TRIGONOMETRY ABHYAS 01

Class 11 - Mathematics

Section A

1. 11^c in degree

a) 372°
b) 630°
c) 315°
d) 418°

2. Mark the Correct alternative in the following: If 2 tanα = 3 tanβ, then tan (α - β) =

a) $\frac{\sin 2\beta}{5-\cos 2\beta}$
b) None of these
c) $\frac{\cos 2\beta}{5-\cos 2\beta}$
d) $\frac{\sin 2\beta}{5+\cos 2\beta}$

3. The value of tan x + $\tan\left(\frac{\pi}{3}+x\right)$ + $\tan\left(\frac{2\pi}{3}+x\right)$ is

a) tan 3x
b) cot 3x
c) 3 tan 3x
d) 3 cot 3x

4. The value of sin 50° - sin 70° + sin 10° is equal to

a) 2
b) 0
c) $\frac{1}{2}$
d) 1

5. Mark the Correct alternative in the following: The value of tan x $\sin\left(\frac{\pi}{2}+x\right)$ $\cos\left(\frac{\pi}{2}-x\right)$ is

a) $\frac{1}{2}$ sin 2x
b) -1
c) None of these
d) 1

6. ($4\cos^3 15° - 3\cos 15°$) = ?

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

7. $\frac{\cos 8°-\sin 8°}{\cos 8°+\sin 8°}$ = ?

a) tan 52°
b) tan 37°
c) None of these
d) tan 8°

8. The maximum value of $\sin^2\left(\frac{2\pi}{3}+x\right)+\sin^2\left(\frac{2\pi}{3}-x\right)$ is

a) $\frac{1}{4}$
b) $\frac{1}{2}$
c) $\frac{3}{4}$
d) $\frac{3}{2}$

9. If sin x = $\frac{-1}{2}$ and x lies in quadrant IV, then sin $\frac{x}{2}$ = ?

a)
b)

Hitesh sir (9717101190)

$\frac{\sqrt{3+\sqrt{2}}}{2}$ $\frac{\sqrt{2-\sqrt{3}}}{2}$

c) None of these d) $\frac{\sqrt{2+\sqrt{3}}}{2}$

10. If tan ($\frac{\pi}{4}$ + x) + tan ($\frac{\pi}{4}$ - x) = λsec 2x, then the value of λ will be

a) 4 b) 1

c) 3 d) 2

11. At 3 : 40, the hour and minute hands of a clock are inclined at

a) $\frac{7\pi^c}{18}$ b) $\frac{2\pi^c}{3}$

c) $\frac{3\pi^c}{18}$ d) $\frac{13\pi^c}{18}$

12. If $\tan\theta = \frac{1}{2}$ and $\tan\phi = \frac{1}{3}$, then value of $\theta + \phi$ is

a) 0 b) π

c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}$

13. Find the value of sec $\left(\frac{-19\pi}{3}\right)$.

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

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

14. If cot θ = $\sqrt{5}$ and θ does not lie in quadrant I, then the values of cosec θ and sec θ are respectively.

a) $-\sqrt{6}, \sqrt{\frac{6}{5}}$ b) $\sqrt{6}, \sqrt{\frac{6}{5}}$

c) $\sqrt{6}, -\sqrt{\frac{6}{5}}$ d) $-\sqrt{6}, -\sqrt{\frac{6}{5}}$

15. $(1 + \sin\theta)\left(\frac{\sin\theta+\cos\theta-1}{\sin\theta-\cos\theta+1}\right)$ = ?

a) $\tan\theta$ b) $\sin\theta$

c) $\cot\theta$ d) $\cos\theta$

16. $\frac{\sin 2x}{1+\cos 2x}$ = ?

a) cosec x b) sec x

c) cot x d) tan x

17. The value of cos 12° + cos 84° + cos 156° + cos 132° is

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

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

18. If cos x = $\frac{-4}{5}$ and $\pi < x < \frac{3\pi}{2}$, then cos $\frac{x}{2}$ = ?

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

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

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

a) 2 b) 0

c) 1 d) 3

20. Which is smaller, sin 64° or cos 64°?

Hitesh sir (9717101190)

a) sin 64° b) cos 64°

c) cannot be compared d) both are equal

21. Write the maximum and minimum values of sin (sin x).

22. Show that sin 100° - sin 10° is positive.

23. Find the value of $\cot\left(\frac{29\pi}{4}\right)$

24. Find the maximum and minimum value of the 4 sin x - 3 cos x + 7.

25. If tan A + tan B = a and cot A + cot B =b, prove that: cot (A + B) $= \frac{1}{a} - \frac{1}{b}$.

Section B

26. Match the following:

(a) $\cos x$ is positive in	(i) I and III Quadrant
(b) tanx is positive in	(ii) $4\cos^3 x - 3\cos x$
(c) sin 3x =	(iii) I and IV Quadrant
(d) cos 3x =	(iv) 3sinx - $4\sin^3$x

27. Match the following:

(a) 'Trignometry' means	(i) 1 degree
(b) A measure of rotation of a given ray about its initial point	(ii) Measuring the sides of the triangle
(c) 60'	(iii) 60"
(d) 1'	(iv) Angle

28. Match the following:

(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]

29. Match the following:

(a) $\cos(2n\pi + x) = \sin x$	(i) True
(b) $\sin(2n\pi + x) = \sin x$	(ii) False
(c) $\sin(-x) =$	(iii) -cosx
(d) $\cos(\pi + x) =$	(iv) -sinx

30. If x cos $\theta = y\cos\left(\theta + \frac{2\pi}{3}\right) = z\cos\left(\theta + \frac{4\pi}{3}\right)$, then write the value of $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$.

31. If A, B, C, D are angles of a cyclic quadrilateral, prove that cos A + cos B + cos C + cos D = 0.

32. Find the value of cosec (-1110°)

33. Prove that: $\sin\frac{\pi}{10}\sin\frac{13\pi}{10} = -\frac{1}{4}$.

34. Show that: $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2\cos 8x}}}$ = 2 cos x, 0 < x < $\frac{\pi}{8}$.

35. Prove that ($\cos^4$ x + $\sin^4$ x) $= \frac{1}{2}$ (2 - $\sin^2$ 2x).

36. If A + B + C= π, prove that tan 2A + tan 2B + tan 2C = tan 2A tan 2B tan 2C

Hitesh Sir (9717101190)

37. If A + B + C = π, prove that $\sin^2\frac{A}{2} + \sin^2\frac{B}{2} - \sin^2\frac{C}{2} = 1 - 2\cos\frac{A}{2}\cos\frac{B}{2}\sin\frac{C}{2}$

38. If cos A = m cos B, then write the value of $\cot\frac{A+B}{2}\cot\frac{A-B}{2}$.

39. Prove that: $\frac{1}{\sin(x-a)\cos(x-b)} = \frac{\cot(x-a)+\tan(x-b)}{\cos(a-b)}$.

40. If $\sin x = -\frac{1}{2}$ and $\pi < x < \frac{3\pi}{2}$, find the value of

i. sin 2x

ii. cos 2x

iii. tan 2x

41. Prove that cos x + cos (120° - x) + cos (120° + x) = 0.

Section C

42. Prove that: $\cos 5A = 16\cos^5 A - 20\cos^3 A + 5\cos A$.

43. If $\cos\theta = \frac{\cos\alpha\cos\beta}{1-\sin\alpha\sin\beta}$, prove that one value of $\tan\frac{\theta}{2} = \frac{\tan\frac{\alpha}{2}-\tan\frac{\beta}{2}}{1-\tan\frac{\alpha}{2}\tan\frac{\beta}{2}}$.

44. Find the value of $\tan\frac{\pi}{8}$.

45. Prove that: $\tan\alpha + 2\tan 2\alpha + 4\tan 4\alpha + 8\cot 8\alpha = \cot\alpha$.

46. Prove that: $\cos^2 x + \cos^2(x + \frac{\pi}{3}) + \cos^2(x - \frac{\pi}{3}) = \frac{3}{2}$

Section D

Question No. 47 to 51 are based on the given text. Read the text carefully and answer the questions:

Consider sin(A + B) = 1 and $\sin(A - B) = \frac{1}{2}$ where A, B $\in \left[0, \frac{\pi}{2}\right]$.

47. What is the value of A?

a) $\frac{\pi}{8}$ b) $\frac{\pi}{4}$

c) $\frac{\pi}{3}$ d) $\frac{\pi}{6}$

48. What is the value of B?

a) $\frac{\pi}{2}$ b) $\frac{\pi}{7}$

c) $\frac{\pi}{6}$ d) $\frac{\pi}{3}$

49. What is the value of tan (A + 2B) tan (2A + B)?

a) 0 b) 1

c) 2 d) -1

50. What is the value of $\sin^2 A - \sin^2 B$?

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

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

51. What is the value of cos 2A?

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

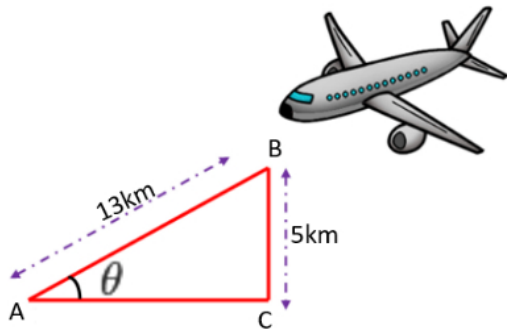
c) $-\frac{1}{4}$ d) $-\frac{1}{3}$

Question No. 52 to 56 are based on the given text. Read the text carefully and answer the questions:

An airplane is observed to be approaching a point that is at a distance of 13 km from the point of observation and makes an angle of elevation of θ and the height of the airplane above the ground is 5km. Based on the above information answer the

Hitesh sir (9717101190)

following questions.



52. The value of sin 2θ

a) $\sin 2\theta = \frac{10}{13}$ b) $\sin 2\theta = \frac{120}{169}$

c) $\sin 2\theta = \frac{119}{169}$ d) $\sin 2\theta = \frac{10}{144}$

53. The value of cos 2θ

a) $\cos 2\theta = \frac{120}{169}$ b) $\cos 2\theta = -\frac{120}{169}$

c) $\cos 2\theta = \frac{119}{169}$ d) $\cos 2\theta = -\frac{119}{169}$

54. The value of $\sin\left(\frac{\theta}{2}\right)$

a) $\sin\frac{\theta}{2} = -\frac{1}{\sqrt{26}}$ b) $\sin\frac{\theta}{2} = \frac{5}{\sqrt{26}}$

c) $\sin\frac{\theta}{2} = -\frac{5}{\sqrt{26}}$ d) $\sin\frac{\theta}{2} = \frac{1}{\sqrt{26}}$

55. The value of $\cos\left(\frac{\theta}{2}\right)$

a) $\cos\frac{\theta}{2} = -\frac{5}{\sqrt{26}}$ b) $\cos\frac{\theta}{2} = \frac{1}{\sqrt{26}}$

c) $\cos\frac{\theta}{2} = -\frac{1}{\sqrt{26}}$ d) $\cos\frac{\theta}{2} = \frac{5}{\sqrt{26}}$

56. The value of cot 2θ

a) $\cot 2\theta = \frac{144}{120}$ b) $\cot 2\theta = \frac{25}{120}$

c) $\cot 2\theta = \frac{120}{119}$ d) $\cot 2\theta = \frac{119}{120}$

57. Prove the following identity: $\tan 82\frac{1}{2}^\circ = (\sqrt{3}+\sqrt{2})(\sqrt{2}+1) = \sqrt{2}+\sqrt{3}+\sqrt{4}+\sqrt{6}$.

58. If sin x = $\frac{\sqrt{5}}{3}$ and x lies in the 2nd quadrant, find the values of $\cos\frac{x}{2}$, $\sin\frac{x}{2}$ and $\tan\frac{x}{2}$.

59. If α, β are two different values of x lying between 0 and 2π which satisfy the equation 6 cos x + 8 sin x = 9, find the value of sin $(\alpha+\beta)$

60. If $\sin\alpha + \sin\beta$ = a and $\cos\alpha + \cos\beta$ = b, prove that $\cos(\alpha - \beta) = \frac{a^2+b^2-2}{2}$.

Hitesh sir (9717010190)