Saitechinfo NEET JEE Academy

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TRIGONOMETRY

Class 11 - Mathematics

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 50**

1. If sin α + sin β = a and cos α - cos β = b, then tan $\frac{\alpha-\beta}{2}$ = **[1]**

   a) $\sqrt{a^2+b^2}$ b) $\sqrt{a^2-b^2}$

   c) -$\frac{a}{b}$ d) -$\frac{b}{a}$

2. If sec x = -2 and $\pi < x < \frac{3\pi}{2}$, then sin x = ? **[1]**

   a) $\frac{-\sqrt{3}}{2}$ b) $\frac{-1}{2}$

   c) $\frac{1}{2}$ d) $\frac{\sqrt{3}}{2}$

3. The value of $\frac{2(\sin 2x+2\cos^2 x-1)}{\cos x-\sin x-\cos 3x+\sin 3x}$ is **[1]**

   a) sin x b) sec x

   c) cos x d) cosec x

4. If $\tan\ \alpha = \frac{1}{7}$, $\tan\ \beta = \frac{1}{3}$, then cos 2$\alpha$ is equal to **[1]**

   a) sin 3β b) sin 2β

   c) cos 2β d) sin 4β

5. tan $\left(\frac{-16\pi}{3}\right)$ = ? **[1]**

   a) $-\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$

   c) $\sqrt{3}$ d) $\frac{-1}{\sqrt{3}}$

6. The value of tan 3A - tan 2A - tan A is equal to **[1]**

   a) – tan 3A tan 2A tan A b) tan A tan 2A – tan 2A tan 3A – tan 3A tan A

   c) tan 3A tan 2A – tan A tan 3A – tan 3A tan 2A d) tan 3A tan 2A tan A

7. The extremum values of sin θ are **[1]**

   a) -1 and 0 b) $\frac{-\sqrt{3}}{2}$ and $\frac{1}{\sqrt{2}}$

   c) -1 and 1 d) 0 and 1

8. ($\sin^2$6x - $\sin^2$4x) = ? **[1]**

   a) sin 10x b) sin 2x

   c) sin 10x sin 2x d) sin 3x

9. The values of $\cot\frac{\pi}{3}, \cot\frac{\pi}{4}, \cot\frac{\pi}{6}$ are in **[1]**

a) HP

b) H.M.

c) AP

d) GP

10. $\sqrt{2+\sqrt{2+2\cos 4\theta}}$ = ? **[1]**

a) cos 2θ

b) 2 cos θ

c) 2 sin θ

d) sin 2θ

11. Match the following: **[2]**

(a) Domain of tanx	(i) False
(b) $\sin^2 x + \cos^2 x = 1$	(ii) $\{x : x \in \mathbb{R} \ \& \ x \neq (2n+1)\frac{\pi}{2}\}$
(c) $1 + \cot^2 x = \sec^2 x$	(iii) $\frac{4}{3}$
(d) If $\cos x = \frac{-3}{5}$, x lies in the third quadrant then tanx	(iv) True

12. Match the following: **[2]**

(a) 1^0	(i) $\frac{41\pi}{360}$ radian
(b) 4 radians	(ii) $\frac{\pi}{180}$ radian
(c) $20^0 30'$	(iii) $5^0 43' 38''$approximately
(d) Degree measure of the angle subtended at the center of a circle of radius 200 cm by an arc of length 22 cm	(iv) $229^0 5' 27''$ approximately

13. Match the following: **[2]**

(a) If none of the x, y, and x+y is an odd multiple of $\frac{\pi}{2}$ then tan(x + y) =	(i) $\frac{\sqrt{3}+1}{2\sqrt{2}}$
(b) $\frac{\sin(x-y)}{\sin(x+y)} =$	(ii) $\frac{\tan x+\tan y}{1-\tan x \tan y}$
(c) $\cos 15^o$ =	(iii) $\frac{\tan x-\tan y}{\tan x+\tan y}$
(d) tan4x tanx tan3x =	(iv) tan4x - tan3x - tanx

14. Match the following: **[2]**

(a) Quadrantal angles	(i) only tan and cot are positive
(b) In the third quadrant	(ii) all trigonometric functions are positive
(c) In the first quadrant	(iii) Integral multiples of $\frac{\pi}{2}$
(d) Range of sin x	(iv) [-1, 1]

15. Match the following: **[2]**

(a) Value of $\cos(-1890^o)$	(i) cosx
(b) $\sin(\pi - x) =$	(ii) $\frac{\sqrt{3}}{2}$
(c) Value of $\sin\frac{13\pi}{3}$	(iii) zero
(d) $\sin(\frac{\pi}{2} - x) =$	(iv) sinx

16. Find the angle in radians between the hands of a clock at 7 : 20 p.m. **[4]**

17. Prove that : $\cos^2 x + \cos^2 y - 2\cos x \cdot \cos y \cdot \cos(x + y) = \sin^2(x + y)$ **[4]**

18. If $\cos x = \frac{-1}{3}$ and $\pi < x < \frac{3\pi}{2}$. Find the value of $\cos\frac{x}{2}$, $\tan\frac{x}{2}$. **[4]**

19. Sketch the graphs of: $h(x) = 2 \sin 3x$, $0 \leq x \leq \frac{2\pi}{3}$. **[6]**

20. Prove that: $16 \cos\frac{2\pi}{15}\cos\frac{4\pi}{15}\cos\frac{8\pi}{15}\cos\frac{14\pi}{15} = 1$. **[6]**

21. Prove the following identity: $\sin^2\frac{\pi}{8} + \sin^2\frac{3\pi}{8} + \sin^2\frac{5\pi}{8} + \sin^2\frac{7\pi}{8} = 2$. **[6]**