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Sahi Prep Hai Toh Life Set Hai

# COMPOUND ANGLES

Compound Angles

+ Multiples & Sub-Multiples → 2 Cases





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1. (i)

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

(ii)

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$

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i

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

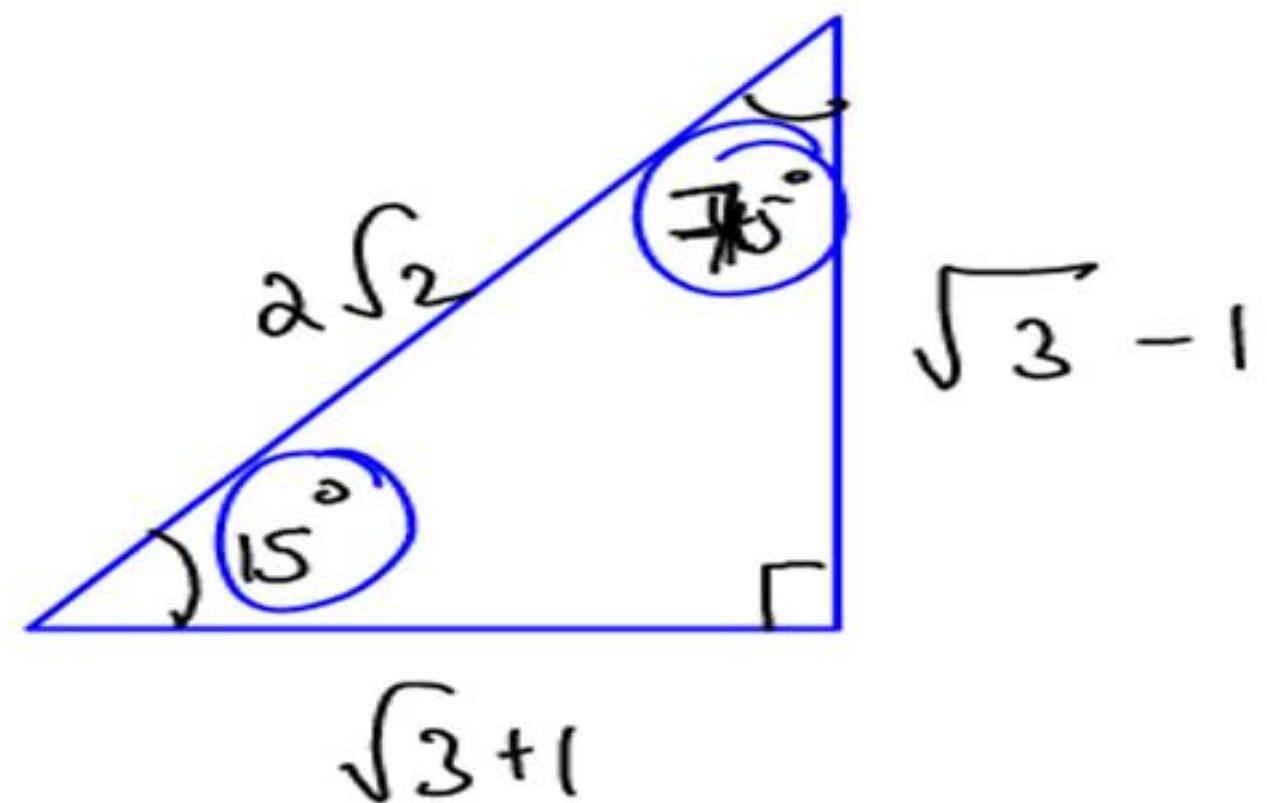


Eg. (i) Find the value of  $\sin 75^\circ$ .

$$\begin{aligned}\sin(45+30) &= \sin 45 \cos 30 + \cos 45 \sin 30 \\ &= \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \cdot \frac{1}{2} = \frac{\sqrt{3}+1}{2\sqrt{2}}\end{aligned}$$

(ii) Find the value of  $\sin 15^\circ$ .

$$\begin{aligned}\sin(45-30) &= \sin 45 \cos 30 - \cos 45 \sin 30 \\ &= \frac{\sqrt{3}-1}{2\sqrt{2}}\end{aligned}$$



$$\sin 15^\circ \rightarrow \frac{\sqrt{3}-1}{2\sqrt{2}}$$

$$\cos 15^\circ \rightarrow \frac{\sqrt{3}+1}{2\sqrt{2}}$$

$$\tan 15^\circ \rightarrow \frac{\sqrt{3}-1}{\sqrt{2}+1}$$

Ans. (i)  $\frac{\sqrt{3} + 1}{2\sqrt{2}}$

(ii)  $\frac{\sqrt{3} - 1}{2\sqrt{2}}$



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2. (i)  $\cos(A + B) = \cos A \cos B - \sin A \sin B$

(ii)  $\cos(A - B) = \cos A \cos B + \sin A \sin B$

2  
★

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$



Eg. Find the value of  $\cos 105^\circ$ .

$$\cos(60+45) \Rightarrow$$

$$\cos 60^\circ \cos 45^\circ - \sin 60^\circ \sin 45^\circ$$

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

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

Ans.  $\frac{1 - \sqrt{3}}{2\sqrt{2}}$

$$3. (i) \tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

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

Divide N.R.s D.R by  $\cos A \cos B$

$$= \frac{\cancel{\sin A} + \cancel{\sin B}}{1 - \cancel{\cos A} \cancel{\cos B}}$$

$$(ii) \tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

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

Divide N & D by  $\cos A \cos B$

$$= \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

③ \*

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$4. (\text{i}) \cot(A+B) = \frac{\cot A \cot B - 1}{\cot B + \cot A}$$

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

Divide LHS & RHS by  $\sin A \sin B$

$$= \frac{\cot A \cot B - 1}{\cot B + \cot A}$$

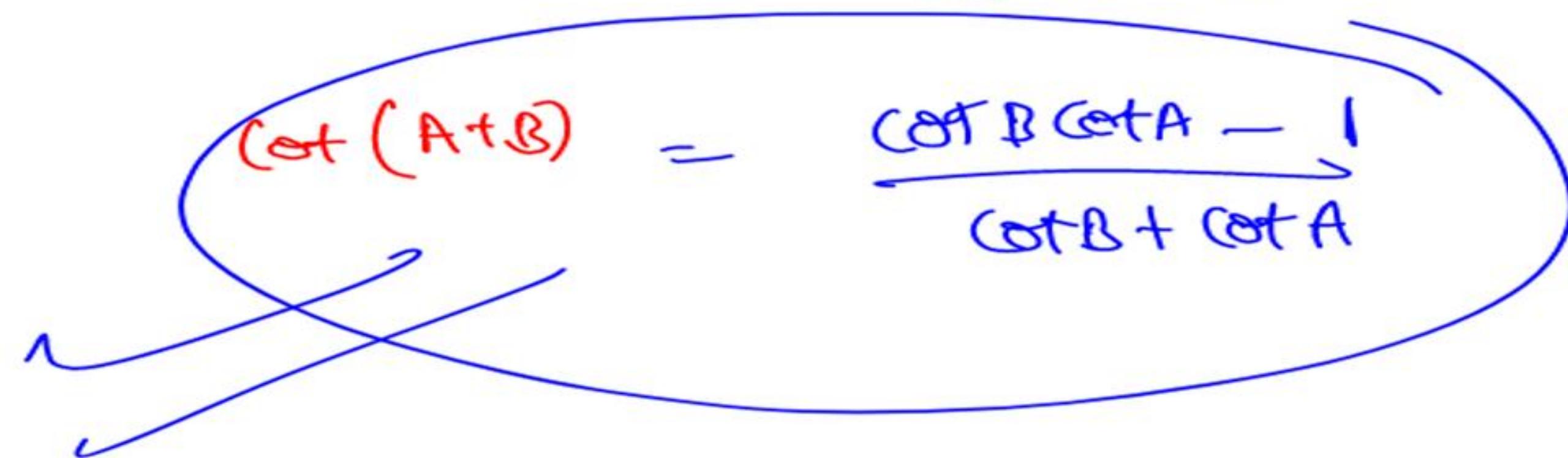
$$\tan(A+B) =$$

$$\frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\cot(A+B)$$

 $=$ 

$$\frac{\cot B \cot A - 1}{\cot B + \cot A}$$



$$(ii) \cot(A - B) = \frac{\cot A \cot B + 1}{\cot B - \cot A}$$

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

$$\frac{\cot B (\cot A + 1)}{\cot B - \cot A}$$

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

5.  $\tan(A+B+C) =$ 

$$\frac{\tan A + \tan B + \tan C - \tan A \tan B \tan C}{1 - \tan A \tan B - \tan B \tan C - \tan C \tan A}$$

$$\tan(A+B+C) = \frac{\tan(A+B) + \tan C}{1 - \tan(A+B) \tan C}$$

$$\frac{\frac{\tan A + \tan B}{1 - \tan A \tan B} + \tan C}{1 - \left( \frac{\tan A + \tan B}{1 - \tan A \tan B} \right) \tan C} \rightarrow \frac{\tan A + \tan B + \tan C - \tan A \tan B \tan C}{1 - \tan A \tan B - \tan A \tan C - \tan B \tan C}$$



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6. If  $A + B + C = 180^\circ$ 

Q(i)

$$\text{Ans} \quad \boxed{\text{(i)} \tan A + \tan B + \tan C = \tan A \tan B \tan C}$$

$$\text{(ii)} \cot A \cot B + \cot B \cot C + \cot C \cot A = 1$$

Derivation of (i)Divide (i) by  $\tan A \tan B \tan C$ 

$$\frac{1}{\tan B \tan C} + \frac{1}{\tan A \tan C} + \frac{1}{\tan A \tan B} = 1$$

$$\cot B \cot C + \cot A \cot C + \cot A \cot B = 1$$

$$A + B + C = 180$$

$$A + B = 180 - C$$

$$\tan(A+B) = \tan(180-C)$$

$$\frac{\tan A + \tan B}{1 - \tan A \tan B} = -\tan C$$

$$\tan A + \tan B = -\tan C + \tan A \tan B \tan C$$

$$\tan A + \tan B + \tan C = \tan A \tan B \tan C$$



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Eg.  $\tan 23^\circ + \tan 75^\circ + \tan 82^\circ = ??$

(a)  $\tan 23^\circ \tan 75^\circ \tan 8^\circ$

(b)  $\tan 23^\circ \tan 75^\circ \cot 8^\circ$

(c)  $\tan 23^\circ \cot 75^\circ \tan 82^\circ$

(d)  $\cot 23^\circ \cot 75^\circ \cot 82^\circ$

A = 23

B = 75

C = 82

A + B + C = 180°

$$\tan 23 + \tan 75 + \tan 82 = \tan 23 \tan 75 \tan 82$$

**Ans. (b)**

7. If  $A + B + C = 90^\circ$

(i)  $\tan A \tan B + \tan B \tan C + \tan C \tan A = 1$

(ii)  $\cot A + \cot B + \cot C = \cot A \cot B \cot C$

$$A + B + C = 90^\circ$$

$$A+B = 90^\circ - C$$

$$\tan(A+B) = \tan(90^\circ - C)$$

$$\tan(A+B) = \cot C$$

$$\frac{\tan A + \tan B}{1 - \tan A \tan B} = \frac{1}{\tan C}$$

$$\boxed{\tan A \tan B + \tan B \tan C + \tan C \tan A = 1}$$

Eg.  $\tan \underline{20^\circ} \tan \underline{30^\circ} + \tan \underline{30^\circ} \tan \underline{40^\circ} + \tan \underline{40^\circ} \tan \underline{20^\circ}$

(a)  $\tan 30^\circ \tan 40^\circ \tan 50^\circ$

(b)  $\cot 30^\circ \cot 40^\circ \cot 50^\circ$

(c) 1

(d)  $\tan 30^\circ \cot 40^\circ \tan 50^\circ$

A = 20

B = 30

C = 90



gradeup Ans. (c)

8. If  $A + B = 45^\circ$ ~~v. imp~~  
4(i)

(i)  $(1 + \tan A)(1 + \tan B) = 2$

(ii)  $(\cot A - 1)(\cot B - 1) = 2$

$$A + B = 45^\circ$$

$$\tan(A + B) = 1$$

$$\frac{\tan A + \tan B}{1 - \tan A \tan B} = 1$$

$$\tan A + \tan B = 1 - \tan A \tan B$$

$$\underbrace{\tan A \tan B}_{1} + \underbrace{\tan A + \tan B}_{1} + 1 = 1 + 1$$

$$\tan A (\tan B + 1) + 1 (\tan A + 1) = 2$$

$$(\tan A + 1)(\tan B + 1) = 2$$



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Eg1.  $(1 + \tan 20^\circ)(1 + \tan 25^\circ) = ??$

A =  $20^\circ$

B =  $25^\circ$

$$(1 + \tan A)(1 + \tan B) = 2$$



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Ans. 2



Eg2.  $(1 + \tan \underline{5^\circ})(1 + \tan \underline{6^\circ})(1 + \tan \underline{39^\circ})(1 + \tan \underline{40^\circ}) = ??$

$$(1 + \tan A)(1 + \tan B) = 2 \quad \text{if } A + B = 45^\circ$$

$$2 \cdot 2 = \underline{\underline{4}}$$





Eg. Find the value of :

$$\frac{(1 + \tan 1)(1 + \tan 2)}{1} \dots \frac{(1 + \tan 43)(1 + \tan 44)(1 + \tan 45)}{1}$$

$$2 \cdot 2 \cdot 2 \cdot \dots \quad (22 \text{ pairs}) \quad (1+1)$$

$$2^{22} \cdot 2$$

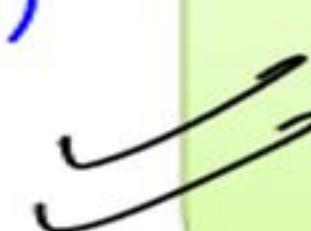
$$\underline{\underline{2^{23}}} \quad \checkmark$$



9.

(i)  $\sin 2\theta = 2 \sin \theta \cos \theta$

5(i)



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

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$

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

$$= 2 \sin \theta \cos \theta$$

$$\frac{2 \sin \theta \cos \theta}{1} \Rightarrow$$

$$\frac{2 \sin \theta \cos \theta}{\sin^2 \theta + \cos^2 \theta}$$

Divide N & D by  $\cos^2 \theta$

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



(ii)

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

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

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

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

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

$$\cos 2\theta =$$

$$\underline{\underline{\cos^2 \theta - \sin^2 \theta}}$$

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

$$\begin{aligned}\tan(A+B) &= \frac{\tan(A+B)}{1 - \tan A \tan B} \\ &= \frac{2\tan\theta}{1 - \tan^2\theta}\end{aligned}$$



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

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



10.

(i)  $\sin 3\theta = 3 \sin \theta - 4 \sin^3 \theta$

6(i)

$$3 \sin^1 \theta - 4 \sin^3 \theta$$

$$\sin 3\theta = \sin(2\theta + \theta)$$

$$= \frac{\sin 2\theta \cos \theta}{\text{_____}} + \frac{\cos 2\theta \sin \theta}{\text{_____}}$$

$$= 2 \sin \theta (\underbrace{\cos \theta \cdot \cos \theta}_{\text{_____}}) + (1 - 2 \sin^2 \theta) \sin \theta$$

$$= \frac{2 \sin \theta (1 - \sin^2 \theta)}{\text{_____}} + \frac{\sin \theta - 2 \sin^3 \theta}{\text{_____}}$$

$$= 3 \sin \theta - 4 \sin^3 \theta$$



(ii)

6(lil)

$$\cos 3\theta = 4\cos^3 \theta - 3\cos \theta$$

$$4\overset{3}{(\cos \theta)} - 3\cos \theta$$

$$\begin{aligned}\cos(2\theta + \theta) &= \underline{\cos 2\theta} \cos \theta - \sin 2\theta \sin \theta \\&= (2\cos^2 \theta - 1) \cos \theta - (2\sin \theta \cos \theta) \sin \theta \\&= \underline{2\cos^3 \theta - \cos \theta} - 2(1 - \cos^2 \theta) \cos \theta \\&= 4\cos^3 \theta - 3\cos \theta\end{aligned}$$



(iii)

$$\tan 3\theta = \frac{3\tan\theta - \tan^3\theta}{1 - 3\tan^2\theta}$$

6(iii)

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

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

$$= \frac{3\tan\theta - \tan^3\theta}{1 - 3\tan^2\theta}$$

$$\sin(A+B) = \sin A \cos B + \cos A \sin B \quad \text{--- (1)}$$

$$\sin(A-B) = \sin A \cos B - \cos A \sin B \quad \text{--- (2)}$$

$$\sin(A+B) + \sin(A-B) = 2 \sin A \cos B$$

$$\sin(A+B) - \sin(A-B) = 2 \cos A \sin B$$

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

$$\cos(A-B) = \cos A \cos B + \sin A \sin B$$

$$\cos(A+B) + \cos(A-B) = 2\cos A \cos B$$

$$\cos(A+B) - \cos(A-B) = -2\sin A \sin B$$



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11.

$$(i) \sin(A + B) + \sin(A - B) = 2 \sin A \cos B$$

Ans: 

$$(ii) \sin(A + B) - \sin(A - B) = 2 \cos A \sin B$$

$$(iii) \cos(A + B) + \cos(A - B) = 2 \cos A \cos B$$

$$(iv) \cos(A + B) - \cos(A - B) = -2 \sin A \sin B$$



$$\text{let } A+B = C$$

$$A-B = D$$

$$2A = C+D$$

$$A = \frac{C+D}{2}$$

$$B = \frac{C-D}{2}$$

$$\sin C + \sin D = 2 \sin\left(\frac{C+D}{2}\right) \cos\left(\frac{C-D}{2}\right)$$

$$\sin(A+B) + \sin(A-B) = 2 \sin A \cos B$$

$$\sin C - \sin D = 2 \cos\left(\frac{C+D}{2}\right) \sin\left(\frac{C-D}{2}\right)$$

$$\sin(A+B) - \sin(A-B) = 2 \cos A \sin B$$

$$\cos C + \cos D = 2 \cos\left(\frac{C+D}{2}\right) \cos\left(\frac{C-D}{2}\right)$$

$$\cos(A+B) + \cos(A-B) = 2 \cos A \cos B$$

$$\cos C - \cos D = -2 \sin\left(\frac{C+D}{2}\right) \sin\left(\frac{C-D}{2}\right)$$

$$\cos(A+B) - \cos(A-B) = -2 \sin A \sin B$$

$$2 \sin\left(\frac{C+D}{2}\right) \sin\left(\frac{D-C}{2}\right)$$



gradeup If,  $A + B = C$

$A - B = D$

**then,**  $A = \frac{C + D}{2}$ ,  $B = \frac{C - D}{2}$



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(8)

$$(i) \sin C + \sin D = 2 \sin\left(\frac{C+D}{2}\right) \cos\left(\frac{C-D}{2}\right)$$

$$(ii) \sin C - \sin D = 2 \cos\left(\frac{C+D}{2}\right) \sin\left(\frac{C-D}{2}\right)$$

$$(iii) \cos C + \cos D = 2 \cos\left(\frac{C+D}{2}\right) \cos\left(\frac{C-D}{2}\right)$$

$$(iv) \cos C - \cos D = -2 \sin\left(\frac{C+D}{2}\right) \sin\left(\frac{C-D}{2}\right)$$

or  $2 \sin\left(\frac{C+D}{2}\right) \sin\left(\frac{D-C}{2}\right)$

12.  $\sin(A+B)\sin(A-B) = \underline{\underline{\sin^2 A - \sin^2 B}}$

q(i)

$$(\underline{\sin A \cos B + \cos A \sin B}) (\underline{\sin A \cos B - \cos A \sin B})$$

$$\sin^2 A \cos^2 B - \cos^2 A \sin^2 B$$

$$\sin^2 A (1 - \sin^2 B) - (1 - \sin^2 A) (\sin^2 B)$$

$$\underline{\underline{\sin^2 A - \cancel{\sin^2 A \sin^2 B} - \cancel{\sin^2 B + \sin^2 A \sin^2 B}}}$$

13.  $\cos(A+B)\cos(A-B) = \underline{\cos^2 A} - \underline{\sin^2 B} \rightarrow \cos^2 B - \sin^2 A$   
q(ii)

$$(\cos A \cos B - \sin A \sin B) (\cos A \cos B + \sin A \sin B)$$

$$\cos^2 A \cos^2 B - \sin^2 A \sin^2 B$$

$$\cos^2 A \cos^2 B - (-\cos^2 A)(-\cos^2 B)$$

$$\cos^2 A \cos^2 B - [1 - \cos^2 A - \cos^2 B + \cos^2 A \cos^2 B]$$

$$\cos^2 A + \cos^2 B - 1$$

$$\cos^2 A - (1 - \cos^2 B) = \cos^2 A - \sin^2 B$$

14.

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



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

(iii)  $\tan \theta \tan (60 - \theta) \tan (60 + \theta) = \underline{\tan 3\theta}$

$$\frac{\sin \theta}{\sin} \frac{\sin (60-\theta)}{\sin} \frac{\sin (60+\theta)}{\sin}$$

$$\sin \theta \left[ \sin^2 60 - \sin^2 \theta \right]$$

$$\sin \theta \left[ \frac{3}{4} - \sin^2 \theta \right]$$

$$\sin \theta \left[ \frac{3 - 4 \sin^2 \theta}{4} \right] = \frac{1}{4} [3 \sin \theta - 4 \sin^3 \theta]$$

$$= \frac{1}{4} \sin 30$$

====

$$\cos \theta \quad \cos(60 - \theta) \quad \cos(60 + \theta)$$

$$\cos \theta \quad \left[ \cos^2 60 - \sin^2 \theta \right]$$

$$\cos \theta \quad \left[ \frac{1}{4} - \sin^2 \theta \right]$$

$$\cos \theta \quad \left[ \frac{1}{4} - (1 - \cos^2 \theta) \right]$$

$$\cos \theta \quad \left[ \cos^2 \theta - \frac{3}{4} \right] = \frac{1}{4} \left[ 4\cos^3 \theta - 3\cos \theta \right]$$
$$= \frac{1}{4} \cos 3\theta$$



Eg. Find the value of :  $\underline{\sin 20^\circ} \underline{\sin 40^\circ} \underline{\sin 60^\circ} \underline{\sin 80^\circ}$

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

$$\sin 60 \left[ \underline{\sin 20} \underline{\sin 40} \underline{\sin 80} \right]$$

$$\sin 60 \left[ \frac{1}{4} \sin 60 \right]$$

$$\frac{1}{4} \sin^2 60 = \frac{1}{4} \cdot \frac{3}{4} = \frac{3}{16}$$



Ans.  $\frac{3}{16}$



Eg. Find the value of :  $\cos 20^\circ \cos 40^\circ \underline{\underline{\cos 60^\circ}} \cos 80^\circ$

$$\cos 60^\circ [\cos 20^\circ \cos 40^\circ \cos 80^\circ]$$

$$\cos 60^\circ [\cos 20^\circ \cos(60^\circ - 20^\circ) \cos(60^\circ + 20^\circ)]$$

$$\cos 60^\circ \left[ \frac{1}{4} \cos 60^\circ \right]$$

$$\frac{1}{4} \cos^2 60^\circ = \frac{1}{4} \cdot \left(\frac{1}{2}\right)^2$$

$$= \frac{1}{16}$$

Ans.  $\frac{1}{16}$

# Practice Questions



Q.1 (i) If,  $\cot \alpha = \frac{1}{2}$        $180^\circ < \alpha < 270^\circ$

$$\sec \beta = \frac{-5}{3} \quad 90^\circ < \beta < 180^\circ$$

Find :  $\tan(\alpha + \beta)$

(a)  $\frac{1}{11}$

(b)  $\frac{2}{11}$

(c)  $\frac{3}{11}$

(d)  $\frac{4}{11}$



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Ans. (b)



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$\sin(\alpha - \beta) = \frac{5}{13}$ , find  $\tan 2\alpha$

(a)  $\frac{56}{33}$

(b)  $\frac{25}{16}$

(c)  $\frac{19}{12}$

(d)  $\frac{20}{7}$



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Ans. (a)



Q.2  $\tan 70^\circ = ??$

- (a)  $\tan 20^\circ - 2 \tan 50^\circ$
- (b)  $\tan 50^\circ - 2 \tan 20^\circ$
- (c)  $\tan 50^\circ + 2 \tan 20^\circ$
- (d)  $\tan 20^\circ + 2 \tan 50^\circ$

Hint  $\tan(A+B)$



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Ans. (d)



Q.3 If  $\tan 25 = x$

$$\frac{\tan 155 - \tan 115}{1 + \tan 155 \tan 115}$$

(a)  $\frac{1-x^2}{2x}$

(b)  $\frac{1+x^2}{2x}$

(c)  $\frac{1-x^2}{1+x^2}$

(d)  $\frac{1+x^2}{1-x^2}$



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Q.4 (i)

$$\frac{\cos^2 33 - \cos^2 57}{\sin^2 10.5 - \sin^2 34.5} = ??$$

(a)  $\sqrt{2}$

(b)  $-\sqrt{2}$

(c)  $\frac{1}{\sqrt{2}}$

(d)  $\frac{-1}{\sqrt{2}}$



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gradeup Ans. (b)



- Q.4 (ii)  $\cos(36 - \theta)\cos(36 + \theta) + \cos(54 + \theta)\cos(54 - \theta) = ??$
- (a)  $\cot 2\theta$       (b)  $\cos 2\theta$       (c)  $\tan 2\theta$       (d)  $\sin 2\theta$



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Ans. (b)



Q.5  $\cos^2(A - B) + \cos^2 B - 2\cos(A - B)\cos A \cos B = ??$

- (a)  $\sin^2 A$
- (b)  $\cos^2 A$
- (c)  $\tan^2 A$
- (d)  $\operatorname{cosec}^2 A$



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Ans. (a)

Q.6 (i)  $1 + \cos 2x + \cos 4x + \cos 6x =$

- (a)  $\cos x \cos 2x \cos 3x$
- (b)  $2 \cos x \cos 2x \cos 3x$
- (c)  $3 \cos x \cos 2x \cos 3x$
- (d)  $4 \cos x \cos 2x \cos 3x$



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Ans. (d)

Q.6 (ii)  $\sin x + \sin 3x + \sin 5x + \sin 7x = ??$

(a)  $\cos x \cos 2x \sin 4x$

(b)  $2 \cos x \cos 2x \sin 4x$

(c)  $4 \cos x \cos 2x \sin 4x$

(d)  $2 \sin x \sin 2x \cos 4x$



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Ans. (c)

Q.7(i)  $\cos 20 \cos 40 \cos 60 \cos 80 = ??$

(a)  $\frac{3}{16}$

(b)  $\frac{1}{16}$

(c)  $\frac{3}{8}$

(d)  $\frac{1}{8}$



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Ans. (b)

Q.7 (ii)  $\sin 10 \sin 30 \sin 50 \sin 70 = ??$

(a)  $\frac{3}{16}$

(b)  $\frac{1}{16}$

(c)  $\frac{3}{8}$

(d)  $\frac{1}{8}$



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Q.7 (iii)  $\sin 20 \sin 40 \sin 60 \sin 80 = ??$

(a)  $\frac{3}{16}$

(b)  $\frac{1}{16}$

(c)  $\frac{3}{8}$

(d)  $\frac{1}{8}$



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gradeup Ans. (a)

Q.7 (iv)  $\cos 10 \cos 30 \cos 50 \cos 70 = ??$

(a)  $\frac{3}{16}$

(b)  $\frac{1}{16}$

(c)  $\frac{3}{8}$

(d)  $\frac{1}{8}$



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Ans. (a)

Q.7 (v)  $4 \cos 12 \cos 48 \cos 72 = ??$

(a)  $\cos 18$

(b)  $\cos 36$

(c)  $\cos 54$

(d)  $\cos 72$



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Ans. (b)



Q.7 (vi)  $4 \sin 12 \sin 48 \sin 72 = ??$

(a)  $\sin 18$

(b)  $\sin 36$

(c)  $\sin 54$

(d)  $\sin 72$



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Ans. (b)

Q.8 (i)  $4 \sin \theta \sin (60 + \theta) \sin (120 + \theta) = ??$

- (a)  $\sin \theta$
- (b)  $2 \sin 2\theta$
- (c)  $\sin 3\theta$
- (d)  $3 \sin 3\theta$



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Ans. (c)

Q.8 (ii)  $\sin \theta + \sin (\theta + 120^\circ) + \sin (\theta + 240^\circ) = ??$

- (a) 0
- (b)  $\frac{1}{2}$
- (c)  $\sqrt{3}$
- (d) None of these



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Ans. (a)



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Q. 9

$$\cos 40 + \cos 80 + \cos 160 + \cos 240 = ??$$

- (a)  $-\frac{1}{2}$
- (b) 0
- (c)  $\frac{1}{2}$
- (d) 1



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gradeup Ans. (a)



Q. 10 (i)  $\sin 47 + \sin 61 - \sin 11 - \sin 25 = ??$

- (a)  $\sin 36$
- (b)  $\cos 36$
- (c)  $\sin 7$
- (d)  $\cos 7$



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Ans. (d)



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Q. 10(ii)  $\cos 52 + \cos 68 + \cos 172 = ??$

- (a) 0
- (b)  $\frac{1}{2}$
- (c) 1
- (d) 2



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Ans. (a)

Q. 10 (iii)  $\cos 35 + \cos 155 + \cos 85 = ??$

- (a) 0
- (b)  $\frac{1}{2}$
- (c) 1
- (d)  $\cos 120$



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Ans. (a)

Q.11  $\frac{\sin A + \sin 3A + \sin 5A + \sin 7A}{\cos A + \cos 3A + \cos 5A + \cos 7A} = ??$

- (a)  $2\tan 2A$
- (b)  $\tan 2A$
- (c)  $\tan 4A$
- (d)  $2\tan 4A$



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Ans. (c)

Q.12 
$$\frac{1 + \sin 2\theta + \cos 2\theta}{1 + \sin 2\theta - \cos 2\theta} = ??$$

- (a)  $\tan \theta$
- (b)  $\cot \theta$
- (c)  $\tan 2\theta$
- (d)  $\cot 2\theta$



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Ans. (b)

Q.13  $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2\cos 8\theta}}} = ??$

- (a)  $2\cos\theta$
- (b)  $2\cos 2\theta$
- (c)  $4\cos\theta$
- (d)  $4\cos 4\theta$



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Ans. (a)



gradeup Q.14

$$\frac{\sec 8x - 1}{\sec 4x - 1} = ??$$

(a)  $\frac{\sin 4x}{\sin 2x}$

(b)  $\frac{\tan 8x}{\tan 2x}$

(c)  $\frac{\cot 2x}{\cot x}$

(d)  $\frac{\sec^4 x}{\sec 2x}$



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gradeup Ans. (b)



Q.15

$$(1 + \cos 22.5)(1 + \cos 67.5)(1 + \cos 112.5)(1 + \cos 157.5) = ??$$

(a)  $\frac{1}{8}$

(b)  $\frac{3}{8}$

(c)  $\frac{1}{16}$

(d)  $\frac{3}{16}$



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Ans. (a)

Q.16  $\sqrt{3} \operatorname{cosec} 20 - \sec 20 = ??$

- (a) 0
- (b) 1
- (c) 2
- (d) 4



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Ans. (d)



gradeup Q17. Find the value of  $\cos 12^\circ \cos 24^\circ \cos 36^\circ \cos 48^\circ \cos 72^\circ \cos 84^\circ$

A.  $1/32$

B.  $1/64$

C.  $1/78$

D.  $1/34$



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Ans. (b)



**Q18.** What is the value of  $\frac{\sin 59^\circ \cos 31^\circ + \cos 59^\circ \sin 31^\circ}{\cos 20^\circ \cos 25^\circ - \sin 20^\circ \sin 25^\circ}$  ?

A. 1

B. -1

C.  $\frac{1}{\sqrt{2}}$

D.  $\sqrt{2}$



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**Q19. If  $\tan A - \tan B = x$  and  $\cot B - \cot A = y$ , then what is the value of  $\cot(A - B)$ ?**

A.  $\frac{1}{x} + \frac{1}{y}$

B.  $\frac{1}{x} - \frac{1}{y}$

C.  $\frac{xy}{x+y}$

D.  $1 + \frac{1}{xy}$



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Ans. (a)

**Q20.** The value of  $\frac{\sin 3\theta + \cos 3\theta}{\sin \theta - \cos \theta}$  is:

- A.  $2 \sin 2\theta + 1$
- B.  $\sin 2\theta - 1$
- C.  $-1 - 2 \sin 2\theta$
- D.  $2 \sin 2\theta - 1$



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Ans. (c)

# HOMEWORK



gradeup Q. 1 If,  $\sin A = \frac{3}{5}$

$$0 < A < 90$$

$$\cos B = \frac{-12}{13} \quad 180 < B < 270$$

$$\tan(A - B) = ??$$

(a)  $\frac{16}{63}$

(b)  $\frac{-16}{63}$

(c)  $\pm \frac{16}{63}$

(d) None of these



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Ans. (c)



gradeup Q.2  $\tan 3A - \tan 2A - \tan A = ??$

- (a)  $\frac{\tan 3A}{\tan 2A + \tan A}$
- (b)  $\frac{\tan 3A - \tan 2A}{\tan A}$
- (c)  $\tan 3A \tan 2A \tan A$
- (d)  $\tan 3A \tan A$



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Ans. (c)



Q.3 If  $\alpha + \beta = 90$ ,  $\beta + \gamma = \alpha$ ; find  $\tan \alpha = ??$

(a)  $2(\tan \beta + \tan \gamma)$

(b)  $\tan \beta + \tan \gamma$

(c)  $\tan \beta + 2\tan \gamma$

(d)  $2\tan \beta + \tan \gamma$



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gradeup Ans. (c)

Q.4  $\tan 20 + \tan 40 + \sqrt{3} \tan 20 \tan 40 = ??$

(a) 1

(b)  $\sqrt{3}$

(c)  $\frac{1}{\sqrt{3}}$

(d) None of these



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gradeup Ans. (b)

Q.5  $\frac{\sin 5x - \sin 3x}{\cos 5x + \cos 3x} = ??$

(a) tan x

(b) cot x

(c) cosec x

(d) sec x



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Ans. (a)



Q.6

$$\frac{\cos 8A \cos 5A - \cos 12A \cos 9A}{\sin 8A \cos 5A + \cos 12A \sin 9A} = ??$$

- (a)  $2 \tan 2A$
- (b)  $\tan 2A$
- (c)  $\tan 4A$
- (d)  $2 \tan 4A$



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Ans. (c)



Q.7 If,  $\sin x = n \sin(x + 20)$  Find:  $\frac{\tan x + 0}{\tan \theta}$

(a)  $\frac{1+n}{1-n}$

(b)  $\frac{1+n}{n-1}$

(c)  $\frac{n-1}{n+1}$

(d)  $\frac{1-n}{1+n}$



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Ans. (a)

Q8.  $\sin^4 \frac{\pi}{8} + \sin^4 \frac{3\pi}{8} + \sin^4 \frac{5\pi}{8} + \sin^4 \frac{7\pi}{8} = ??$

(a)  $\frac{2}{3}$

(b)  $\frac{3}{2}$

(c)  $\frac{5}{2}$

(d)  $\frac{2}{5}$



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Ans. (b)

**Q9. What is the value of**

$$\frac{\cos 140^\circ - \cos 40^\circ}{\cos 80^\circ + \cos 20^\circ}$$

- A.  $2 \cot 50^\circ$
- C.  $\frac{2}{\sqrt{3}} \tan 50^\circ$

- B.  $\cot 50^\circ$
- D.  $\tan 50^\circ$



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Ans. (c)

**Q10. What is  $(\sin x \cos y + \cos x \sin y)(\sin x \cos y - \cos x \sin y)$  equal to?**

- A.  $\cos^2 x - \cos^2 y$
- B.  $\cos^2 x - \sin^2 y$
- C.  $\sin^2 x - \cos^2 y$
- D.  $\sin^2 x - \sin^2 y$



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Ans. (d)

**Q11. Find the value of**  $\left( \frac{\cot x}{\cot x - \cot 3x} + \frac{\tan x}{\tan x - \tan 3x} \right)$

- A. 1
- B. -1
- C. 0
- D. 2



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Ans. (a)

**Q12. What is the value of :**

$$[(\sec 2\theta + 1)\sqrt{\sec^2 \theta - 1}] \times \frac{1}{2}(\cot \theta - \tan \theta)$$

- A. -1
- B.  $\tan \theta$
- C. 1
- D.  $1/2$



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Ans. (c)

- Q13. What is the value of**  $\begin{bmatrix} \sin x + \sin y & \sin x - \sin y \\ \cos x + \cos y & \cos y - \cos x \end{bmatrix}$
- A.** -1      **B.** 1      **C.**  $\frac{1}{2}$       **D.**  $\frac{3}{2}$



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Ans. (b)



**Q14. Consider a triangle ABC, where A,B and C are the angles of the triangle**

**then find the value of**  $\cos\left(\frac{A+B}{2}\right) \times \cos\left(\frac{B+C}{2}\right) \times \cos\left(\frac{C+A}{2}\right)$

A.  $2 \sin\left(\frac{A}{2}\right) \times \sin\left(\frac{B}{2}\right) \times \sin\left(\frac{C}{2}\right)$

B.  $3 \sin\left(\frac{A}{2}\right) \times \sin\left(\frac{B}{2}\right) \times \sin\left(\frac{C}{2}\right)$

C.  $4 \sin\left(\frac{A}{2}\right) \times \sin\left(\frac{B}{2}\right) \times \sin\left(\frac{C}{2}\right)$

D.  $\sin\left(\frac{A}{2}\right) \times \sin\left(\frac{B}{2}\right) \times \sin\left(\frac{C}{2}\right)$



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Ans. (d)

**Q15. Find the value of  $\sin\left(t + \frac{2\pi}{3}\right) + \sin\left(t + \frac{4\pi}{3}\right)$**

- A. 0
- B.  $\cos t$
- C.  $\sin t$
- D.  $-\sin t$



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Ans. (d)

**Q16.** If  $\frac{\sin(A+B)}{\sin(A-B)} = \frac{m+n}{m-n}$  then the value of  $\frac{\tan A}{\tan B}$  is :

A. mn

B. m/n

C. m+n

D. m-n



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Ans. (b)



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Sahi Prep Hai Toh Life Set Hai

Practise  
topic-wise quizzes

Keep attending  
live classes



