COMPOUND ANGLES

PREVIOUS EAMCET BITS

1. $\sqrt{2}\,\text{cosec}20^\circ \sec 20^\circ =$ **[EAMCET 2008]**

1) 2 2) $2\sin 20^\circ \text{ cosec}40^\circ$ 3) 4 4) $4\sin 45^\circ \text{ cosec}40^\circ$

Ans: 4

Sol. $\sqrt{2}\,\text{cosec}20^\circ \sec 20^\circ = \dfrac{\sqrt{2}}{\sin 20^\circ \cos 20^\circ} = \dfrac{2\sqrt{2}}{2\sin 20^\circ \cos 20^\circ} = \dfrac{2\sqrt{2}}{\sin 40^\circ}$

$= 2\sqrt{2}\,\text{cosec}40^\circ = 4\sin 45^\circ \text{cosec}40^\circ$

2. If $\cos(A-B) = \dfrac{3}{5}$ and tanA tanB=2, then which one of the following is true? **[EAMCET 2007]**

1) $\sin(A+B) = \dfrac{1}{5}$ 2) $\sin(A+B) = -\dfrac{1}{5}$ 3) $\cos(A-B) = \dfrac{1}{5}$ 4) $\cos(A+B) = -\dfrac{1}{5}$

Ans: 4

Sol. $\tan A \tan B = 2 \Rightarrow \dfrac{\sin A \sin B}{\cos A \cos B} = \dfrac{2}{1}$

By using compounds and dividends $\dfrac{\cos(A-B)}{\cos(A+B)} = -3 \Rightarrow \cos(A+B) = \dfrac{-1}{5}$

3. $\dfrac{\tan 80^\circ - \tan 10^\circ}{\tan 70^\circ} =$ **[EAMCET 2007]**

1) 0 2) 1 3) 2 4) 3

Ans: 3

Sol. $\tan 70^\circ = \tan(80^\circ - 10^\circ)$

$\tan 70^\circ = \dfrac{\tan 80^\circ - \tan 10^\circ}{1 + \tan 80^\circ \tan 10^\circ}$

$\Rightarrow \dfrac{\tan 80^\circ - \tan 10^\circ}{\tan 70^\circ} = 2$

4. $\text{cosec}15^\circ + \sec 15^\circ =$ **[EAMCET 2006]**

1) $2\sqrt{2}$ 2) $\sqrt{6}$ 3) $2\sqrt{6}$ 4) $\sqrt{6}+\sqrt{2}$

Ans: 3

Sol. $\sin 15 = \dfrac{\sqrt{3}-1}{2\sqrt{2}};\ \cos 15 = \dfrac{\sqrt{3}+1}{2\sqrt{2}}$

$\text{cosec}15^\circ + \sec 15^\circ = \dfrac{2\sqrt{2}}{\sqrt{3}-1} + \dfrac{2\sqrt{2}}{\sqrt{3}+1}$

$2\sqrt{2}\dfrac{\left(\sqrt{3}+1+\sqrt{3}-1\right)}{\left(\sqrt{3}+1\right)\left(\sqrt{3}-1\right)} = \dfrac{2\sqrt{2}\times 2\sqrt{3}}{2} = 2\sqrt{6}$

5. $\cos 12^\circ + \cos 84^\circ + \cos 132^\circ + \cos 156^\circ =$ **[EAMCET 2004]**

1) $\dfrac{1}{2}$ 2) $\dfrac{1}{4}$ 3) $-\dfrac{1}{4}$ 4) $-\dfrac{1}{2}$

Ans: 4

Sol. $\cos 132^\circ + \cos 12^\circ + \cos 156^\circ + \cos 84^\circ = 2\cos 72^\circ \cos 60^\circ + 2\cos 120^\circ \cos 36^\circ = -\frac{1}{2}$

6. If $\cos(\alpha+\beta)=\frac{4}{5}\sin(\alpha-\beta)=\frac{5}{13}$ and α, β lie between 0 and $\frac{\pi}{4}$, then $\tan 2\alpha$= **[EAMCET 2002]**

1) $\frac{56}{33}$ 2) $\frac{33}{56}$ 3) $\frac{16}{65}$ 4) $\frac{60}{61}$

Ans: 1

Sol. $2\alpha = (\alpha+\beta)+(\alpha-\beta)$

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

$$= \frac{\frac{3}{4}+\frac{5}{2}}{1-\frac{3}{4}.\frac{5}{12}} = \frac{56}{33}$$

7. $\cos^2\left(\frac{\pi}{6}+\theta\right)-\sin^2\left(\frac{\pi}{6}-\theta\right)=$ **[EAMCET 2001]**

1) $\frac{1}{2}\cos 2\theta$ 2) 0 3) $\frac{-1}{2}\cos^2\theta$ 4) $\frac{1}{2}$

Ans: 1

Sol. $\cos^2\left(\frac{\pi}{6}+\theta\right)-\sin^2\left(\frac{\pi}{6}-\theta\right)$

$$= \cos\left(\frac{\pi}{6}+\theta+\frac{\pi}{6}-\theta\right).\cos\left(\frac{\pi}{6}+\theta-\frac{\pi}{6}+\theta\right)$$

$$= \frac{1}{2}\cos 2\theta$$

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