KHAN GLOBAL STUDIES

K.G.S. campus, Near Sai Mandir, Mussalahpur Hatt, Patna – 6
Mob. : 8877918018, 8757354880

Defence (Mathematics)

By : Prashant Sir

Trigonometry dpps -3

1. If $\sin\theta = \frac{12}{13}$, $\left(0 < \theta < \frac{\pi}{2}\right)$ and $\cos\emptyset = -\frac{3}{5}$, $\left(\pi < \emptyset < \frac{3\pi}{2}\right)$, then $\sin(\theta + \emptyset)$ will be

(a) $\frac{-56}{61}$ (b) $\frac{-56}{65}$

(c) $\frac{1}{65}$ (d) -56

2. 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

(a) $\frac{-171}{221}$ (b) $\frac{-21}{221}$

(c) $\frac{21}{221}$ (d) $\frac{171}{221}$

3. If $\sin\theta = 3\sin(\theta + 2\alpha)$, then the value of $\tan(\theta + \alpha) + 2\tan\alpha$ is

(a) 3 (b) 2

(c) -1 (d) 0

4. The value of $\cos 15° - \sin 15°$ is equal to

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$

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

5. The value of $\cos\left(\frac{\pi}{4} + x\right) + \cos\left(\frac{\pi}{4} - x\right)$ is

(a) $\sqrt{2}\,sin^2x$ (b) $\sqrt{2}\sin x$

(c) $\sqrt{2}\,cos^2x$ (d) $\sqrt{2}\cos x$

6. Given then $\cos\left(\frac{\alpha-\beta}{2}\right) = 2\cos\left(\frac{\alpha+\beta}{2}\right)$, then $\tan\frac{\alpha}{2}\tan\frac{\beta}{2}$ is equal to

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$

(c) $\frac{1}{4}$ (d) $\frac{1}{8}$

7. If $\frac{-\pi}{2} < \theta < \frac{\pi}{2}$ and $\theta \neq \pm\frac{\pi}{4}$, then the value of $\cot\left(\frac{\pi}{4} + \theta\right)\cot\left(\frac{\pi}{4} - \theta\right)$ is

(a) 0 (b) -1

(c) 1 (d) -2

8. If $\tan\theta_1 = k\cot\theta_2$, then $\frac{\cos(\theta_1+\theta_2)}{\cos(\theta_1-\theta_2)}$

(a) $\frac{1+k}{1-k}$ (b) $\frac{1-k}{1+k}$

(c) $\frac{k+1}{k-1}$ (d) $\frac{k-1}{k+1}$

9. If $2\sin\left(\theta + \frac{\pi}{3}\right) = \cos\left(\theta - \frac{\pi}{6}\right)$, then $\tan\theta =$

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

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

10. The value of $cos^2 45° - sin^2 15°$ is

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{\sqrt{3}}{4}$

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

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

(a) $\frac{1}{2}\cos 2\theta$ (b) 0

(c) $-\frac{1}{2}\cos 2\theta$ (d) $\frac{1}{2}$

12. If $\tan(A + B) = p$, $\tan(A - B) = q$, then the value of $\tan 2A$ in terms of p and q is

(a) $\frac{p+q}{p-q}$ (b) $\frac{p-q}{1+pq}$

(c) $\frac{p+q}{1-pq}$ (d) $\frac{1+pq}{1-q}$

13. If $\cos(\alpha + \beta) = \frac{3}{5}$, $\sin(\alpha - \beta) = \frac{5}{13}$ and $0 < \alpha$, $\beta < \frac{\pi}{4}$, then $\tan(2\alpha)$ is equal to

(a) $\frac{63}{52}$ (b) $\frac{63}{16}$

(c) $\frac{21}{16}$ (d) $\frac{33}{52}$

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

(a) $\frac{16}{63}$ (b) $\frac{56}{33}$

(c) $\frac{28}{33}$ (d) None of these

15. $\frac{\cos 9^\circ+\sin 9^\circ}{\cos 9^\circ-\sin 9^\circ}=$

(a) $\tan 54^\circ$ (b) $\tan 36^\circ$

(c) $\tan 18^\circ$ (d) $\tan 9^\circ$

16. If $A-B=\frac{\pi}{4}$, then $(1+\tan A)(1-\tan B)=$

(a) 4 (b) 3

(c) 1 (d) 2

17. The value of $\sin\frac{31}{3}\pi$ is

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

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

18. At $x=\frac{5\pi}{6}$, the value of $2\sin 3x+3\cos 3x$ is

(a) 0 (b) 1

(c) -1 (d) None of these

19. $\tan 75^\circ-\cot 75^\circ=$

(a) $2\sqrt{3}$ (b) $2+\sqrt{3}$

(c) $2-\sqrt{3}$ (d) $-2\sqrt{3}$

20. The value of $\sin 1^\circ+\sin 2^\circ+\cdots+\sin 359^\circ$ is equal to

(a) 1 (b) 180

(c) 0 (d) -1

21. If $2\sec 2\alpha=\tan\beta+\cot\beta$, then one of the values of $\alpha+\beta$ is

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$

(c) π (d) 2π

22. $\tan 70^\circ$ is equal to

(a) $\tan 20^\circ+\tan 50^\circ$

(b) $2\tan 20^\circ+\tan 50^\circ$

(c) $\tan 20^\circ+2\tan 50^\circ$

(d) $2\tan 20^\circ+2\tan 50^\circ$

23. $sin^2 17.5^\circ+sin^2 72.5^\circ$ is equal to

(a) $cos^2 90^\circ$ (b) $tan^2 45^\circ$

(c) $cos^2 30^\circ$ (d) $sin^2 45^\circ$

24. $sin^2(3^\circ)+sin^2(6^\circ)+sin^2(9^\circ)+\cdots sin^2(84^\circ)+sin^2(87^\circ)+sin^2(90^\circ)=$

(a) $\frac{31}{2}$ (b) $\frac{39}{2}$

(c) $\frac{59}{2}$ (d) 36

25. $\frac{\sqrt{3}}{\sin(20^\circ)}-\frac{1}{\cos(20^\circ)}=$

(a) 2 (b) $\frac{2\sin 20^\circ}{\sin 40^\circ}$

(c) 4 (d) $\frac{4\sin 20^\circ}{\sin 40^\circ}$

26. If α is a root of $25cos^2\theta+5\cos\theta-12=0$ and $\frac{\pi}{2}<\alpha<\pi$, then $\sin 2\alpha$ is equal to

(a) $\frac{24}{25}$ (b) $\frac{-24}{25}$

(c) $\frac{13}{18}$ (d) $\frac{-13}{18}$

27. $3(\sin x-\cos x)^4+6(\sin x+\cos x)^2+4\left(sin^6 x+cos^6 x\right)=$

(a) 14 (b) 11

(c) 12 (d) 13

28. If $8\cos 2\theta+8\sec 2\theta=65$, $0<\theta<\frac{\pi}{2}$, then the value of $4\cos 4\theta$ is equal to

(a) $-\frac{33}{8}$ (b) $-\frac{31}{8}$

(c) $-\frac{31}{32}$ (d) $-\frac{33}{32}$

29. If $5\left(tan^2 x-cos^2 x\right)=2\cos 2x+9$, then the value of $\cos 4x$ is

(a) $-\frac{7}{9}$ (b) $-\frac{3}{5}$

(c) $\frac{1}{3}$ (d) $\frac{2}{9}$

30. If $x+\frac{1}{x}=2\cos\alpha$, then $x^n+\frac{1}{x^n}=$

(a) $2^n\cos\alpha$ (b) $2^n\cos n\alpha$

(c) $2i \sin n\alpha$ (d) $2 \cos n\alpha$

31. If $\sin 2\theta + \sin 2\emptyset = \frac{1}{2}$ and $\cos 2\theta + \cos 2\emptyset = \frac{3}{2}$, then $cos^2(\theta - \emptyset) =$

(a) $\frac{3}{8}$ (b) $\frac{5}{8}$

(c) $\frac{3}{4}$ (d) $\frac{5}{4}$

32. $\cos 2\alpha = \frac{3\cos 2\beta - 1}{3 - \cos 2\beta}$, then $\tan \alpha =$

(a) $\sqrt{2} \tan \beta$ (b) $\frac{\tan \beta}{\sqrt{2}}$

(c) $\frac{tan^2 \beta}{\sqrt{2}}$ (d) $\tan \beta$

33. $2 \sin A \ cos^3 A - 2 \ sin^3 A \cos A =$

(a) $\sin 4A$ (b) $\frac{1}{2} \sin 4A$

(c) $\frac{1}{4} \sin 4A$ (d) $\frac{1}{8} \sin 4A$

34. The value of $\frac{\cot x - \tan x}{\cot 2x}$ is

(a) 1 (b) 2

(c) -1 (d) 4

35. If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, then the value of $\cos \frac{x}{2}$ is

(a) $-\frac{1}{\sqrt{10}}$ (b) $\frac{3}{\sqrt{10}}$

(c) $\frac{1}{\sqrt{10}}$ (d) $-\frac{3}{\sqrt{10}}$

36. If $cosec \ \theta = \frac{p+q}{p-q}$, then $\cot\left(\frac{\pi}{4} + \frac{\theta}{2}\right) =$

(a) $\sqrt{\frac{p}{q}}$ (b) $\sqrt{\frac{q}{p}}$

(c) $\sqrt{pq}$ (d) pq

37. If $90° < A < 180°$ and $\sin A = \frac{4}{5}$, then $\tan \frac{A}{2}$ is equal to

(a) $\frac{1}{2}$ (b) $\frac{3}{5}$

(c) $\frac{3}{2}$ (d) 2

38. If θ is an acute angle and $\sin \frac{\theta}{2} = \sqrt{\frac{x-1}{2x}}$, then $\tan \theta$ is equal to

(a) $x^2 - 1$ (b) $\sqrt{x^2 - 1}$

(c) $\sqrt{x^2 + 1}$ (d) $x^2 + 1$

39. $\tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right) + \tan\left(\frac{\pi}{4} - \frac{\theta}{2}\right)$ is equal to

(a) $\sec \theta$ (b) $2 \sec \theta$

(c) $\sec \frac{\theta}{2}$ (d) $\sin \theta$

40. If $\cos \theta = \frac{1}{2}\left(a + \frac{1}{a}\right)$, then the value of $\cos 3\theta$ is

(a) $\frac{1}{8}\left(a^3 + \frac{1}{a^3}\right)$ (b) $\frac{3}{2}\left(a + \frac{1}{a}\right)$

(c) $\frac{1}{2}\left(a^3 + \frac{1}{a^3}\right)$ (d) $\frac{1}{3}\left(a^3 + \frac{1}{a^3}\right)$

41. $cos^3 110° + cos^3 10° + cos^3 130° =$

(a) $\frac{3}{4}$ (b) $\frac{3}{8}$

(c) $\frac{3\sqrt{3}}{8}$ (d) $\frac{3\sqrt{3}}{4}$

42. If $0 < \theta < \frac{\pi}{2}$, and $f(\theta) = (1 + \cot \theta - cosec \ \theta)(1 + \tan \theta + \sec \theta)$, then $f\left(\frac{\pi}{4}\right)$ is equal to

(a) 0 (b) 1

(c) 2 (d) $2 + \sqrt{2}$

43. For $0 < \alpha, \ \beta < \frac{\pi}{2}$, let then $E = (\tan \alpha + \tan \beta)(1 - \cot \alpha \cot \beta)(\cot \alpha + \cot \beta)(1 - \tan \alpha \tan \beta)$ then E is

(a) independent of α only

(b) independent of β only

(c) independent of α and β both

(d) equal to $2(\tan \alpha + \tan \beta)$

44. If $\cot A = \tan((n-1)A)$, where $n \epsilon N$, then a value of A can be

(a) $\frac{\pi}{2n}$ (b) $\frac{\pi}{n}$

(c) $\frac{2\pi}{n}$ (d) $\frac{\pi}{4n}$

45. If $\tan A - \tan B = \frac{1}{2}$ and $\cot A - \cot B = \frac{1}{3}$, then $\cot(A - B)$ is equal to:

(a) 1 (b) -1

(c) 5 (d) -5

46. If $2\cos\theta + \sin\theta = 1$, $\left(\theta \neq (4k+1)\frac{\pi}{2}, k \in I\right)$ then $7\cos\theta + 6\sin\theta$ is equal to:

(a) $\frac{1}{2}$ (b) 2

(c) $\frac{11}{2}$ (d) $\frac{46}{5}$

47. The number of solutions of the equation $\tan x + \sec x = 2\cos x$, $x \in [0, 2\pi]$ is

(a) 1 (b) 2

(c) 3 (d) 0

48. If $0 < x < \pi$, and $\sin x + \cos x = \frac{1}{3}$, then a possible value of $\tan x$ is

(a) $\frac{1}{8}(-9 + \sqrt{17})$ (b) $\frac{1}{8}(9 - \sqrt{17})$

(c) $-\frac{1}{5}(9 + \sqrt{5})$ (d) $\frac{1}{5}(9 - \sqrt{5})$

49. Let $f(\theta) = (1 + \cos\theta)(1 + \cos 3\theta)(1 + \cos 5\theta)(1 + \cos 7\theta)$ then $f\left(-\frac{\pi}{8}\right)$ is equal to:

(a) $-\frac{1}{8}$ (b) $\frac{1}{4}$

(c) $-\frac{1}{4}$ (d) $\frac{1}{8}$

50. $sin^2\alpha + cos^2(\alpha + \beta) + 2\sin\alpha\sin\beta\cos(\alpha + \beta)$ is independent of

(a) α (b) β

(c) both α and β (d) None of these

51. The value of $\cos 12° + \cos 84° + \cos 156° + \cos 132°$ is

(a) $\frac{1}{8}$ (b) $-\frac{1}{2}$

(c) 1 (d) $\frac{1}{2}$

52. If $\cos\theta = \cos\alpha\cos\beta$, then $\tan\frac{\theta+\alpha}{2}\tan\frac{\theta-\alpha}{2}$ is equal to

(a) $tan^2\left(\frac{\alpha}{2}\right)$ (b) $tan^2\left(\frac{\beta}{2}\right)$

(c) $tan^2\left(\frac{\theta}{2}\right)$ (d) $cot^2\left(\frac{\beta}{2}\right)$

53. If $\cos\alpha + \cos\beta = a$, $\sin\alpha + \sin\beta = b$ and $\alpha - \beta = 2\theta$, then $\frac{\cos 3\theta}{\cos\theta} =$

(a) $a^2 + b^2 - 2$ (b) $a^2 + b^2 - 3$

(c) $3 - a^2 - b^2$ (d) $\frac{(a^2+b^2)}{4}$

54. The solution set of the equation $\tan(\pi\tan x) = \cot(\pi\cot x)$ is

(a) $\{0\}$ (b) $\left\{\frac{\pi}{4}\right\}$

(c) $\emptyset$ (d) None of these

55. The number of values of x in the interval $[0, 3\pi]$ satisfying the equation $2sin^2x + 5\sin x - 3 = 0$ is

(a) 2 (b) 4

(c) 6 (d) 1

56. If $\cos A = \frac{3}{4}$ then value of $32\sin\left(\frac{A}{2}\right)\sin\left(\frac{5A}{2}\right)$ is equal to

(a) $\sqrt{11}$ (b) $-\sqrt{11}$

(c) 11 (d) -11

57. If $\sin x + \cos y = a$ and $\cos x + \sin y = b$, then $\tan\frac{x-y}{2}$ is equal to

(a) $a + b$ (b) $a - b$

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

58. If $2\tan\alpha + \cot\beta = \tan\beta$, then the value of $\tan(\beta - \alpha)$ is

(a) $\tan\alpha$ (b) $\cot\alpha$

(c) $\tan\beta$ (d) $\cot\beta$

Answer Key

1	B	11	A	21	A	31	B	41	C	51	B
2	D	12	C	22	C	32	A	42	C	52	B
3	D	13	B	23	B	33	B	43	C	53	B
4	A	14	B	24	A	34	B	44	A	54	C
5	D	15	A	25	C	35	B	45	B	55	B
6	B	16	D	26	B	36	B	46	B	56	C
7	C	17	A	27	D	37	D	47	B	57	D
8	B	18	D	28	B	38	B	48	A	58	
9	D	19	A	29	A	39	B	49	D		
10	B	20	C	30	D	40	C	50	A		


KHAN GLOBAL STUDIES
Kisan Cold Storage Campus, Musallahpur, Patna-6
KHAN SIR