AB's PATHS KOLHAPUR

Topic Name: trigonometry objective

Date : 00/00/2025 **Total Marks:** **No Of Questions:**

1. If $\alpha+\beta=\frac{\pi}{2}$ and $\alpha=\frac{1}{3}$, then sin β is

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

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

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

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

2. If $5\tan\theta=4$, then value of $\frac{5\sin\theta-3\cos\theta}{5\sin\theta+2\cos\theta}$ is

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

(b) $\frac{1}{6}$

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

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

3. If $7\sin\alpha=24\cos\alpha; 0<\alpha<\frac{\pi}{2}$, then value of 14 $\tan\alpha-75\cos\alpha-7\sec\alpha$ is equal to

(a) 1
(b) 2
(c) 3
(d) 4

4. Given 3 sin β + 5 cos β = 5, then the value of ($3\cos\beta-5\sin\beta$)^2 is equal to

(a) 9

(b) $\frac{9}{5}$

(c) $\frac{1}{3}$

(d) $\frac{1}{9}$

5. If $\tan\theta=4$, then $\left(\frac{\tan\theta}{\frac{\sin^3\theta}{\cos\theta}+\sin\theta\cos\theta}\right)$ is equal to

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

6. The value of tan 5^0 tan 10^0 tan 15^0 20^0 .... tan 85^0, is
(a) 1
(b) 2
(c) 3
(d) None of these

7. As x increases from 0 to $\frac{\pi}{2}$ the value of cos x

(a) Increases
(b) Decreases
(c) Remains constant
(d) Increases, then decreases

8. Find the value of x from the equation x sin $\frac{\pi}{6}\cos^2\frac{\pi}{4}=\frac{\cot^2\frac{\pi}{6}\sec\frac{\pi}{3}\tan\frac{\pi}{4}}{\text{cosec}^2\frac{\pi}{4}\text{cosec}\frac{\pi}{6}}$

(a) 4
(b) 6
(c) – 2
(d) 0

9. The area of a triangle is 12 sq. cm. Two sides are 6 cm and 12 cm. The included angle is

(a) $\cos^{-1}\left(\frac{1}{3}\right)$

(b) $\cos^{-1}\left(\frac{1}{6}\right)$

(c) $\sin^{-1}\left(\frac{1}{6}\right)$

(d) $\sin^{-1}\left(\frac{1}{3}\right)$

10. If $\alpha+\beta=90^0$ and $\alpha=2\beta$ then $\cos^2\alpha+\sin^2\beta$ equals to

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

11. In $\Delta ABC, \angle B=90^0$. If AB = 14 cm and AC = 50 cm then tan A equals :

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

(b) $\frac{24}{7}$

(c) $\frac{7}{24}$

(d) $\frac{25}{24}$

12. If $\sin\theta=\frac{12}{13}$ then the value of the $\frac{2\cos\theta+3\tan\theta}{\sin\theta+\tan\theta\sin\theta}$ is :

(a) $\frac{12}{5}$

(b) $\frac{5}{13}$

(c) $\frac{259}{102}$

(d) $\frac{259}{65}$

13. If $\sec\theta = \frac{\sqrt{p^2+q^2}}{q}$ then the value of the $\frac{p\sin\theta + q\cos\theta}{p\sin\theta + q\cos\theta}$ is :

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

(b) $\frac{p^2}{q^2}$

(c) $\frac{p^2-q^2}{p^2+q^2}$

(d) $\frac{p^2+q^2}{p^2-q^2}$

14. If angle A is acute and $\cos A = \frac{8}{17}$ then cot A is :

(a) $\frac{8}{15}$

(b) $\frac{17}{8}$

(c) $\frac{15}{8}$

(d) $\frac{17}{15}$

15. sec θ is equal to –

(a) $\frac{1}{\sqrt{1-\cos^2\theta}}$

(b) $\frac{\sqrt{1+\cot^2\theta}}{\cot\theta}$

(c) $\frac{\cot\theta}{\sqrt{1+\cot^2\theta}}$

(d) $\frac{\sqrt{\cos ec^2\theta - 1}}{\cos ec\theta}$

16. $\sin 30^0 + \cos 60^0$ equals :

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

(b) $\sqrt{3}$

(c) 1

(d) None of these

17. The value of $2\tan^2 60^0 - 4\cos^2 45^0 - 3\sec^2 30^0$ is :

(a) 0

(b) 1

(c) 12

(d) 8

18. The value of $\frac{3}{4}\tan^2 30^0 - 3\sin^2 60^0 + \text{cosec}^2 45^0$ is

(a) 1

(b) 8

(c) 0

(d) 12

19. $7\sin^2\theta + 3\cos^2\theta = 4$ then :

(a) $\tan\theta = \frac{1}{\sqrt{2}}$

(b) $\tan\theta = \frac{1}{2}$

(c) $\tan\theta = \frac{1}{3}$

(d) $\tan\theta = \frac{1}{\sqrt{3}}$

20. The solution of the trigonometric equation

$$\frac{\cos^2\theta}{\cot^2\theta - \cos^2\theta} = 3, 0^0 < \theta < 90^0 :$$

(a) $\theta = 0^0$

(b) $\theta = 30^0$

(c) $\theta = 60^0$

(d) $\theta = 90^0$

21. If $\cot\theta + \cos\theta = p$ and $\cot\theta - \cos\theta = q$, then the value of $p^2 - q^2$ is :

(a) $2\sqrt{pq}$

(b) $4\sqrt{pq}$

(c) 2 pq

(d) 4 pq

22. The value of $\sin^2 15^0 + \sin^2 30^0 + \sin^2 45^0 + \sin^2 60^0 + \sin^2 75^0$ is :

(a) 1

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

(c) $\frac{5}{2}$

(d) 3

23. The value of $\frac{\sin 29^0}{\cos 61^0} - \frac{\sin 61^0}{\cos 29^0}$ is :

(a) Zero

(b) 1

(c) $\frac{61}{29}$

(d) $\frac{29}{61}$

24. The values of x and y which make the following solutions true are: $\cos x^0 = \sin 52^0$ and $\cos y^0 = \sin(y^0 + 10)$

(a) $x = 52^0, y = 30^0$

(b) $x = 38^0, y = 40^0$

(c) x = 48^0, y = 52^0
(d) x = 40^0, y = 50^0

25. If $\alpha+\beta=90^0$ and $\alpha=2\beta$ then $\cos^2\alpha+\sin^2\beta$ equal :
(a) 1
(b) Zero
(c) $\frac{1}{2}$
(d) 2

26. A flagstaff 6 metres high throws a shadow $2\sqrt{3}$ metres long on the ground. The angle of elevation is :
(a) 30^0
(b) 45^0
(c) 90^0
(d) 60^0

27. An observer $\sqrt{3}$ m tall is 3 m away from the pole $2\sqrt{3}$ m high. The angle of elevation of the top from the pole is :
(a)45^0
(b) 30^0
(c) 60^0
(d) 15^0

28. An observer 1.5 m tall is 28.5 m away from. a chimney. The angle of elevation of the top of the chimney from her eyes is 45^0. The height of the chimney is :
(a)30 m
(b) 27 m
(c) 28.5 m
(d) None of these

29. The angle of elevation of the top of a tower from a distance 100 m from its foot is 30^0. The height of the tower is :
(a) $100\sqrt{3}$ m
(b) $\frac{200}{\sqrt{3}}$ m
(c) $50\sqrt{3}$ m
(d) $\frac{100}{\sqrt{3}}$ m

30. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60^0. The length of the string is :
(a) $40\sqrt{3}$ m
(b) 30 m
(c) $20\sqrt{3}$ m
(d) $60\sqrt{3}$ m

31. A tree is broken by the wind. Its top struck the ground at an angle 30^0 at a distance of 30 m from its foot. The whole height of the tree is :
(a) $10\sqrt{3}$ m
(b) $20\sqrt{3}$ m
(c) $40\sqrt{3}$ m
(d) $30\sqrt{3}$ m

32. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30^0 and 45^0 respectively. If the bridge is at a height of 3 m from the banks then the width of the river is :
(a) $3(\sqrt{3}-1)$ m
(b) $3(\sqrt{3}+1)$ m
(c) $(3+\sqrt{3})$ m
(d) $(3-\sqrt{3})$ m

33. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. The height of the tower is :
(a) $\sqrt{5}$ m
(b) $\sqrt{13}$ m
(c)6 m
(d) 2.25 m

34. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angles of elevation from his eyes to the top of the building increases from 30 to 60^0 as he walks towards the building. The distance he walked towards the building is :
(a) $19\sqrt{3}$ m
(b) $57\sqrt{3}$ m
(c) $38\sqrt{3}$ m
(d) $18\sqrt{3}$ m

35. As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30^0 and 60^0. if one strip is exactly behind the other on the same side of the light-house then the distance between the two ships is :
(a) $25\sqrt{3}$ m
(b) $75\sqrt{3}$ m
(c) $50\sqrt{3}$ m
(d) None of these

36. If $\frac{ax}{\cos\theta}+\frac{by}{\sin\theta}=a^2-b^2$ and $\frac{ax\sin\theta}{\cos^2\theta}-\frac{by\cos\theta}{\sin^2\theta}=0$ then $(ax)^{2/3}+(by)^{2/3}$ is equal to :
(a) $(a^2-b^2)^{2/3}$
(b) $(a^2+b^2)^{2/3}$
(c) $(a-b)^{2/3}$
(d) None of these

37. The sides of a right angled triangle form a geometric progression, find the cosines of the acute angles. (If a, b, c are in G.P. $\Rightarrow b^2=ac$) :
(a) $\frac{\sqrt{5}-1}{2}$ and $\sqrt{\frac{\sqrt{5}+1}{2}}$
(b) $\frac{\sqrt{5}+1}{2}$ and $\sqrt{\frac{\sqrt{5}+1}{2}}$
(c) $\frac{\sqrt{5}-1}{2}$ and $\sqrt{\frac{\sqrt{5}-1}{2}}$
(d) None of these

38. If $y=\frac{2\sin\alpha}{1+\cos\alpha+\sin\alpha}$, then $\frac{1-\cos\alpha+\sin\alpha}{1+\sin}$ is equal to :

(a) 1+ y
(b) 1 – y
(c) $\frac{1}{y}$
(d) y

39. cot 36^0 cot 72^0 is equal to :
(a) $\frac{1}{5}$
(b) $\frac{1}{\sqrt{5}}$
(c) 1
(d) None of these

40. The value of $\cos^2 15^0 - \cos^2 30^0 + \cos^2 45^0 - \cos^2 60^0 + \cos^2 75^0$ is :
(a) 2
(b) 0
(c) $\frac{1}{4}$
(d) $\frac{1}{2}$

41. If $x = \sin^2\theta\cos\theta$ and $y = \cos^2\theta\sin\theta$, then :
(a) $(x^2y)^{2/3} + (xy^2)^{2/3} = 1$
(b) $\left[\frac{x^2}{y}\right]^{2/3} + \left[\frac{y^2}{x}\right]^{2/3} = 1$
(c) $x^2 + y^2 = x^2y^2$
(d) None of these

42. If $x = \sec\theta - \tan\theta$ and $y = \operatorname{cosec}\theta + \cot\theta$, then $xy + 1$ is equal to :
(a) x + y
(b) x – y
(c) 2x + y
(d) y – x

43. If $5\sin\theta = 3$, then $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta}$ is equal to :
(a) $\frac{1}{4}$
(b) 4
(c) 2
(d) None of these

44. The value of the expression $1 - \frac{\sin^2 y}{1+\cos y} + \frac{1+\cos y}{\sin y} - \frac{\sin y}{1-\cos y}$ is equal to :
(a) Cos y
(b) 1
(c) 0
(d) Sin y

45. If $\sec\theta = x + \frac{1}{4x}, x \in R, x \neq 0$, then the value of $\sec\theta + \tan\theta$ is :
(a) 2x
(b) $\frac{1}{2x}$
(c) 2x or $\frac{1}{2x}$
(d) None of these

46. If $\tan\theta = \frac{p}{q}$, then the value of $\frac{p\sin\theta - q\cos\theta}{p\sin\theta + q\cos\theta}$ is :
(a) $\frac{p^2 - q^2}{p^2 + q^2}$
(b) $\frac{p^2 + q^2}{p^2 - q^2}$
(c) 0
(d) None of these

47. If m = $\tan\theta + \sin\theta$ and $n = \tan\theta - \sin\theta$, then $(m^2 - n^2)^2$ is equal to :
(a) mn
(b) 4 mn
(c) 16 mn
(d) $4\sqrt{mn}$

48. If $x = a\cos\theta + b\sin\theta$ and $y = a\sin\theta - b\cos\theta$ then $a^2 + b^2$ is equal to :
(a) $x^2 - y^2$
(b) $x^2 + y^2$
(c) $(x + y)^2$
(d) None of these

49. If $\cos\theta + \frac{y}{b}\sin\theta + 1 = 0$ and $\frac{x}{a}\sin\theta - \frac{y}{b}\cos\theta - 1 = 0$ then $\frac{x^2}{a^2} + \frac{y^2}{b^2}$ is equal to :
(a) 2
(b) 0
(c) – 2
(d) 1

50. ABC is a triangle, right angled at A. If the length of hypotenuse is $2\sqrt{2}$ times the length of perpendicular from A on the hypotenuse, the other angles of the triangle are :
(a) 22.5^0, 67.5^0
(b) 30^0, 60^0
(c) 45^0, 45^0
(d) None of these

51. If sin A + cos A = m and $\sin^3 A + \cos^3 A = n$, then :
(a) $m^3 + 3m + 2n = 0$
(b) $m^3 - 3m + 2n = 0$
(c) $n^3 - 3n + 2m = 0$
(d) $m^3 - 3m + n = 0$

52. If $\sin^2\theta + 3\cos\theta - 2 = 0$, then $\cos^3\theta + \sec^3\theta$ is equal to :
(a) 18
(b) 9
(c) 4
(d) $\frac{1}{4}$

53. If $\sin\alpha + \cos\alpha = a$, then $\sin^6\alpha + \cos^6\alpha$ is equal to :

(a) $1+\frac{3}{4}(a^2-1)^2$

(b) $1-\frac{3}{4}(a^2-1)^2$

(c) $\frac{3+4(a^2-1)^2}{4}$

(d) $\frac{3-3(a^2-1)^2}{4}$

54. The quadratic equation whose roots are sin 18^0 and cos 36^0 is :

(a) $4x^2+2\sqrt{5}x+1=0$

(b) $4x^2-2\sqrt{5}x-1=0$

(c) $x^2+2\sqrt{5}x+1=0$

(d) $4x^2-2\sqrt{5}x+1=0$

55. If $\cos\theta+\sec\theta=2$, then the value of $\cos^2\theta+\sec^2\theta$ is :

(a) 1

(b) 2(c) 4

(c) 4

(d) None of these

56. If $\sin(A-B)=\cos(A+B)=\frac{1}{2}$, then the values of A and B lying between 0^0 and 90^0 are respectively:

(a) 30^0 and 60^0

(b) 60^0 and 30^0

(c) 45^0 and 15^0

(d) None of these

57. If $0 \le x \le \frac{\pi}{2}$ and $81^{\sin^2 x}+81^{\cos^2 x}=30$, then x is equal to :

(a) $\frac{\pi}{3}$ or $\frac{\pi}{6}$

(b) $\frac{\pi}{4}$ or 0

(c) $\frac{\pi}{2}$ or $\frac{\pi}{4}$

(d) None of these

58. If $m^2+m'^2+2mn'\cos\theta=1, n^2+n'^2+2nn'\cos\theta=1$, and $mn+m'n'+(mn'+m'n)\cos\theta=0$, then $m^2 + n^2$ is equal to :

(a) $\sin^2\theta$

(b) $\operatorname{cosec}^2\theta$

(c) $\cos^2\theta$

(d) None of these

59. If $\frac{\sin A}{\sin B}=p$ and $\frac{\cos A}{\cos B}=q$, then tan A is equal to :

(a) $\pm\frac{p}{q}\sqrt{\frac{q^2-1}{1-p^2}}$

(b) $\pm\sqrt{\frac{q^2-1}{1-p^2}}$

(c) $\pm\frac{p}{q}\sqrt{\frac{q^2-1}{1-p^2}}$

(d) None of these

60. If $T_n=\sin^n\theta+\cos^n\theta$, then $\frac{T_3-T_5}{T_1}$ is equal to :

(a) $\frac{T_5-T_7}{T_3}$

(b) $\frac{T_3-T_5}{T_7}$

(c) $\frac{T_9-T_6}{T_4}$

(d) $\frac{T_6-T_9}{T_4}$

61. The number of values of θ which lie between 0 and $\frac{\pi}{2}$ and satisfy the equation

(a) 1

(b) 2

(c) 3

(d) None of these

62. The greatest angle of a cyclic quadrilateral is 3 times least. The circular measure of the least angle is :

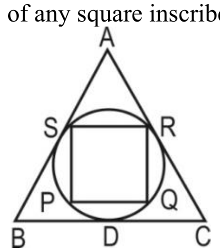
(a) 60^0

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

(c) $\frac{\pi}{3}$

(d) None of these

63. A circle is inscribed in an equilateral triangle of side a, the area of any square inscribed in the circle is :



(a) $6a^2$

(b) $3a^2$

(c) $\frac{a^2}{6}$

(d) $\frac{a^2}{3}$

64. If $\sin x + \sin^2 x = 1$, then the value of $\cos^{12}x + 3\cos^{10}x + 3\cos^8 x\cos^6 x + 2\cos^4 x + \cos^2 x - 2$ is equal to :

(a) 0

(b) 1

(c) 2

(d) $\sin^2 x$

65. The angles of elevation of the top of a TV tower from three points A, B and C in a straight line (in the horizontal plane) through the foot of tower are α, 2α and 3α respectively. If AB = a, the height of tower is :
(a) a $\tan\alpha$
(b) a $\sin\alpha$
(c) a $\sin 2\alpha$
(d) a $\sin 3\alpha$

66. The expression $\operatorname{cosec}^2 A \cot^2 A - \sec^2 A \tan^2 A - (\cot^2 A - \tan^2 A)(\sec^2 A \operatorname{cosec}^2 A - 1)$ is equal to
(a) 0
(b) 1
(c) – 1
(d) None of these

67. $(1+\tan\alpha\tan\beta)^2+(\tan\alpha-\tan\beta)^2$ is equal to :
(a) $\cos^2\alpha\cos^2\beta$
(b) $\tan^2\alpha\tan^2\beta$
(c) $\tan^2\alpha+\tan^2\beta$
(d) $\sec^2\alpha\sec^2\beta$

68. From the top of a light house, 60 m high with its base at the sea level, the angle of depression of a boat is 15^0. The distance of the boat from the foot of the light house is :
(a) $\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\right)60$ m
(b) $\frac{\sqrt{3}+1}{\sqrt{3}-1}$ m
(c) $\left(\frac{\sqrt{3}-1}{\sqrt{3}+1}\right)60$ m
(d) None of these

69. The angles of elevation of the top of a tower as observed from the bottom and top of a building of height 60 m are 60^0 and 45^0 respectively. The distance of the base of the tower from the base of the building is :
(a) $30(\sqrt{3}-1)$ m
(b) $30(3+\sqrt{3})$ m
(c) $30(3-\sqrt{3})$ m
(d) $30(\sqrt{3}+1)$ m

70. $\sin^6\theta+\cos^6\theta+3\sin^2\theta\cos^2\theta$ is equal to :
(a) 0
(b) 1
(c) – 1
(d) None of these

71. If $0 < x < \frac{\pi}{2}$, then the largest angle of a triangle whose sides are 1, sin x, cos x is :
(a) $\frac{\pi}{2}$
(b) $\frac{\pi}{3}$
(c) $\frac{\pi}{2} - x$
(d) x

72. ABC is right angled at C, then tan A + tan B =
(a) $\frac{a^2}{bc}$
(b) $\frac{c^2}{ab}$
(c) $\frac{b^2}{ac}$
(d) a + b

73. A rectangle with an area of 9 square metre is inscribed in a triangle ABC having AB = 8 m, BC = 6 m and $\angle ABC = 90^0$. The dimensions of the rectangle (in metres) are :
(a) $2, \frac{9}{2}$ or $6, \frac{3}{2}$
(b) 1 , 9 or 3, 3
(c) 2, 4.5
(d) 4, 2.25

74. From the top of a light house, the angles of depression of two stations on opposite sides of it at distance 'a' apart are α and β. The height of the light house is :
(a) $\frac{a}{\cot\alpha\cot\beta}$
(b) $\frac{a}{\cot\alpha+\cot\beta}$
(c) $\frac{a\cot\alpha\cot\beta}{\cot\alpha+\cot\beta}$
(d) $\frac{a\tan\alpha\tan\beta}{\cot\alpha+\cot\beta}$

75. The value of the expression $\tan 1^0 \tan 2^0 \tan 3^0 \ldots\ldots \tan 89^0$ is equal to :
(a) 0
(b) Not defined
(c) 1
(d) ∞

76. If $\sin\theta_1+\sin\theta_2+\sin\theta_3=3$ then $\cos\theta_1+\cos\theta_2+\cos\theta_3$ is equal to :
(a) 3
(b) 2
(c) 1
(d) 0

77. If $\sin x + \sin^2 x = 1$, then $\cos^8 x + 2\cos^6 x + \cos^4 x$ is equal to :
(a) 0
(b) – 1
(c) 2
(d) 1

78. Which of the following is not possible ?
(a) $\sin\theta = \frac{5}{7}$

(b) $\cos\theta = \dfrac{1+t^2}{1-t^2}, t \neq 0$

(c) $\tan\theta = 100$

(d) $\sec\theta = \dfrac{5}{2}$

79. $\cot\theta = 2\sin\theta\cos\theta (0 \le \theta \le 90^0)$ if θ equals :

(a) 45^0 and 90^0

(b) 45^0 and 60^0

(c) 45^0 only

(d) 90^0 only

80. In a triangle ABC right angled at C, tan A and tan B satisfy the equation :

(a) $abx^2 - (a^2 + b^2) x - ab = 0$

(b) $abx^2 - c^2x + ab = 0$

(c) $c^2x^2 - abx + c^2 = 0$

(d) $ax^2 - bx + a = 0$

81. The area of the circle and the area of a regular polygon of n sides and of perimeter equal to that of the circle are in the ratio of :

(a) $\tan\left(\dfrac{\pi}{n}\right) : \dfrac{\pi}{n}$

(b) $\cos\left(\dfrac{\pi}{n}\right) . \dfrac{\pi}{n}$

(c) $\sin\left(\dfrac{\pi}{n}\right) : \dfrac{\pi}{n}$

(d) $\cot\left(\dfrac{\pi}{n}\right) : \dfrac{\pi}{n}$

82. If $\tan\theta + \sec\theta = \sqrt{3}$, $0 < \theta < \dfrac{\pi}{2}$ then θ is equal to :

(a) $\dfrac{\pi}{3}$

(b) $\dfrac{\pi}{6}$

(c) $\dfrac{\pi}{4}$

(d) None of these

83. A tower subtends an angle α at a point 'A' in the plane of it's base and the angle of depression of the foot of the tower at a height b just above A is B. Then the height of the tower is :

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

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

(c) $b\tan\alpha\tan\beta$

(d) $b\cot\alpha\cot\beta$

84. If $\sin x + \sin^2 x = 1$, then $\cos^2 x + \cos^4 x$ is equal to :

(a) 1

(b) – 1

(c) 2

(d) 0

85. The angle of elevation of a tower from a point A due south of it is x and from a point B due to east of A is y. if

(a) $\dfrac{\ell}{\sqrt{\cot^2 y - \cot^2 x}}$

(b) $\dfrac{\ell}{\sqrt{\tan^2 y - \tan^2 x}}$

(c) $\ell\sqrt{\cot^2 y - \cot^2 x}$

(d) $\ell\sqrt{\tan^2 y - \tan^2 x}$

86. In Δ ABC. AB = 30 cm and $\angle C = 45^0$. The length of the radius of circumcircle of Δ ABC is (**Based On Sine Rule)**

(a) $15\sqrt{2}$ cm

(b) $5\sqrt{2}$ cm

(c) $15\sqrt{3}$ cm

(d) $5\sqrt{3}$ cm

87. The radius of the circumcircle of Δ ABC is $\dfrac{2\sqrt{3}}{3}$ cm. If BC = 2 cm, the size of angle A is :
(Based On Sine Rule)

(a) 30^0

(b) 60^0

(c) 90^0

(d) 45^0

88. In Δ ABC, $\angle A : \angle B ; \angle C = 1 : 3 : 8$. If AB = 10 cm, the length of AC is : [Use : $\sin(180^0 - \theta) = \sin\theta$]
(Based On Sine Rule)

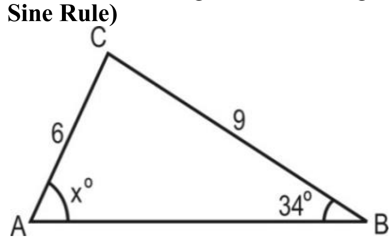
(a) $\dfrac{10\sqrt{6}}{3}$ cm

(b) $\dfrac{10\sqrt{3}}{3}$ cm

(c) $\dfrac{10\sqrt{3}}{6}$ cm

(d) None of these

89. The measure of angle x in the triangle below is : **(Based On Sine Rule)**



(a) 54^0

(b) 57.01^0

(c) 59^0

(d) None of these

90. In a circle of radius 7 cm, the arc AB subtends an angle of 120^0 at the centre. The length of chord AB is : **(Based On Sine Rule**

(a) $7\sqrt{3}$ cm

(b) $3\sqrt{2}$ cm

(c) $5\sqrt{3}$ cm

(d) $2\sqrt{3}$ cm

91. In a triangle ABC, a = 6, b = 12 and B = 60^0. The value of sin A is ;
(Based On Sine Rule)
(a) $\frac{\sqrt{3}}{4}$
(b) $\frac{1}{\sqrt{3}}$
(c) $\frac{1}{2}$
(d) None of these

92. In ΔABC. a = 2, b = 3 and $\sin A = \frac{2}{3}$, then $\angle$B is equal to :
(Based On Sine Rule)
(a) 30^0
(b) 60^0
(c) 90^0
(d) 120^0

93. In a ΔABC. a = 4, c = 12 and $\angle$C = 60^0, then the value of sin A is :
(Based On Sine Rule)
(a) $\frac{1}{2\sqrt{3}}$
(b) $\frac{-1}{2\sqrt{3}}$
(c) $\frac{\sqrt{2}}{3}$
(d) $\frac{\sqrt{3}}{2}$

94. In an isosceles triangle ABC, the base AB = 12 cm and the angle at the top is 30^0. D is a point on the side BC such that $\angle$CAD : $\angle$DAB = 1 : 4. The length of the radius of circumcircle of ΔABC is : **(Based On Sine Rule)**
(a) $3\sqrt{2}$ cm
(b) $5\sqrt{2}$ cm
(c) $6\sqrt{2}$ cm
(d) $10\sqrt{2}$ cm

95. The base of an isosceles triangle is 10 cm, and the angle at the base is 2a. the length of the angle bisector of one of the base angles is : [Use : $\sin(180^0 - \theta) = \sin\theta$]
(Based On Sine Rule)
(a) 10 sin 2a cos 2a
(b) $\frac{10\sin 2a}{\sin 3a}$
(c) $\frac{10\sin 3a}{\sin 2a}$
(d) 10 sin 4a

96. In the circumference with radius 50 cm is inscribed a quadrilateral. Two of its angles are 45^0 and 120^0. The length of diagonals is :
(Based On Sine Rule)
(a) $25\sqrt{2}$ cm; $25\sqrt{3}$ cm
(b) $10\sqrt{2}$ cm; $10\sqrt{3}$ cm
(c) $50\sqrt{2}$ cm; $50\sqrt{3}$ cm
(d) None of these

97. In a ΔABC, $\angle$A = 45^0, $\angle$B = 30^0. M is a point on the side AB. The radius of the circumcircle of ΔAMC is R. The radius of the circumcircle of ΔMBC is : **(Based On Sine Rule)**
(a) 2R cm
(b) $R\sqrt{2}$ cm
(c) $\frac{R}{\sqrt{2}}$ cm
(d) None of these

98. The angle of a triangle are as 5 : 5 : 2, the ratio of the greatest side to the least side is :
(Based On Sine Rule)
(a) 2 + $\sqrt{3}$: 1
(b) 2 + $\sqrt{3}$: 2 – $\sqrt{3}$
(c) $\sqrt{3}$ – 1 : $\sqrt{3}$ + 1
(d) None of these

99. The perimeter of an acute angled triangle ABC is 6 times the arithmetic mean of the sines of its angles. If the side b is 2, the angle B is :
(Based On Sine Rule)
(a) 30^0
(b) 60^0
(c) 90^0
(d) None of these

100. If the angles of a triangle be in the ratio 1 : 4 : 5, then the ratio of it's greatest side to the smallest side is :
(Based On Sine Rule)
(a) 5 : 1
(b) $(\sqrt{5}+1)$: 1
(c) 1 : $(\sqrt{5}-1)$
(d) None of these

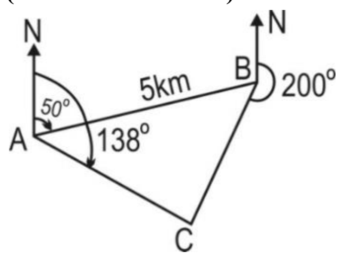
101. In a ΔABC, if a sin A = b sin B, then the triangle is :
(Based On Sine Rule)
(a) Right angled
(b) Equilateral
(c) Right angled isosceles
(d) Isosceles

102. Points D, E are taken on the side BC of a triangle ABC such that BD = DE = EC. If $\angle$BAD = x, $\angle$DAE = y, $\angle$EAC = z, then the value of $\frac{\sin(x+y)\sin(y+z)}{\sin x \sin z}$ is equal to :
(Based On Sine Rule)
(a) 4
(b) 1
(c) 2

(d) None of these

103. In a triangle ABC, A = 45^0, B = 75^0, then $a+\sqrt{2}$ c is equal to :
(Based On Sine Rule)
(a) 2b
(b) b
(c) 4b
(d) $\frac{b}{2}$

104. A hiker starts her journey at point A. She notices a farm house at point C and works out it's bearing is at 138^0. She then walks for 5 kilometres and stops at point B. At point B the hiker looks again at the farm house and calculates its bearing now to be 200^0. The distance AC and BC respectively are :
(Based On Sine Rule)



(a) 3.28 km, 6.55 km
(b) 2.66 km, 5.83 km
(c) 2.83 km, 5.66 km
(d) None of these

105. The angles of a triangle are in the ratio 4 : 1 : 1, then the ratio of the largest side to the perimeter is (Use : sin $(180^0-\theta)=\sin\theta$)
(Based On Sine Rule)
(a) 1 : $(1+\sqrt{3})$
(b) 2 : 3
(c) $\sqrt{3}$: $(2+\sqrt{3})$
(d) 1 : $(2+\sqrt{3})$)

106. In a ΔABC, AB = 5 cm, AC = 6 cm, $\angle$A = 60^0. The length of the side BC is :
(Based On Cosine Rule)
(a) $\sqrt{31}$ cm
(b) $\sqrt{29}$ cm
(c) 31 cm
(d) 29 cm

107. Which of the following options contains the sides of a right angled triangle ? **(Based On Cosine Rule)**
(a) 13, 14, 15
(b) 12, 35, 37
(c) 13, 15, 24
(d) None of these

108. The size of $\angle$C of ΔABC, if a = $2\sqrt{3}$ cm, b = 3 cm, c = $\sqrt{3}$ cm is :
(Based On Cosine Rule)
(a) 90^0
(b) 60^0
(c) 30^0
(d) None of these

109. The size of $\angle$C of ΔABC, if a = 11 cm, b = 60 cm, c = 61 cm is :
(Based On Cosine Rule)
(a) 90^0
(b) 60^0
(c) 30^0
(d) None of these

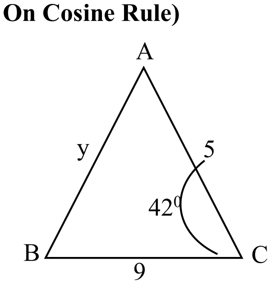
110. In ΔABC we have AC = 3 cm, BC = $\sqrt{5}$ cm, $\angle$A = 45^0. The length of the side AB is : **(Based On Cosine Rule)**
(a) $\sqrt{3}$ cm
(b) $3\sqrt{3}$ cm
(c) $\sqrt{2}$ cm or $2\sqrt{2}$ cm
(d) $\sqrt{3}$ cm or $3\sqrt{3}$ cm

111. The length of a diagonal of a rectangle is 32 cm, and the angle between the diagonals is 135^0. The length of the sides of rectangle are :
(Based On Cosine Rule)
(a) $4\sqrt{3-\sqrt{3}}$ cm and $4\sqrt{3+\sqrt{3}}$ cm
(b) $16\sqrt{2-\sqrt{2}}$ cm and $16\sqrt{2+\sqrt{2}}$ cm
(c) 4 cm and 16 cm
(d) None of these

112. The incentre of a right angled triangle is at distance $\sqrt{5}$ and $\sqrt{10}$ from the two ends of the hypotenuse. The length of the hypotenuse is :
(Based On Cosine Rule)
(a) 5 cm
(b) 10 cm
(c) 15 cm
(d) 7.5 cm

113. The incentre of ΔABC is at distance 7 and $3\sqrt{3}$ from the points A and B. If the angle at point C is 120^0, the length of the side AB is :
(Based On Cosine Rule)
(a) $\sqrt{139}$ cm
(b) $\sqrt{129}$ cm
(c) $\sqrt{119}$ cm
(d) None of these

114. Calculate the length y of the side in the triangle below : **(Based On Cosine Rule)**



(a) 5.25
(b) 4
(c) 6.25
(d) None of these

115. A ship sails from harbour and travels 25 km on a bearing of 30^0 before reaching a marker bouy. At this point the ship turns and follows a course on a bearing of 90^0 and travels for 32 km until it reaches an island. On the return journey, the ship is able to take the most direct route back to the harbour. The total distance travelled by the ship is : **(Based On Cosine Rule)**

(a) 105 km
(b) 95 km
(c) 112 km
(d) 130 km

116. If the angles of a triangle ABC are in AP, then : **(Based On Cosine Rule)**

(a) $c^2 = a^2 + b^2 + ab$
(b) $a^2 + c^2 - ac = b^2$
(c) $c^2 = a^2 + b^2$
(d) None of these

117. If a = 4, b = 3 and A = 60^0, then c is a root of the equation : **(Based On Cosine Rule)**

(a) $x^2 - 3x - 7 = 0$
(b) $x^2 + 3x + 7 = 0$
(c) $x^2 - 3x + 7 = 0$
(d) $x^2 + 3x - 7 = 0$

118. If p_1, p_2, p_3 are the altitudes of a triangle from the vertices A, B C and Δ, the area of the triangle, $\frac{1}{p_1}+\frac{1}{p_2}+\frac{1}{p_3} = \frac{ab(1+k)}{\Delta(a+b+c)}$, then k is equal to :
(Based On Cosine Rule)

(a) Cos C
(b) Cos A
(c) Cos B
(d) None of these

119. In a ΔABC, 2ac $\sin\frac{A-B+C}{2}$ is equal to : **(Based On Cosine Rule)**

(a) $a^2 + b^2 - c^2$
(b) $c^2 + a^2 - b^2$
(c) $b^2 - c^2 - a^2$
(d) $c^2 - a^2 - b^2$

120. In a triangle the length of two larger sides are 10 and 9 respectively. If the angles are in A. P., then the third side can be :
(Based On Cosine Rule)

(a) $5 \pm \sqrt{6}$
(b) $5 - \sqrt{6}$
(c) $3\sqrt{3}$
(d) 5

121. In a ΔABC if b = 20, c = 21 and sin A = $\frac{3}{5}$, then a = **(Based On Cosine Rule)**

(a) 12
(b) 13
(c) 14
(d) 15

122. In a ΔABC, $\frac{b+c}{11} = \frac{c+a}{12} = \frac{a+b}{13}$, then cos C = **(Based On Cosine Rule)**

(a) $\frac{5}{7}$
(b) $\frac{7}{5}$
(c) $\frac{16}{17}$
(d) $\frac{17}{36}$

123. The sides of a triangle are $\sqrt{3}+1$ and $\sqrt{3}-1$ and the included angle is 60^0. The difference of the remaining angles is :
(Mixed Applications of Sine & Cosine Rule)

(a) 30^0
(b) 45^0
(c) 60^0
(d) 90^0

124. If two sides of a triangle and the included angle are given by a = $(1+\sqrt{3})$ cm, b = 2 cm, C = 60^0, the other two angles are :
(Mixed Applications of Sine & Cosine Rule)

(a) 90^0, 30^0
(b) 75^0, 45^0
(c) 60^0, 60^0
(d) None of these

125. In the previous Q., the third side is ;
(Mixed Applications of Sine & Cosine Rule)

(a) $\sqrt{6}$ cm
(b) 6 cm
(c) 9 cm
(d) None of these

126. If $b^2 + c^2 = 3a^2$, then cot B + cot C – cot A =
(Mixed Applications of Sine & Cosine Rule)

(a) 1
(b) $\frac{ab}{4\Delta}$
(c) 0
(d) $\frac{ac}{4\Delta}$

127. In a triangle ABC, B = 45^0, a = $2(\sqrt{3}+1)$ and area of ΔABC = 6 + $2\sqrt{3}$ square units, then the side b is equal to
(Based On Area Of Triangle)

(a) $\frac{\sqrt{3}+1}{\sqrt{2}}$
(b) 4
(c) $\sqrt{2}(\sqrt{3}+1)$
(d) None of these

128. In any ΔABC, the expression $\frac{(a+b+c)(b+c-a)(c+a-b)(a+b-c)}{4b^2c^2}$ is equal to :
(Based On Area Of Triangle)

(a) Cos^2A
(b) Sin^2A
(c) 1 – cosA
(d) 1 + cos A

129. In any ΔABC, the expression (a + b +c) (a + b – c) (b + c – a) (c + a – b) is equal to :
(Based On Area Of Triangle)
(a) 16 Δ
(b) 4 Δ^2
(c) 4 Δ
(d) None of these

130. If x,y,z are perpendiculars drawn from the vertices of a triangle having sides a, b and c, then $\frac{bx}{c}+\frac{cy}{a}+\frac{az}{b}=$
(Based On Area Of Triangle)
(a) $\frac{a^2+b^2+c^2}{2R}$
(b) $\frac{a^2+b^2+c^2}{R}$
(c) $\frac{a^2+b^2+c^2}{4R}$
(d) $\frac{2(a^2+b^2+c^2)}{R}$

131. In an equilateral triangle of each side $2\sqrt{3}$ cm, the radius of the circumcircle is : **(Based On Area Of Triangle)**
(a) 2 cm
(b) 1 cm
(c) $\sqrt{3}$ cm
(d) $2\sqrt{3}$ cm

132. A pole stands vertically inside a triangular partk ABC. If the angle of elevation of the top of the pole from each corner of the park is same, then in ΔABC, the foot of the pole is at the :
(a) Centroid
(b) Circumcentre
(c) Incentre
(d) Orthocentre

133. A man from the top of a 100 m high tower sees a car moving towards the tower at an angle of depression of 30^0. After some time, the angle of depression becomes 60^0. the distance (in metres) travelled by the car during this time is :
(a) 100 $\sqrt{3}$
(b) $\frac{200\sqrt{3}}{3}$
(c) $\frac{100\sqrt{3}}{3}$
(d) $200\sqrt{3}$

134. The value of k for which $(\cos x + \sin x)^2$ + k sin x cos x – 1 = 0 is an identity is :
(a) – 1
(b) – 2
(c) 0
(d) 1

135. Which of the following pieces of data does not uniquely determine an acute angled triangle ABC (R being the radius of the circumcircle)?
(a) a, sinA, sinB
(b) a, b, c
(c) a, sinB, R
(d) a, sinA, R.

The value of $\frac{1-\tan^2 15^0}{1+\tan^2 15^0}=$
136. (a) 1
(b) $\sqrt{3}$
(c) $\frac{\sqrt{3}}{2}$
(d) 2

137. $\cos^2\frac{\pi}{12}+\cos^2\frac{\pi}{4}+\cos^2\frac{5\pi}{12}$ is equal to :
(a) $\frac{2}{3+\sqrt{3}}$
(b) $\frac{2}{3}$
(c) $\frac{3+\sqrt{3}}{2}$
(d) $\frac{2}{3}$

138. If tanA + cotA = 4, then $\tan^4$A + $\cot^4$A is equal to :
(a) 110
(b) 191
(c) 80
(d) 194

139. If $\tan\theta+\sec\theta=e^x$, then $\cos\theta$ equals :
(a) $\frac{e^x+e^{-x}}{2}$
(b) $\frac{2}{e^x+e^{-x}}$
(c) $\frac{e^x-e^{-x}}{2}$
(d) $\frac{e^x-e^{-x}}{e^x+e^{-x}}$

140. In a ΔABC, if $a^2+b^2+c^2$ – ab – bc – ca = 0, then $\sin^2$A + $\sin^2$B + $\sin^2$C =
(a) $\frac{4}{9}$
(b) $\frac{9}{4}$
(c) $3\sqrt{3}$
(d) 1

141. In a triangle ABC, medians AD and BE are drawn. If AD = 4, $\angle DAB = \frac{\pi}{6}$ and $\angle ABE = \frac{\pi}{3}$, then the area of the triangle ABC is :

(a) $\frac{64}{3}$

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

(c) $\frac{32}{3}$

(d) $\frac{32}{3\sqrt{3}}$

142. The upper $\left(\frac{3}{4}\right)$th portion of a vertical pole subuends an angle $\tan^{-1}\left(\frac{3}{5}\right)$ at a point in the horizontal plane through it's foot and at a distance 40 m from the foot. A possible height of the vertical pole is :

[Hint : Use the formula $\tan(\theta+\alpha) = \frac{\tan\theta + \tan\alpha}{1-\tan\alpha+\tan\theta}$]

(a) 60 m
(b) 20 m
(c) 40 m
(d) 80 m

143. If θ and ϕ are acute angles, $\sin\theta = \frac{1}{2}.\cos\phi = \frac{1}{3}$, then the value of $\theta + \phi$ lies in :

(a) $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$

(b) $\left(\frac{\pi}{3}, \frac{2\pi}{3}\right)$

(c) $\left(\frac{2\pi}{3}, \frac{5\pi}{6}\right)$

(d) $\left(\frac{5\pi}{6}, \pi\right)$

144. The sides of a triangle are in the ratio 1 : $\sqrt{3}$: 2, the angles of the triangle are in the ratio :
(a) 1 : 3 : 5
(b) 2 : 3 : 4
(c) 3 : 2 : 1
(d) 1 : 2 : 3

145. A person standing on the bank of a river observes that the angle of elevation of the top of a tree on the opposite bank of the river is 60^0 and when he retires 40 metres away from the tree the angle of elevation becomes 30^0. The breadth of the river is :
(a) 20 m
(b) 30 m
(c) 40 m
(d) 60 m

146. If the roots of the quadratic equation $x^2 + px + q = 0$ are tan 30^0 and tan 15^0, then the value of $2 + q - p$ is
(a) 1
(b) 2
(c) 3
(d) 0

147. A tower stands at the centre of a circular park. A and B are two points on the boundary of the park such that AB (= a) subtends an angle of 60^0 at the foot of the tower, and the angle of elevation of the top of the tower from A or B is 30^0. The height of the tower is :

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

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

(c) $\frac{a}{\sqrt{3}}$

(d) $a\sqrt{3}$

148. AB is a vertical pole with B at the ground level and A at the top. A man finds that the angle of elevation of the point A from a certain point C on the ground is 60^0. He moves away from the pole along the line BC to a point D such that CD = 7 m. From D the angle of elevation of the point A is 45^0. then the height of the pole is :

(a) $\frac{7\sqrt{3}}{2(\sqrt{3}-1)}$ m

(b) $\frac{7\sqrt{3}}{2}(\sqrt{3}+1)$ m

(c) $\frac{7\sqrt{3}}{2}(\sqrt{3}-1)$ m

(d) $\frac{7\sqrt{3}}{2(\sqrt{3}+1)}$ m

1. (b)
2. (b)
3. (b)
4. (a)
5. (d)
6. (a)
7. (b)
8. (b)
9. (d)
10. (a)
11. (b)
12. (c)
13. (c)
14. (a)
15. (b)
16. (c)
17. (a)
18. (c)
19. (d)
20. (c)
21. (b)
22. (c)
23. (a)
24. (b)
25. (c)
26. (d)
27. (b)
28. (a)
29. (d)
30. (a)
31. (d)
32. (b)
33. (c)
34. (a)
35. (c)
36. (a)
37. (c)
38. (d)
39. (b)
40. (d)
41. (b)
42. (d)
43. (b)
44. (a)
45. (c)
46. (a)
47. (c)
48. (b)
49. (a)
50. (a)
51. (b)
52. (a)
53. (b)
54. (d)
55. (c)
56. (c)
57. (a)
58. (b)
59. (a)
60. (a)
61. (d)
62. (b)
63. (c)
64. (d)
65. (c)
66. (a)
67. (d)
68. (a)
69. (d)
70. (b)
71. (a)
72. (a)
73. (a)
74. (b)
75. (c)
76. (d)
77. (d)
78. (b)
79. (a)
80. (b)
81. (a)
82. (b)
83. (a)
84. (a)
85. (a)
86. (a)
87. (b)
88. (a)
89. (b)
90. (a)
91. (a)
92. (c)
93. (a)
94. (c)
95. (b)
96. (c)
97. (b)
98. (a)
99. (c)
100. (b)
101. (d)
102. (a)
103. (a)
104. (c)
105. (c)
106. (a)
107. (b)
108. (c)
109. (a)
110. (c)
111. (b)
112. (a)
113. (a)
114. (c)
115. (b)
116. (b)
117. (a)
118. (a)
119. (b)
120. (a)
121. (b)
122. (a)
123. (d)
124. (d)
125. (b)
126. (c)

127.(b)
128.(b)
129.(d)
130.(a)
131.(a)
132.(b)
133.(b)
134.(b)
135.(d)
136.(c)
137.(d)
138.(d)
139.(b)
140.(b)
141.(d)
142.(c)
143.(b)
144.(d)
145.(a)
146.(c)
147.(c)
148.(b)