

MGMs JUNIOR COLLEGE

Trigonometry

XI ASSIGNMENT

60 min

Marks : 60

1) The angle subtended at the centre of a circle of radius 3 metres by an arc of length 1 metre is equal to [MNR 1973]

- A) 20° B) 60°
C) $\frac{1}{3}$ radian D) 3 radian

2) If $\cos(\alpha + \beta) = \frac{4}{5}$ and $\sin(\alpha - \beta) = \frac{5}{13}$ where $0 \leq \alpha$, $\beta \leq \frac{\pi}{4}$. Then, $\tan 2\alpha$ is equal to [AIEEE 2010]

- A) $\frac{25}{16}$ B) $\frac{56}{33}$ C) $\frac{19}{12}$ D) $\frac{20}{7}$

3) $\cos A + \cos(240^\circ + A) + \cos(240^\circ - A) =$ [MP PET 1991]

- A) $\cos A$ B) 0
C) $\sqrt{3}\sin A$ D) $\sqrt{3}\cos A$

4) The least value of $2\sin^2\theta + 3\cos^2\theta$ is [IMP PET 2010]

- A) 1 B) 2 C) 3 D) 5

5) The most general value of θ satisfying the equations $\tan \theta = -1$ and $\cos \theta = \frac{1}{\sqrt{2}}$ is [MNR 1982; Roorkee 1990; UPSEAT 2002; MP PET 2003]

- A) $n\pi + \frac{7\pi}{4}$ B) $n\pi + (-1)^n \frac{7\pi}{4}$
C) $2n\pi + \frac{7\pi}{4}$ D) None of these

6) If $\sin A = \frac{4}{5}$ and $\cos B = -\frac{12}{13}$, where A and B lie in first and third quadrant respectively, then $\cos(A + B) =$

- A) $\frac{56}{65}$ B) $-\frac{56}{65}$ C) $\frac{16}{65}$ D) $-\frac{16}{65}$

7) The expression $(1 + \tan x + \tan^2 x)(1 - \cot x + \cot^2 x)$ has the positive values for x, given by

- A) $0 \leq x \leq \frac{\pi}{2}$ B) $0 \leq x \leq \pi$
C) For all $x \in \mathbb{R}$ D) $x \geq 0$

8) $\cos \alpha \cdot \sin(\beta - \gamma) + \cos \beta \sin(\gamma - \alpha) + \cos \gamma \sin(\alpha - \beta) =$ [EAMCET 2003]

- A) 0 B) $1/2$
C) 1 D) $4\cos \alpha \cos \beta \cos \gamma$

9) In ΔABC , $2 \cos A \sin \left(\frac{A - B + C}{2} \right)$ is equal to [AIEEE 2002]

- A) $a^2 + b^2 - c^2$ B) $c^2 + a^2 - b^2$
C) $b^2 - c^2 - a^2$ D) $c^2 - a^2 - b^2$

10) A man observes that when he moves up a distance c m on a slope the angle of depression of a point on the horizontal plane from the base of the slope is 30° and when he moves up further a distance c m the angle of depression of that point is 45° . The angle of inclination of the top with the horizontal is

- A) 60° B) 45° C) 75° D) 30°

11) If $0 < x < 1$, then

$\sqrt{1+x^2} [(x \cos(\cos^{-1}x) + \sin(\cot^{-1}x))^2 - 1]^{1/2}$ is equal to

- A) $\frac{x}{\sqrt{1+x^2}}$ B) x
C) $x\sqrt{1+x^2}$ D) $\sqrt{1+x^2}$

12) The angular depressions of the top and the foot of a chimney as seen from the top of a second chimney, which is 150 m high and standing on the same level as the first are θ and ϕ , respectively. If $\tan \theta = \frac{4}{3}$ and $\tan \phi = \frac{5}{2}$ then the distance between their tops is

- A) 120 m B) 110 m
C) 100 m D) None of these

13) The solution of $\cos^{-1} x\sqrt{3} + \cos^{-1} x = \frac{\pi}{2}$ is

- A) $-\frac{1}{2}$ B) $-\frac{1}{2}$ or $\frac{1}{2}$
C) $\frac{1}{2}$ D) None of these

14) The sum $S = \sin \theta + \sin 2\theta + \dots + \sin n\theta$, equals [AMU 2002]

- A) $\sin \frac{1}{2}(n+1)\theta \sin \frac{1}{2}n\theta / \sin \frac{\theta}{2}$
B) $\cos \frac{1}{2}(n+1)\theta \sin \frac{1}{2}n\theta / \sin \frac{\theta}{2}$
C) $\sin \frac{1}{2}(n+1)\theta \cos \frac{1}{2}n\theta / \sin \frac{\theta}{2}$
D) $\cos \frac{1}{2}(n+1)\theta \cos \frac{1}{2}n\theta / \sin \frac{\theta}{2}$

15) If $\operatorname{cosec} A + \cot A = \frac{11}{2}$ then $\tan A =$ [Roorkee 1995]

- A) $\frac{21}{22}$ B) $\frac{15}{16}$ C) $\frac{44}{117}$ D) $\frac{117}{43}$

16) $\sin^4 \frac{\pi}{8} + \sin^4 \frac{3\pi}{8} + \sin^4 \frac{5\pi}{8} + \sin^4 \frac{7\pi}{8}$ is equal to

- A) 1 B) $\frac{3}{2}$ C) 2 D) $\frac{1}{4}$

17) $\frac{2\sin\theta \tan\theta(1 - \tan\theta) + 2\sin\theta \sec^2\theta}{(1 + \tan\theta)^2} =$ [Roorkee 1975]

- A) $\frac{\sin\theta}{1 + \tan\theta}$ B) $\frac{2\sin\theta}{1 + \tan\theta}$
C) $\frac{\sin\theta}{(1 + \tan\theta)^2}$ D) None of these

18) $\frac{\cot^2 15^\circ - 1}{\cot^2 15^\circ + 1}$

- A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{3\sqrt{3}}{4}$ D) $\sqrt{3}$

19) In a ΔABC , if $(\sqrt{3} - 1)a = 2b$, $A = 3B$, then C is [Kerala (Engg.) 2007]

- A) 60° B) 120° C) 30° D) 45°

20) $2\sin A \cos^3 A - 2\sin^3 A \cos A =$ [Roorkee 1975; Kerala (Engg.) 2001]

- A) $\sin 4A$ B) $\frac{1}{2}\sin 4A$
C) $\frac{1}{4}\sin 4A$ D) None of these

21) If the mapping $f(x) = ax + b$, $a > 0$ maps $[-1, 1]$ on to $[0, 2]$, then $\cot[\cot^{-1}7 + \cot^{-1}8 + \cot^{-1}18]$ is equal to

- A) $f(-1)$ B) $f(0)$ C) $f(1)$ D) $f(2)$

22) A positive acute angle is divided into two parts whose tangents are $1/2$ and $1/3$. Then the angle is [WB JEE 2009]

- A) $\pi/4$ B) $\pi/5$ C) $\pi/3$ D) $\pi/6$

23) $\frac{\sin\theta}{1+\cot\theta} + \frac{\cos\theta}{1-\tan\theta} =$ [Karnataka CET 1998]

- A) 0 B) 1
C) $\cos\theta - \sin\theta$ D) $\cos\theta + \sin\theta$

24) The minimum value of $3\cos x + 4\sin x + 5$ is [MNR 1991; AMU 2009; Similar MNR 1976; Pb. CET 1996; UPSEAT 2004; MP PET 2006]

- A) 5 B) 9 C) 7 D) 0

25) If $0 \leq x \leq \pi$ and $81^{\sin^2 x} + 81^{\cos^2 x} = 30$, then $x =$ [Karnataka CET 2004]

- A) $\pi/6$ B) $\pi/2$ C) $\pi/4$ D) $3\pi/4$

26) The solution of equation $\cos^2\theta + \sin\theta + 1 = 0$ lies in the interval [MP PET 2006]

- A) $\left(-\frac{\pi}{4}, \frac{\pi}{4}\right)$ B) $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$
C) $\left(\frac{3\pi}{4}, \frac{5\pi}{4}\right)$ D) $\left(\frac{5\pi}{4}, \frac{7\pi}{4}\right)$

27) The top of a hill observed from the top and bottom of a building of height h is at angles of elevation p and q , respectively. The height of the hill is

- A) $\frac{h \cot q}{\cot q - \cot p}$ B) $\frac{h \cot p}{\cot p - \cot q}$
C) $\frac{h \tan p}{\tan p - \tan q}$ D) None of these

28) If $\cos A + \cos B + 2\cos C = 2$, then the sides of the ΔABC are in

- A) AP B) GP
C) HP D) None of these

29) If $\sin x + \sin^2 x = 1$, then the value of expression $\cos^{12} x + 3\cos^{10} x + 3\cos^8 x + \cos^6 x - 1$ is equal to

[Kurukshetra CEE 1998; MP PET 2001,06; Karnataka CET 2004; UPSEAT 2006; Similar Pb. CET 2002; VIT 2007]

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

30) If $\frac{\pi}{2} < \alpha < \pi, \pi < \beta < \frac{3\pi}{2}$, $\sin\alpha = \frac{15}{17}$ and $\tan\beta = \frac{12}{5}$ then the value of $\sin(\beta - \alpha)$ is Roorkee 2000

- A) $-171/22$ B) $-21/221$ C) $21/22$ D) $171/221$