



Sahi Prep Hai Toh Life Set Hai

Multiple and Sub-multiple of Angles

Agenda → Revise all formulas (8-10) min

Practice Question

Min 12 Question

Revision of Important Formulae

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

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

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

4(i) If $A + B + C = 180^\circ$

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

4(ii) If $A + B = 45^\circ$

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

5 (i)

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

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

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

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

5(ii)

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

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

$$= 1 - \underline{2 \sin^2 \theta}$$

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

5(iii)

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

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

6(ii) $\cos 3\theta = 4 \cos^3 \theta - 3 \cos \theta$

6(iii) $\tan 3\theta = \frac{3 \tan \theta - \tan^3 \theta}{1 - 3 \tan^2 \theta}$

7.

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

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

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

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

OR

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

10.

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

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

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

Practice Questions

Q.1 (i) If, $\cot \alpha = \frac{1}{2}$

$$180^\circ < \alpha < 270^\circ$$

$$\sec \beta = \frac{-5}{3}$$

$$90^\circ < \beta < 180^\circ$$

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

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

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

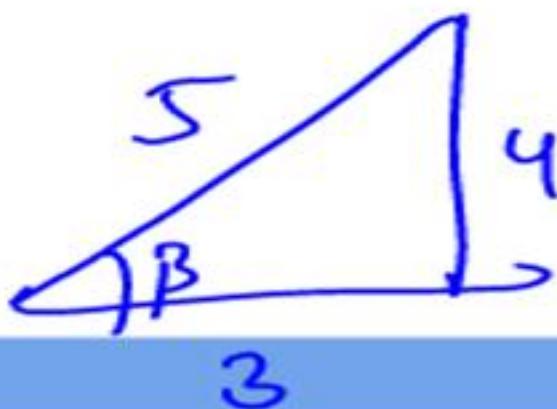
(c) $\frac{3}{11}$

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

IIIrd quad

IInd quad

$\boxed{\tan \alpha = 2}$



$\boxed{\tan \beta = -\frac{4}{3}}$

$$\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 + \tan \alpha \tan \beta}$$

$$= \frac{2 - \frac{4}{3}}{1 + \frac{8}{3}} \Rightarrow \frac{\frac{2}{3}}{\frac{11}{3}} = \frac{2}{11}$$





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Ans. (b)

$$0 \leq \alpha \leq \beta \leq 45$$



gradeup Q.1 (ii) If, $\cos(\alpha + \beta) = \frac{4}{5}$

~~$\sin(\alpha - \beta)$~~

$$0 \leq \alpha + \beta \leq 90$$

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

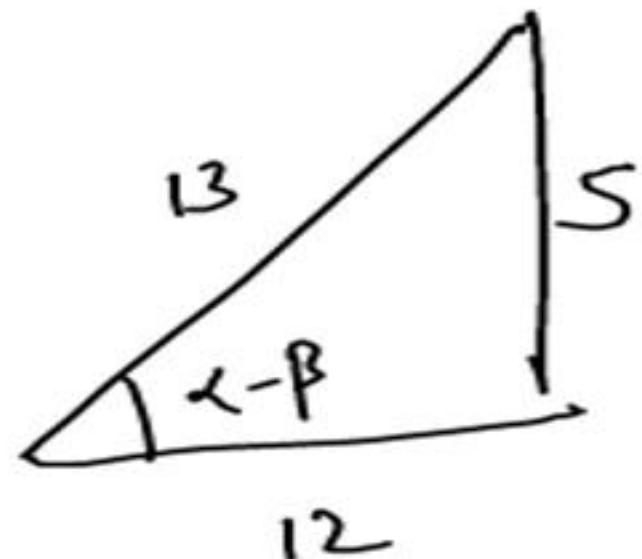
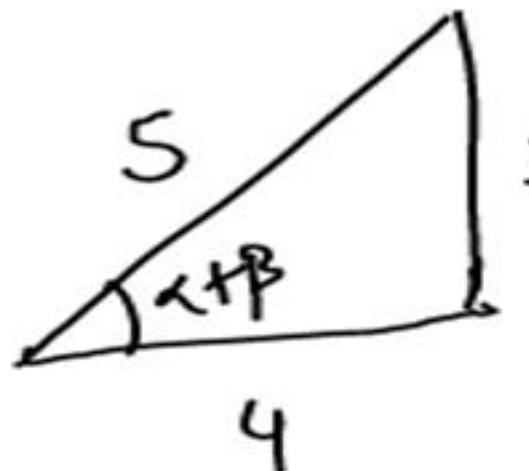
$$0 \leq \alpha - \beta \leq 90$$

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

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

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

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



$$\tan(\alpha + \beta) = \frac{3}{4} \quad \tan(\alpha - \beta) = \frac{5}{12}$$

$$\tan[(\alpha + \beta) + (\alpha - \beta)] = \frac{\tan(\alpha + \beta) + \tan(\alpha - \beta)}{1 - \tan(\alpha + \beta)\tan(\alpha - \beta)}$$

$$\tan 2\alpha =$$

$$\frac{\frac{3}{4} + \frac{5}{12}}{1 - \frac{3}{4} \cdot \frac{5}{12}} = \frac{56}{33}$$



Ans. (a)

Q.2 $\tan 70 = ??$

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

$$70 = 50 + 20$$

$$\tan 70 = \tan(50 + 20)$$

$$\tan 70 = \frac{\tan 50 + \tan 20}{1 - \tan 50 \tan 20}$$

$$\tan 70 - \cancel{\tan 70} \cancel{\tan 50 \tan 20} = \tan 50 + \tan 20$$

$$\tan 70 = 2 \tan 50 + \tan 20$$



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

$$\frac{\tan(180-25) - \tan(90+25)}{1 + \tan(180-25) \tan(90+25)} = \frac{-x + \frac{1}{x}}{1 - x\left(-\frac{1}{x}\right)}$$

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





Ans. (a)

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

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

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

$$\sin^2 10.5 - \sin^2 34.5$$

$$\frac{\sin 10.5 \sin(24)}{\sin 34.5 \sin(24)} =$$

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





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) $\sin 2\theta$

$$\theta = 0$$

$$\underline{\underline{\cos 72}}$$

$$\cos(36-\theta) \cos(36+\theta) + \cos(54+\theta) \cos(54-\theta)$$

$$\rightarrow \cancel{\cos^2 36 - \sin^2 \theta} + \cancel{\cos^2 54 - \sin^2 \theta}$$
$$1 - 2\sin^2 \theta = \underline{\underline{\cos 2\theta}}$$

Ans. (b)



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

~~(a) $\sin^2 A$~~

(b) $\cos^2 A$

(c) $\tan^2 A$

(d) $\operatorname{cosec}^2 A$

cosec

I Put $B = 0$

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

$$1 - \cos^2 A$$

$$\sin^2 A$$

$$\overbrace{\cos^2(A-B)} + \overbrace{\cos^2 B} - 2\overbrace{\cos(A-B) \cos A \cos B}$$

$$\cos(A-B) \left[\cos(A-B) - 2\cos A \cos B \right] + \cos^2 B$$

$$\cos(A-B) \left[\cos A \cos B + \sin A \sin B - 2\cos A \cos B \right] + \cos^2 B$$

$$= \cos(A-B) \left[\cos A \cos B - \sin A \sin B \right] + \cos^2 B$$

$$- \left[\cos(A-B) \cos(A+B) \right] + \cos^2 B$$

$$- \left[\cos^2 A - \sin^2 B \right] + \cos^2 B$$

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

Ans. (a)

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

- (a) $\cos x \cos 2x \cos 3x$
- (c) $3 \cos x \cos 2x \cos 3x$

Ist let $x = 0$

$$1+1+1+1=4$$

IInd

$$(1 + \cos 6x) + (\cos 2x + \cos 4x)$$

$$2\cos^2 3x + 2\cos 3x \cos x$$

$$2\cos 3x [\cos 3x + \cos x]$$

$$2\cos 3x \quad 2\cos 2x \cos x$$

$$4 \cos x \cos 2x \cos 3x$$

75sec

$$(1 + \cos 2x) + (\cos 4x + \cos 6x)$$

$$2\cos^2 x + 2\cos 5x \cos x$$

$$2\cos x [\cos x + \cos 5x]$$

$$2\cos x [2\cos 3x \cos 2x]$$

$$4\cos x \cos 3x \cos 2x$$



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Ans. (d)

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

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

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

Homework





Ans. (c)

V. A.M.P.

Q.7(i) $\frac{\cos 20 \cos 40 \cos 60 \cos 80}{16} = ??$

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

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

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

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

$\rightarrow \frac{1}{4} \cos^2 60 = \frac{1}{4} \cdot \frac{1}{4}$

~~Y/16~~

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

$$\cos 20 \cos 40 \cos 80 = \frac{1}{4} \cos 60$$



Ans. (b)

Q.7 (ii) $\frac{\sin 10}{3} \sin 30 \sin 50 \sin 70 = ??$

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

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

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

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

$\rightarrow \frac{1}{4} \sin^2 30 \Rightarrow \frac{1 \cdot 1}{4 \cdot 4} = \frac{1}{16}$

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

$\theta = 10^\circ$

$$\sin 10 \sin 50 \sin 70 = \frac{1}{4} \sin^3 30$$



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

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

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

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

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

Homework





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) $\frac{1}{8}$

Homework





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Ans. (a)

Ans



~~Q.7 (v) $4 \cos \frac{12}{\cancel{12}} \cos 48 \cos 72 = ??$~~

(a) $\cos 18$

~~(b) $\cos 36$~~

(c) $\cos 54$

(d) $\cos 72$

$$4 \left[\cos 12 \cos 48 \cos 72 \right] = \cancel{4} \left[\frac{1}{4} \cos 36 \right]$$

$$\underline{4} \cos 12 \cos 48 \cos 72$$

$$(2 \cos 12 \cos 48) \cdot 2 \cos 72$$

$$2 [\cos 60 + \cos 36] \cos 72$$

$$\rightarrow \cdot \cos 72 \rightarrow 2 \cos 36 \cos 72$$

$$\cos 72 + \frac{\cos 108}{\cos 72} + \cos 36$$

$$\cancel{\cos 72} \quad \cancel{\cos(180 - 72)} \Rightarrow \underline{\cos 36}$$



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Ans. (b)

framework



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

- (a) $\sin 18$
- (b) $\sin 36$
- (c) $\sin 54$
- (d) $\sin 72$



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) $3 \sin 3\theta$

$$4 \sin \theta \sin (60 + \theta) \sin [180 - (60 - \theta)]$$

$$\frac{4 \sin \theta \sin (60 + \theta) \sin (60 - \theta)}{}$$

$$\cancel{4} \left[\cancel{\sin 3\theta} \right]$$

✓ Best

✓ II

✓ III

Concepts

Concepts

Putting

Try to
do
+ Putting ✓

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

$\frac{\pi}{3}$

I Put $\theta = 0^\circ$

$$0 + \sin 120^\circ + \sin 240^\circ$$

$$\sin(90^\circ + 30^\circ) + \sin(180^\circ + 60^\circ)$$

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

IInd

$$\sin\theta + \sin(\theta+120) + \sin(\theta+240)$$

$$\sin\theta + 2\sin\left[\frac{\theta+120+\theta+240}{2}\right] \cos\left[\frac{\theta+120-\theta-240}{2}\right]$$

$$\sin\theta + 2\sin[(180+\theta)\cos(-60)]$$

$$\underline{\underline{\sin\theta}} + \underline{\underline{2}(\underline{-\sin\theta}) \cdot \frac{1}{2}}$$

$$= \underline{\underline{0}}$$

Ans. (a)

Q. 9

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

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

$$\begin{aligned} & (\cos 40 + \cos 160) + (\cos 80 + \cancel{\cos 240}) \\ & - 2(\cos 100 \cancel{\cos 60}) + \cancel{\cos 80} + \cancel{\cos(180+60)} \\ & \cancel{\cos 160} + \cancel{\cos 80} + \left(-\frac{1}{2}\right) \end{aligned}$$

$$\cos 40^\circ + \cos 80^\circ + \cos 160^\circ + \cos 240^\circ$$

$$\cos 40^\circ + \cancel{\cos 240^\circ} + \cos 80^\circ + \cos 160^\circ$$

$$\cos 40^\circ + \left(-\frac{1}{2}\right) + 2\cos 120^\circ \cancel{\cos 40^\circ}$$

$$\cancel{\cos 40^\circ} - \frac{1}{2} - \cancel{\cos 40^\circ} \\ = -\frac{1}{2}$$



gradeup Ans. (a)

90 sec



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

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



$$(\sin 47 - \sin 11) + (\sin 61 - \sin 25)$$

$$\rightarrow 2\sin 18 \cos 29 + 2\sin 18 \cos 43$$

$$2\sin 18 [\cos 29 + \cos 43]$$

$$\rightarrow \frac{2\sin 18 (\cos 29 + \cos 43)}{\cos 18} \cdot \frac{\cos 7}{\cos 7} \rightarrow \frac{\cancel{2\sin 18} (\cos 29 + \cos 43)}{\cos 18}$$





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Ans. (d)

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

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

$$\cos 52 + \cos 172 + \cos 68$$

$$\underline{2 \cos 112 \cos 60} + \cos 68$$

$$\cancel{\cos 112} + \cancel{\cos 68} \\ = 0$$



Ans. (a)

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

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


$$\begin{aligned} & \cos 35 + 2\cos 120 \cos 35 \\ & \cos 35 - \cos 35 \\ & = 0 \end{aligned}$$

$$\cos 35 + \cos 155 + \cos 85$$

$$2 \cos 95 \cos 60 + \cos 85$$

$$\cancel{\cos 95} + \cancel{\cos 85} \rightarrow 0$$

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) $2 \tan 4A$

$$\frac{\sin A + \sin 7A + \sin 3A + \sin 5A}{\cos A + \cos 7A + \cos 3A + \cos 5A}$$

$$\frac{2 \sin 4A \cos 3A + 2 \sin 4A \cos 1}{2 \cos 4A \cos 3A + 2 \cos 4A \cos 1}$$

$$\frac{2 \sin 4A [\cos 3A + \cos 1]}{2 \cos 4A [\cos 3A + \cos 1]}$$





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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) $\cot 2\theta$

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

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





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) $4\cos 4\theta$

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

$$\sqrt{2 + \sqrt{2 + \sqrt{2(1 + \cos 8\theta)}}}$$

$$\Rightarrow \sqrt{2 + \sqrt{2 + \sqrt{2 \cdot 2\cos^2 4\theta}}}$$

$$\sqrt{2 + \sqrt{2 + 2\cos 4\theta}}$$

$$\sqrt{2 + \sqrt{2(1 + \cos 4\theta)}} \\ \sqrt{2 + 2(1 + \cos 2\theta)} = \sqrt{2(1 + \cos 2\theta)}$$

$$\Rightarrow \underline{\underline{2\cos \theta}}$$





Ans. (a)



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) $\frac{\sec 4x}{\sec 2x}$



$$\frac{\sec 8x - 1}{\sec 4x - 1} \Rightarrow \frac{\frac{1}{\cos 8x} - 1}{\frac{1}{\cos 4x} - 1} \Rightarrow \frac{\frac{1 - \cos 8x}{\cos 8x}}{\frac{1 - \cos 4x}{\cos 4x}}$$

$$\frac{2 \sin^2 4x \cos 4x}{\cos 8x \cos^2 2x}$$

$$\rightarrow \frac{2 \sin 4x \sin 4x \cos 4x}{\cos 8x \cos^2 2x \sin^2 2x}$$

$$\rightarrow \frac{\cancel{\sin 8x} - \cancel{2 \sin^2 2x} \cos 2x}{\cos 8x \cancel{2 \sin^2 2x} \sin^2 2x} = \frac{\tan 8x}{\tan 4x}$$



gradeup Ans. (b)

$$\theta = 22.5$$



Q.15

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

- (a) $\frac{1}{8}$
(c) $\frac{1}{16}$

- (b) $\frac{3}{8}$
(d) $\frac{3}{16}$

$$\begin{aligned} & (1 + \cos \theta) [1 + \cos(90 - \theta)] [1 + \cos(90 + \theta)] [1 + \cos(180 - \theta)] \\ & \quad \overbrace{(1 + \cos \theta)(1 + \sin \theta)(1 - \sin \theta)(1 - \cos \theta)}^{\text{cancel}} \end{aligned}$$

$$\begin{aligned} \sin^2 \theta \cos^2 \theta &= \frac{1}{4} \cdot 4 \sin^2 \theta \cos^2 \theta = \frac{1}{4} \sin^2 2\theta \\ &= \frac{1}{4} \left(\frac{1}{5}\right)^2 = \frac{1}{8} \end{aligned}$$





Ans. (a)

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

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



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



Ans. (b)



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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. $\sqrt{2}$



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





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. $2 \sin 2\theta - 1$



Ans. (c)

HOMEWORK



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

$$0 < A < 90$$

$$\cos B = \frac{-12}{13}$$

$$180 < B < 270$$

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

(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) $\tan 3A \tan A$





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





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





gradeup Ans. (b)

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

(a) $\tan x$ (b) $\cot x$ (c) $\operatorname{cosec} x$ (d) $\sec x$



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) $2 \tan 4A$



Q.7

If, $\sin x = n \sin(x + 20)$ *Find :* $\frac{\tan(x + \theta)}{\tan \theta}$

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

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

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

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



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) $\frac{2}{5}$



Ans. (b)

Q9. What is the value of

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

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





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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. $\sin^2 x - \sin^2 y$



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**



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
- C. 1

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



Ans. (c)

Q13. What is the value of $\left[\frac{(\sin x + \sin y)(\sin x - \sin y)}{(\cos x + \cos y)(\cos y - \cos x)} \right]$

A. -1 B. 1 C. $\frac{1}{2}$ D. $\frac{3}{2}$



Ans. (b)



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

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

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

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



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. $-\sin t$



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



Ans. (b)



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