sin 18^\circ} - \frac{2}{\sin 54^\circ} \\
 &= 2 \left(\frac{\sin 54^\circ - \sin 18^\circ}{\sin 18^\circ \sin 54^\circ} \right) = 2 \times \frac{2 \cos 36^\circ \sin 18^\circ}{\sin 18^\circ \sin 54^\circ} = 4
 \end{aligned}$$



$$\tan 0 + \cot 0 = \frac{1}{\sin 0 \cdot \cos 0} = \frac{2}{\sin 20}$$



130. If $7 \tan \theta \cdot \tan \phi = 3$, then $\frac{\cos(\theta + \phi)}{\cos(\theta - \phi)} = ?$

[A] $\frac{3}{7}$
[C] $\frac{1}{4}$

[B] $\frac{2}{5}$
[D] $\frac{5}{8}$

$$\frac{\sin \theta \cdot \sin \phi}{\cos \theta \cdot \cos \phi} = \frac{3}{7}$$

$$\frac{\cos \theta \cdot \cos \phi - \sin \theta \cdot \sin \phi}{\cos \theta \cdot \cos \phi + \sin \theta \cdot \sin \phi} = \frac{7-3}{7+3} = \frac{4}{10} = \frac{2}{5}$$



131. If $\cos x = \frac{2\cos y - 1}{2 - \cos y}$, then $\tan \frac{x}{2} \cdot \cot \frac{y}{2} = ?$

[A] $\frac{1}{\sqrt{3}}$

[B] $\sqrt{3}$

[C] $\sqrt{\frac{3}{2}}$

[D] $\sqrt{2}$

$\cos \alpha = -\frac{1}{2}$
 $\Rightarrow \alpha = 120^\circ$

put $y = 90^\circ$



132. Simplify: $\frac{1+\sin(x)}{1-\cos(x)} + \frac{1-\sin(x)}{1+\cos(x)}$

सरल करें: $\frac{1+\sin(x)}{1-\cos(x)} + \frac{1-\sin(x)}{1+\cos(x)}$

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[A] $\frac{2(5+\sin(x)\cos(x))}{4\sin^2(x)}$

[C] $\frac{3(1+\sin(x)\cos(x))}{5\sin^2(x)}$

[B] $\frac{2(1+\sin(x)\cos(x))}{\sin^2(x)}$

[D] $\frac{6(3+\sin(x)\cos(x))}{\sin^2(x)}$

$$\begin{aligned}
 & \frac{1+\sin(x)}{1-\cos(x)} + \frac{1-\sin(x)}{1+\cos(x)} \\
 &= \frac{(1+\sin(x))(1+\cos(x)) + (1-\sin(x))(1-\cos(x))}{(1-\cos(x))(1+\cos(x))} \\
 &= \frac{1+\sin(x)+\cos(x)+\sin(x)\cos(x) + 1-\sin(x)+\cos(x)-\sin(x)\cos(x)}{1-\cos^2(x)} \\
 &= \frac{2+2\cos(x)}{\sin^2(x)} = \frac{2(1+\cos(x))}{\sin^2(x)}
 \end{aligned}$$

sin²



133. If $\cos A + \sin A = \frac{5}{4}$, find $\tan A$.

यदि $\cos A + \sin A = \frac{5}{4}$, तो $\tan A$ ज्ञात कीजिए।

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[A] $\frac{5-\sqrt{7}}{5+\sqrt{7}}$

[C] $\frac{5-\sqrt{2}}{5+\sqrt{2}}$

[B] $\frac{4-\sqrt{7}}{4+\sqrt{7}}$

[D] $\frac{2-\sqrt{3}}{2+\sqrt{3}}$

$$\frac{P+B}{\sqrt{P^2+B^2}} = \frac{5}{4}$$

$$\frac{10}{\sqrt{2 \times (25-7)}} = \frac{10}{8}$$



Chapter end

500+ Qs

