TRIGONOMETRIC FUNCTIONS

PREVIOUS EAMCET BITS

1. If θ lies in the first quadrant and $5\tan\theta = 4$, then $\frac{5\sin\theta - 3\cos\theta}{\sin\theta + 2\cos\theta} =$ **[EAMCET 2007]**

1) $\frac{5}{14}$ 2) $\frac{3}{14}$ 3) $\frac{1}{14}$ 4) 0

Ans: 1

Sol. $\tan\theta = \frac{4}{5}; \frac{5\tan\theta - 3}{\tan\theta + 2} = \frac{5}{14}$

2. $\sin 120°\cos 150° - \cos 240°\sin 330° =$ **[EAMCET 2006]**

1) 1 2) –1 3) $\frac{2}{3}$ 4) $-\left(\frac{\sqrt{3}+1}{4}\right)$

Ans: 2

Sol. $\sin 120°\cos 150° - \cos 240°\sin 330° = \frac{\sqrt{3}}{2}\left(-\frac{\sqrt{3}}{2}\right) - \left(-\frac{1}{2}\right)\left(-\frac{1}{2}\right)$

$= -\frac{3}{4} - \frac{1}{4} = -\frac{4}{4} = -1$

3. If $5\cos x + 12\cos y = 13$, then the maximum values of 5 sinx + 12 siny is **[EAMCET 2006]**

1) 12 2) $\sqrt{120}$ 3) $\sqrt{20}$ 4) 13

Ans: 2

Sol. $5\cos x + 12\cos y = 13$

$5\sin x + 12\sin y = k\text{say}$

squaring and subtracting $169 + 120\left[\cos(x - y)\right] = 169 - k^2$

$\cos(x - y) = \frac{-k^2}{120}$

$-1 \le \frac{-k^2}{120} \le 1 \Rightarrow k^2 \le 120$

$\Rightarrow k < \sqrt{120}$

$\Rightarrow 5\sin x + 12\sin y \le \sqrt{120}$

4. $\cos\theta - 4\sin\theta = 1 \Rightarrow \sin\theta + 4\cos\theta =$ **[EAMCET 2005]**

1) ± 1 2) 0 3) ± 2 4) ± 4

Ans: 4

Sol. $\cos\theta - 4\sin\theta = 1$

$\sin\theta + 4\cos\theta = \sqrt{a^2 + b^2 - c^2}$

$\sqrt{17 - 1} = \pm 4$

5. If A, B, C, D are the angles of a cyclic quadrilateral, then $\cos A + \cos B + \cos C + \cos D =$ **[EAMCET 2001]**

1) 4 2) 1 3) 0 4) –1

Ans: 3

Sol. $A + C = 180°; B + D = 180°$

$\cos A + \cos(180° - A) + \cos B + \cos(180° - B) = 0$

6. $\left(\frac{\sqrt{3} + 2\cos A}{1 - 2\sin A}\right)^{-3} + \left(\frac{1 + 2\sin A}{\sqrt{3} - 2\cos A}\right)^{-3} =$ **[EAMCET 2000]**

1) 1 2) $\sqrt{3}$ 3) 0 4) – 1

Ans: 3

Sol. Put A = 90°

$\left(\frac{\sqrt{3} + 0}{1 - 2}\right)^{-3} + \left(\frac{1 + 2}{\sqrt{3}}\right)^{-3} = 0$

7. If $\frac{\cos A}{\cos B} = n$ and $\frac{\sin A}{\sin B} = m$, then $(m^2 - n^2)\sin^2 B =$ **[EAMCET 2000]**

1) $1 - n^2$ 2) $1 + n^2$ 3) $1 - n$ 4) $1 + n$

Ans: 1

Sol. $\cos A = n\text{Cos}B; \sin A = m \sin B$

$\cos^2 A + \sin^2 A = n^2 \cos^2 B + m^2 \sin^2 B$

$1 = n^2(1 - \sin^2 B) + m^2 \sin^2 B$

$\Rightarrow (m^2 - n^2)\sin^2 B = 1 - n^2$

8. If $(\sin\alpha + \operatorname{cosec}\alpha)^2 + (\cos\alpha + \sec\alpha)^2 = k + \tan^2\alpha + \cot^2\alpha$, then $k =$ **[EAMCET 2000]**

1) 9 2) 7 3) 5 4) 3

Ans: 2

Sol. Put α = 45°

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

$\therefore$ k = 7

9. $\frac{\sin(-660°)\tan(1050°)\sec(-420°)}{\cos(225°)\operatorname{cosec}(315°)\cos(510°)} =$ **[EAMCET 2000]**

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

Ans: 3

Sol. $\frac{-\sin(720 - 60)\tan(1080 - 30)\sec(360 + 60)}{\cos(180 + 45)\operatorname{cosec}(360 - 45)\cos(360 + 150)}$

Substituting it values and simplifying we get $2/\sqrt{3}$

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