INTRODUCTION TO TRIGONOMETRY

Work hard and learn to be Unique!

SECTION – A (Brain Nerves Development)

The section contains (20 Single Correct) chapter problems based on the concepts taught in class & asked in competitive exams. First do each & every problems of this section your own without taking help of your teacher or friends. If you find difficulties to solve & have devoted atleast 15 - 20 Minutes then discuss it with your friend and then your teachers. Marking (+3, - 1)

1. In Δ ABC, If 3 A = 4B = 6C then A : B : C be –

(A) 3 : 4 : 6 (B) $\frac{1}{4}:\frac{1}{3}:\frac{1}{2}$ (C) 6 : 4 : 3 (D) 4 : 3 : 2

2. In ΔABC, if ∠B = 90°, AB = 5, BC = 12, then sin C = …….

(A) $\frac{12}{13}$ (B) $\frac{5}{13}$ (C) $\frac{5}{12}$ (D) $\frac{13}{5}$

3. $(\sec\theta + \tan\theta)(1 - \sin\theta)$ = ……..

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

4. If $\tan\theta = \frac{1}{\sqrt{3}}$, then the value of $\frac{\operatorname{cosec}^2\theta - \sec^2\theta}{\operatorname{cosec}^2\theta + \sec^2\theta}$ is

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

5. If the measures of the angles ΔABC are in proportion 1 : 2 : 3, then the measure of the smallest angle is ___

(A) 30° (B) 60° (C) 90° (D) 120°

6. In ΔABC, if $\frac{AB}{1} = \frac{AC}{2} = \frac{BC}{\sqrt{3}}$, then $m\angle C =$ _____

(A) 90° (B) 30° (C) 60° (D) 45°

7. The sum of all interior angles and one exterior angle of a convex K-sided polygon is 1350° , the value of K is

(A) 7 (B) 8 (C) 9 (D) 11

8. If $\cos 9\alpha = \sin\alpha$ and $9\alpha < 90°$, then the value of $\tan 5\alpha$?

(A) $\frac{1}{\sqrt{3}}$ (B) $\sqrt{3}$ (C) 1 (D) 0

9. $\sin x = \dfrac{6\sin 30° - 8\cos 60° + 2\tan 45°}{2\left(\sin^2 30° + \cos^2 60°\right)}$, then x =

(A) 30^o (B) 45^o (C) 60^o (D) 90^o

10. The value of $\dfrac{\sin 18°}{\cos 72°}$ will be

(A) 2 (B) 3 (C) 4 (D) 1

11. The value of $\dfrac{\cot 54°}{\tan 36°} + \dfrac{\tan 20°}{\cot 70°} - 2$ is

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

12. The arc length of the sector of a circle of radius R which makes an angle x^o at the centre is

(A) $\dfrac{\pi Rx}{180}$ (B) $\dfrac{\pi Rx}{90}$ (C) $\dfrac{\pi R^2 x}{180}$ (D) $\dfrac{\pi R^2 x}{360}$

13. The smallest positive solution of the equation $81^{\sin^2 x} + 81^{\cos^2 x} = 30$ is

(A) $\dfrac{\pi}{12}$ (B) $\dfrac{\pi}{8}$ (C) $\dfrac{\pi}{3}$ (D) $\dfrac{\pi}{6}$

14. $\cos\theta\sqrt{\sec^2\theta - 1}$ is equal to

(A) $\cot\theta$ (B) $\sin\theta$ (C) $\sec\theta$ (D) 1

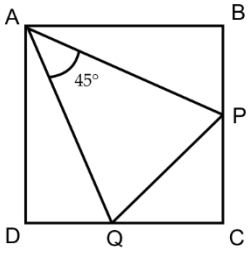
15. The value of $\tan 1^o \tan 2^o \tan 3^o \ldots\ldots \tan 89^o$ is :

(A) 0 (B) 1 (C) 2 (D) none of these

16. If cosec x – cot x = $\dfrac{1}{3}$, where $x \neq 0$, then the value of $\cos^2 x - \sin^2 x$ is

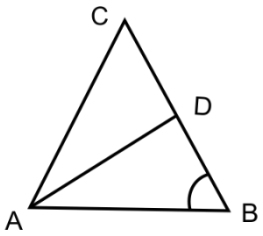
(A) $\dfrac{16}{25}$ (B) $\dfrac{9}{25}$ (C) $\dfrac{7}{25}$ (D) $\dfrac{8}{25}$

17. In the figure, ABCD is a square of side 1dm and $\angle PAQ = 45^o$.
The perimeter (in dm) of the triangle PQC is



(A) 2
(B) $1 + \sqrt{2}$
(C) $2\sqrt{2} - 1$
(D) $1 + \sqrt{3}$

18. In the figure, ABC is a triangle in which AD bisect ∠A, AC = BC, ∠B = 72° and CD = 1cm. Length of BD (in cm) is



(A) 1 (B) $\frac{1}{2}$

(C) $\frac{\sqrt{5}-1}{2}$ (D) $\frac{\sqrt{3}+1}{2}$

19. The value of cot 12° cot 38° cot 52° cot 60° cot 78° is:

(A) 1 (B) 0 (C) $1/\sqrt{2}$ (D) $1/\sqrt{3}$

20. If θ is an acute angle such that tanθ = 2/3, then value of $\left(\frac{1+\tan\theta}{\sin\theta+\cos\theta}\right)\left(\frac{1-\cot\theta}{\sec\theta+\operatorname{cosec}\theta}\right)$ is:

(A) - 1/5 (B) $-\frac{4}{\sqrt{13}}$ (C) 1/5 (D) $\frac{4}{\sqrt{13}}$

SECTION – B (Rank Booster Problems)

The section contains 10 single correct questions of Higher Order Thinking. The section will generate mastery in the topic. So, solve and become unique among your friends. Marking (+4, - 1)

21. If $\sin\theta + \cos\theta = a$ and $\frac{\sin\theta+\cos\theta}{\sin\theta\cdot\cos\theta} = b$, then

(A) $b = \frac{2a}{a^2-1}$ (B) $a = \frac{2b}{b^2-1}$ (C) $ab = b^2 - 1$ (D) a + b = 1

22. If $\operatorname{cosec}\theta + \cot\theta = \frac{11}{2}$, then tan θ is

(A) 21/22 (B) 15/16 (C) 44/117 (D) None of these

23. The value of $\tan 225^\circ \cdot \cot 405^\circ + \tan 765^\circ \cdot \cot 675^\circ$ is

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

24. One of the given statements is not true in general. Which one is it?

1: $\sin^2 A + \cos^2 A = 1$

2: $\cot A (\cot A + \tan A) = \operatorname{cosec}^2 A$

3: $1 + \tan^2 A = \sec^2 A$

4: $\tan A - \cot A = \sec A - \operatorname{cosec} A$

(A) 1 (B) 2 (C) 3 (D) 4

25. The value of $\cot A+\tan(180^\circ+A)+\tan(90^\circ+A)+\tan(360^\circ-A)=$

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

26. If $\cos(1^\circ)\cos(2^\circ)\cos(3^\circ)\cdots\cdots\cos(178^\circ)\cos(179^\circ)=x+1$ then value of x is?

(A) 0 (B) 1 (C) - 1 (D) none of these

27. If $\tan\theta=-\frac{4}{3}$, then sinθ is equal to

(A) $-\frac{4}{5}$ but not $\frac{4}{5}$ (B) $-\frac{4}{5}$ or $\frac{4}{5}$ (C) $\frac{4}{5}$ but not $-\frac{4}{5}$ (D) None of these

28. $\frac{\sin(-660^\circ)\tan(1050^\circ)\sec(-420^\circ)}{\cos(225^\circ)\operatorname{cosec}(315^\circ)\cos(510^\circ)}=$

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

29. The value of $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right)$ is equal to

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{1}{8}$ (D) $\frac{1}{16}$

30. The value of $3\left[\sin^4\left(\frac{3\pi}{2}-\alpha\right)+\sin^4(3\pi+\alpha)\right]-2\left[\sin^6\left(\frac{\pi}{2}+\alpha\right)+\sin^6(5\pi-\alpha)\right]$ is:

(A) 0 (B) 1 (C) 3 (D) sin 4α + sin 6α

SECTION – C (In-depth Analysis, Brain Storming Problems)

The section contains 10 Multi option correct questions. The section required in-depth knowledge to answer the questions correctly. So, solve them and get a wizard level brain. Marking (+4, 0)

31. If $\sqrt{\frac{1-\sin A}{1+\sin A}}=K_1\sec A-K_2\tan A$

(A) $K_1-K_2=2$ (B) $K_1\neq K_2$ (C) $K_1=K_2=1$ (D) $K_1=K_2$

32. If $\tan A=\frac{3}{4}$

(A) $\frac{1-\cos A}{1+\cos A}=\frac{1}{9}$ (B) $\operatorname{cosec}A=\pm\frac{5}{3}$ (C) $\operatorname{cosec}A=\frac{5}{3}$ (D) $\sec A=\pm\sqrt{1+\left(\frac{3}{4}\right)^2}$

33. If $\cos\theta=-\frac{1}{2}$ then θ is equal to

(A) 60° (B) 120° (C) 210° (D) 240°

34. Select the correct statements

(A) $1-\sin^2 5=\cos^2 5$ (B) $\sec^2 x-\tan^2 x=1$

(C) $\dfrac{1-\sin\theta}{\cos\theta}=\dfrac{1}{\sec\theta+\tan\theta}$ (D) $\sin(a+b)=\sin(a)\cos(b)+\cos(a)\sin(b)$

35. Select the correct options

(A) $3^\circ=\left(\dfrac{\pi}{60}\right)^c$ (B) $1.25^\circ=1^\circ 15'$ (C) $\dfrac{\pi}{18}=10^\circ$ (D) $0.125^\circ=7'30''$

36. If A and B are acute angles such that $\sin A = \sin^2 B$, $2\cos^2 A = 3\cos^2 B$ then

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

37. Select the correct options

(A) $\sin(30^\circ)=\dfrac{1}{2}$ (B) $\sin(60^\circ)=\dfrac{\sqrt{3}}{2}$ (C) $\operatorname{cosec}(45^\circ)=2$ (D) $\sin^2 1^\circ+\sin^2 89^\circ=1$

38. If $\sin\theta=-\dfrac{3}{5}$ & $\cos\theta=\dfrac{4}{5}$, then

(A) $\tan\theta=\dfrac{3}{4}$ (B) $\tan\theta=-\dfrac{3}{4}$ (C) $\tan(2\theta)<0$ (D) $\cos(2\theta)=\dfrac{7}{25}$

39. If $\tan1^\circ \tan2^\circ \tan3^\circ$ ……..$\tan89^\circ = x^2 - 8$, then the value of x can be

(A) - 1 (B) 1 (C) - 3 (D) 3

40. If $\sin\theta(1+\sin\theta)+\cos\theta(1+\cos\theta)=x$ and $\sin\theta(1-\sin\theta)+\cos\theta(1-\cos\theta)=y$ then… (Hint: $\sin2\theta = 2\sin\theta\cos\theta$)

(A) $x^2 - 2x = \sin2\theta$ (B) $y^2 + 2x = \sin2\theta$ (C) $xy = \sin2\theta$ (D) $x - y = 2$

SECTION – D (INTEGER ANSWER TYPE)

This section contains **10 questions. Each question**, when worked out will result in **one integer from 0 to 9.** (*Both inclusive*) Marking (+ 4, 0)

41. The value of $\left(\sec^2\theta-\dfrac{\sec^2\theta}{\operatorname{cosec}^2\theta}+1\right)\left(\dfrac{\sin\theta}{\operatorname{cosec}\theta}+\dfrac{\cos\theta}{\sec\theta}\right)$ is

42. If $\cos^6\theta+\sin^6\theta=1+K\sin^2\theta\cdot\cos^2\theta$ then the absolute value of K is

43. The value of $6(\sin^6\theta + \cos^6\theta) - 9(\sin^4\theta + \cos^4\theta) + 4$ equals to

44. If $\sin\theta_1 + \sin\theta_2 + \sin\theta_3 = 3$, then $\cos\theta_1 + \cos\theta_2 + \cos\theta_3$ is equal to

45. The value of $\dfrac{\tan70^\circ-\tan20^\circ}{\tan50^\circ}$ is _____

46. The value of $\frac{1}{\cos\theta+\sin\theta}\left(\frac{\sin\theta}{1-\cot\theta}+\frac{\cos\theta}{1-\tan\theta}\right)$ is equal to

47. The value of $\sin^2\left(7\frac{1}{2}\right)^\circ+\cos^2\left(7\frac{1}{2}\right)^\circ-\left(\sin^2(30)^\circ+\cos^2(30)^\circ\right)+\left(\sin^2(7)^\circ+\sin^2(83)^\circ\right)$ is equal to

48. The value of $\cot A+\tan(180^\circ+A)+\tan(90^\circ+A)+\tan(360^\circ-A)=?$

49. The value of $\frac{\cos(90^\circ+\theta^\circ)\sec(-\theta^\circ)\tan(180^\circ-\theta^\circ)}{\sec(360^\circ-\theta^\circ)\sin(180^\circ+\theta^\circ)\cot(\theta^\circ-90^\circ)}$ is

50. If $\sin x+\sin^2 x=1$, then the value of $\cos^{12}x+3\cos^{10}x+3\cos^8 x+\cos^6 x$ is

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ANSWER KEY

1	D	11	D	21	A	31	A, B	41	2
2	B	12	A	22	C	32	A, B, D	42	3
3	C	13	D	23	B	33	B, D	43	1
4	C	14	B	24	D	34	A, B, C, D	44	0
5	A	15	B	25	A	35	A, B, C, D	45	2
6	B	16	C	26	C	36	A, C	46	1
7	C	17	A	27	B	37	A, B, D	47	1
8	C	18	C	28	C	38	B, C, D	48	0
9	D	19	D	29	C	39	C, D	49	1
10	D	20	A	30	B	40	A, B, C, D	50	1