TRIGONOMETRY-04

CONCEPT OF
COMPLEMENTARY ANGLES

BY ADITYA RANJAN

Maths By Aditya Ranjan

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SSC CGL 19 Maths-227/200
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TRIGONOMETRY (Practice Sheet – 4)

If $\alpha + \beta = 90^\circ$, then

$\tan\alpha \times \tan\beta = 1$, $\sin\alpha \times \sec\beta = 1$, $\cos\alpha \times \operatorname{cosec}\beta = 1$

1. $\tan 10^\circ . \tan 80^\circ = ?$
   (a) 1 (b) – 1
   (c) 0 (d) 2
2. $\tan 39^\circ . \tan 43^\circ . \tan 47^\circ . \tan 51^\circ = ?$
   (a) 1 (b) – 1
   (c) 0 (d) 2
3. $\tan 10^\circ . \tan 20^\circ . \tan 30^\circ . \tan 40^\circ . \tan 50^\circ . \tan 70^\circ . \tan 80^\circ = ?$
   (a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$
   (c) 1 (d) 0
4. $\tan 1^\circ . \tan 2^\circ . \tan 3^\circ ..... \tan 88^\circ . \tan 89^\circ = ?$
   (a) 1 (b) – 1
   (c) 0 (d) 2
5. $\tan 1^\circ . \tan 3^\circ . \tan 5^\circ ..... \tan 87^\circ . \tan 89^\circ = ?$
   (a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$
   (c) 1 (d) 0
6. $\tan 5^\circ . \tan 10^\circ . \tan 15^\circ ..... \tan 80^\circ . \tan 85^\circ = ?$
   (a) 1 (b) – 1
   (c) 0 (d) 2
7. If $\tan A . \tan B = 1$, then $A + B = ?$
   (a) 60° (b) 90°
   (c) 30° (d) 120°
8. If $\tan\theta . \tan 2\theta = 1$, then $\sin 3\theta = ?$
   (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$
   (c) 1 (d) 0
9. If $\tan 3\theta . \tan 6\theta = 1$, then $\sin 3\theta + \cos 3\theta = ?$
   (a) $\frac{1+\sqrt{3}}{2}$ (b) $\frac{1-\sqrt{3}}{2}$
   (c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$
10. If $\tan(x + y).\tan(x - y) = 1$, then $\sin x + \cos x = ?$
    (a) 1 (b) $\sqrt{2}$
    (c) 0 (d) – 1
11. If $\tan(\alpha + 2\beta).\tan(\alpha - 2\beta) = 1$, then $\tan\alpha + \cot\alpha = ?$
    (a) 1 (b) – 1
    (c) 0 (d) 2
12. If $\tan(x + 3y).\tan(x - 3y) = 1$, then $\cos x = ?$
    (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$
    (c) 1 (d) 0
13. If $\tan 37^\circ . \tan\theta = 1$, then $\theta = ?$
    (a) 53° (b) 43°
    (c) 63° (d) 90°
14. If $\tan\frac{\pi}{12} . \tan\theta = 1$, then $\theta = ?$
    (a) $\frac{3\pi}{10}$ (b) $\frac{5\pi}{12}$
    (c) $\frac{7\pi}{12}$ (d) $\frac{\pi}{12}$
15. $\tan\frac{\pi}{12} . \tan\frac{5\pi}{12} = ?$
    (a) 1 (b) – 1
    (c) 0 (d) 2
16. $\tan\frac{\pi}{10} . \tan\frac{2\pi}{10} . \tan\frac{3\pi}{10} \tan\frac{4\pi}{10} = ?$
    (a) 1 (b) – 1
    (c) 0 (d) 2
17. $\tan\frac{\pi}{20} . \tan\frac{3\pi}{20} . \tan\frac{7\pi}{20} . \tan\frac{9\pi}{20} = ?$
    (a) 1 (b) – 1
    (c) 0 (d) 2

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18. If $\tan A.\ \tan B = 1$, then $\sin^2 A + \sin^2 B$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

19. If $\tan\alpha.\ \tan\beta = 1$, then $\frac{\sin\alpha}{\cos\beta}$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

20. If $\tan x.\ \tan y = 1$, then $\frac{\sec x}{\text{cosec}\, y}$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

21. $\cot 10°.\ \cot 80°$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

22. $\cot 39°.\ \cot 43°.\ \cot 47°.\ \cot 51°$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

23. $\cot 10°.\ \cot 20°.\ \cot 30°.\ \cot 40°.\ \cot 50°.\ \cot 70°.\ \cot 80°$ = ?

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$
(c) 1 (d) 0

24. $\cot 1°.\ \cot 2°.\ \cot 3°$.....$\cot 88°.\ \cot 89°$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

25. $\cot 1°.\ \cot 3°.\ \cot 5°$.....$\cot 87°.\ \cot 89°$ = ?

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$
(c) 1 (d) 0

26. $\cot 5°.\cot 10°.\cot 15°$.....$\cot 80°.\cot 85°$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

27. $4\ \cot A.\ \cot B = 1$, then A + B = ?

(a) 60° (b) 90°
(c) 30° (d) 120°

28. If $\cot\theta.\cot 2\theta = 1$, then $\sin 3\theta$ = ?

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

29. If $\cot 3\theta.\cot 6\theta = 1$, then $\sin 3\theta + \cos 3\theta$ = ?

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

30. If $\cot(x + y).\cot(x - y) = 1$, then $\sin x + \cos x$ = ?

(a) 1 (b) $\sqrt{2}$
(c) 0 (d) – 1

31. If $\cot(\alpha + 2\beta).\cot(\alpha - 2\beta) = 1$, then $\cot\alpha + \cot\alpha$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

32. If $\cot(x + 3y).\cot(x - 3y) = 1$, then $\cos x$ = ?

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

33. If $\cot 37°.\ \cot\theta = 1$, then θ = ?

(a) 53° (b) 43°
(c) 63° (d) 90°

34. If $\cot\frac{\pi}{12}.\cot\theta = 1$, then θ = ?

(a) $\frac{3\pi}{10}$ (b) $\frac{5\pi}{12}$
(c) $\frac{7\pi}{12}$ (d) $\frac{\pi}{12}$

35. $\cot\frac{\pi}{12}.\cot\frac{5\pi}{12}$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

36. $\cot\frac{\pi}{10}.\ \cot\frac{2\pi}{10}.\cot\frac{3\pi}{10}.\ \cot\frac{4\pi}{10}$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

37. $\cot\frac{\pi}{20}.\cot\frac{3\pi}{20}.\cot\frac{7\pi}{20}.\cot\frac{9\pi}{20}$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

38. If $\cot A.\ \cot B = 1$, then $\sin^2 A + \sin^2 B$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

39. If $\cot\alpha.\ \cot\beta = 1$, then $\frac{\sin\alpha}{\cos\beta}$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

40. If $\cot x.\cot y = 1$, then $\frac{\sec x}{\text{cosec}\, y}$ = ?

(a) 1 (b) – 1
(c) 0 (d) 2

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41. If $\sin(\theta + 10°) = \cos(\theta + 20°)$, then θ = ?
(a) 30° (b) 40°
(c) 50° (d) 60°

42. If $\sin(\theta - 10°) = \cos(\theta - 20°)$, then θ = ?
(a) 30° (b) 40°
(c) 50° (d) 60°

43. If $\tan(x + 5°) = \cot(x + 5°)$, then x = ?
(a) 30° (b) 40°
(c) 50° (d) 60°

44. If $\sec(x + 25°) = \operatorname{cosec}(x + 5°)$, then x = ?
(a) 30° (b) 40°
(c) 50° (d) 60°

45. If $\cot(x - 5°) = \tan(x - 25°)$, then x = ?
(a) 30° (b) 40°
(c) 50° (d) 60°

46. $\frac{\sin 43°}{\cos 47°} + \frac{\cos 47°}{\sin 43°}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

47. $\frac{\tan 39°}{\cot 51°} + \frac{\cot 51°}{\tan 39°}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

48. $\frac{\sec 40°}{\operatorname{cosec} 50°} + \frac{\operatorname{cosec} 50°}{\sec 40°}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

49. $\frac{\sin 20°}{\cos 70°} + \frac{\tan 70°}{\cot 20°} + \frac{\sec 20°}{\operatorname{cosec} 70°}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

50. $\sin 40° . \sec 50°$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

51. $\sin 39° . \sin 40° . \sec 50° . \sec 51°$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

52. $\sin \frac{\pi}{12} \sec \frac{5\pi}{12}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

53. $\sin \frac{\pi}{20} \sin \frac{3\pi}{20} \sec \frac{7\pi}{20} \sec \frac{9\pi}{20}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

54. $\cos 39° . \operatorname{cosec} 51°$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

55. $\cos 20° . \operatorname{cosec} 50° . \cos 40° . \operatorname{cosec} 70°$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

56. $\cos \frac{\pi}{12} \operatorname{cosec} \frac{5\pi}{12}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

57. $\cos \frac{\pi}{30} \cos \frac{4\pi}{30} \operatorname{cosec} \frac{11\pi}{30} \operatorname{cosec} \frac{14\pi}{30}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

58. If $\sin \frac{\pi}{15} \sec\theta = 1$, then θ = ?
(a) $\frac{13\pi}{30}$ (b) $\frac{\pi}{5}$
(c) $\frac{11\pi}{20}$ (d) $\frac{14\pi}{15}$

59. If $\sin\theta . \sec 35° = 1$, then θ = ?
(a) 55° (b) 25°
(c) 45° (d) 65°

60. If $\cos\theta . \operatorname{cosec} 65° = 1$, then θ = ?
(a) 55° (b) 25°
(c) 45° (d) 65°

61. If $\cos \frac{\pi}{20} . \operatorname{cosec}\theta = 1$, then θ = ?
(a) $\frac{13\pi}{20}$ (b) $\frac{\pi}{5}$
(c) $\frac{9\pi}{20}$ (d) $\frac{14\pi}{15}$

62. If $\sin\alpha . \sec\beta = 1$, then $\tan\alpha . \tan\beta$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

63. If $\cos x . \operatorname{cosec} y = 1$, then $\cot x . \cot y$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

64. If $\sin A . \sec B = 1$, then $\frac{\tan A}{\cot B}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

65. If $\sin A . \sec B = 1$, then $\cos A . \operatorname{cosec} B$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

66. If $\cos\alpha . \operatorname{cosec}\beta = 1$, then $\sin\alpha . \sec\beta$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

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67. If $\tan 4\theta = \cot(2\theta + 30^\circ)$, then θ is equal to :
SSC CGL 11 June 2019 (Morning)
(a) 15° (b) 10°
(c) 20° (d) 25°

68. If $\sin\theta = \cos(50^\circ + \theta)$, then θ is equal to :
SSC CGL 11 June 2019 (Afternoon)
(a) 20° (b) 25°
(c) 30° (d) 35°

69. If $\sin 5\theta = \cos(50^\circ - 3\theta)$, then θ is equal to :
SSC CGL 11 June 2019 (Morning)
(a) 20° (b) 25°
(c) 30° (d) 15°

70. If $\tan 4\theta = \cot(40^\circ - 2\theta)$, then θ is equal to :
SSC CGL 12 June 2019 (Morning)
(a) 20° (b) 25°
(c) 35° (d) 40°

71. If $\text{cosec}\, 3\theta = \sec(20^\circ + 2\theta)$, then θ is equal to :
SSC CGL 12 June 2019 (Afternoon)
(a) 30° (b) 20°
(c) 15° (d) 14°

72. If $\text{cosec}\, 4\theta = \sec(60^\circ - 2\theta)$, then θ is equal to :
SSC CGL 12 June 2019 (Evening)
(a) 18° (b) 22°
(c) 15° (d) 20°

73. If $\sin 3\theta = \cos(20^\circ - \theta)$, then θ is equal to :
SSC CGL 13 June 2019 (Morning)
(a) 25° (b) 35°
(c) 28° (d) 30°

74. If $\text{cosec}\, 2\theta = \sec(3\theta - 15^\circ)$, then θ is equal to :
SSC CGL 13 June 2019 (Afternoon)
(a) 22° (b) 20°
(c) 25° (d) 21°

75. If $\tan x = \cot(45^\circ + 2x)$, then x is equal to :
SSC CGL 12 June 2019 (Evening)
(a) $\frac{45^\circ}{2}$ (b) 20°
(c) 15° (d) 45°

76. If $\tan x = \cot(60^\circ + 6x)$, then what is the value of x ?
SSC CHSL 3 July 2019 (Evening)
(a) 10° (b) $\frac{30^\circ}{7}$
(c) $\frac{15^\circ}{2}$ (d) 12°

77. If $\tan x = \cot(65^\circ + 9x)$, then what is the value of x ?
SSC CHSL 4 July 2019 (Afternoon)
(a) 2.5° (b) 1°
(c) 2° (d) 1.5°

78. If $\tan 3x = \cot(30^\circ + 2x)$, then what is the value of x ?
SSC CPO 2018 12 March 2019 (Evening)
(a) 18° (b) 12°
(c) 10° (d) 15°

79. If $\sec 2x = \text{cosec}(3x - 45^\circ)$, then x is equal to :
SSC CPO 2018 13 March 2019 (Evening)
(a) 40° (b) 45°
(c) 27° (d) 35°

80. If $\tan x = \cot(45^\circ + 2x)$, then what is the value of x ?
SSC CPO 2018 12 March 2019 (Morning)
(a) 45° (b) 15°
(c) $\frac{45^\circ}{2}$ (d) 20°

81. If $\sin x - \cos x = 0$, then the value of $(\sin^3 x - \cos^3 x)$ is :
SSC CHSL 13/10/2020 (Evening)
(a) 0 (b) 2
(c) 1 (d) 4

82. If $\sin x - \cos x = 0$, $0^\circ < x < 90^\circ$, then the value of $(\sec x + \text{cosec}\, x)^2$ is :
SSC CHSL 15/10/2020 (Morning)
(a) 8 (b) 4
(c) 10 (d) 6

83. If $\tan 4A = \cot(A - 20^\circ)$, $0^\circ < \theta < 90^\circ$, then the value of A is :
SSC CHSL 16/10/2020 (Afternoon)
(a) 22° (b) 80°
(c) 5° (d) 14°

84. If $\cos 3\theta = \sin(\theta - 34^\circ)$, then the value of θ as an acute angle is :
SSC CHSL 20/10/2020 (Morning)
(a) 34° (b) 31°
(c) 56° (d) 17°

85. If θ is a positive acute angle and $\tan 2\theta \cdot \tan 3\theta = 1$, then the value of θ is :
SSC CHSL 20/10/2020 (Afternoon)
(a) 45° (b) 18°
(c) 60° (d) 36°

86. If $\cot A = \tan(2A - 45^\circ)$, A is an acute angle then $\tan A$ is equal to :
SSC CHSL 20/10/2020 (Evening)
(a) $\frac{1}{2}$ (b) 0
(c) $\sqrt{3}$ (d) 1

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87. If $\sin 7x = \cos 11x$, $0° < x < 90°$, then the value of $\tan 9x$ is :
SSC CHSL 20/10/2020 (Morning)

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

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

88. If $\sin 3A = \cos(A+10°)$, where $3A$ is an acute angle then what is the value of $2\,\text{cosec}\frac{3A}{2} + 6\tan^2 3A - \frac{3}{2}\tan^2 3A$?
SSC CGL 2019 Tier-II (15/10/2020)

(a) $\frac{7}{4}$ (b) $\frac{35}{2}$

(c) $\frac{17}{2}$ (d) 5

89. If $\sec 3x = \text{cosec}(3x - 45°)$, where $3x$ is an acute angle, then x is equal to :
SSC CPO 23/11/2020 (Evening)

(a) 35° (b) 27.5°
(c) 22.5° (d) 45°

90. If $\sec 3x = \text{cosec}(3x + 45°)$, $0° < 3x < 90°$, then x is equal to :
SSC CPO 23/11/2020 (Evening)

(a) 7.5° (b) 5.5°
(c) 2.5° (d) 10.5°

91. If 4θ is is an acute angle and $\cot 4\theta = \tan(\theta - 5°)$, then what is the value of θ?
SSC CPO 24/11/2020 (Evening)

(a) 45° (b) 19°
(c) 21° (d) 24°

If $\alpha + \beta = 90°$, then
$\sin^2\alpha + \sin^2\beta = 1$ &
$\cos^2\alpha + \cos^2\beta = 1$

92. $\sin^2 43° + \sin^2 47° = ?$
(a) 0 (b) 1
(c) 2 (d) 3

93. $\sin^2 39° + \sin^2 49° + \sin^2 41° + \sin^2 51° = ?$
(a) 0 (b) 1
(c) 2 (d) 3

94. $\sin^2 1° + \sin^2 2° + \sin^2 3° \ldots\ldots\ldots + \sin^2 88° + \sin^2 89° = ?$

(a) $\frac{45}{2}$ (b) 44

(c) $\frac{89}{2}$ (d) $\frac{25}{2}$

95. $\sin^2 1° + \sin^2 3° + \sin^2 5° \ldots\ldots\ldots + \sin^2 89° = ?$

(a) $\frac{45}{2}$ (b) 44

(c) $\frac{89}{2}$ (d) $\frac{25}{2}$

96. $\sin^2 2° + \sin^2 4° + \sin^2 6° \ldots\ldots\ldots + \sin^2 88° = ?$

(a) $\frac{45}{2}$ (b) 22

(c) $\frac{89}{2}$ (d) $\frac{25}{2}$

97. $\sin^2 5° + \sin^2 10° + \ldots\ldots + \sin^2 85° + \sin^2 90° = ?$

(a) $\frac{45}{2}$ (b) 44

(c) $\frac{19}{2}$ (d) $\frac{25}{2}$

98. $\sin^2\frac{\pi}{12} + \sin^2\frac{5\pi}{12} = ?$
(a) 0 (b) 1
(c) 2 (d) 3

99. $\sin^2\frac{\pi}{20} + \sin^2\frac{3\pi}{20} + \sin^2\frac{7\pi}{20} + \sin^2\frac{9\pi}{20} = ?$
(a) 0 (b) 1
(c) 2 (d) 3

100. If $\sin^2\theta + \sin^2 57° = 1$, then $\theta = ?$
(a) 23° (b) 33°
(c) 34° (d) 53°

101. If $\sin^2\frac{\pi}{10} + \sin^2\theta = 1$, then $\theta = ?$

(a) $\frac{2\pi}{5}$ (b) $\frac{4\pi}{5}$

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

102. If $\sin^2\theta + \sin^2 2\theta = 1$, then $\sin\theta \cdot \sin 2\theta = ?$

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

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

103. If $\sin^2(x - y) + \sin^2(x + y) = 1$, then $\sin x + \cos x = ?$

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

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

104. If $\sin^2(\alpha + 2\beta) + \sin^2(\alpha - 2\beta) = 1$, then $\tan\alpha = ?$
(a) 0 (b) 1
(c) 2 (d) 3

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105. If $\sin^2\alpha + \sin^2\beta = 1$, then $\tan\alpha.\tan\beta$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

106. If $\sin^2 x + \sin^2 y = 1$, then $\cot x.\ \cot y$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

107. If $\sin^2 A + \sin^2 B = 1$, then $\frac{\sin A}{\cos B}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

108. If $\sin^2\alpha + \sin^2\beta = 1$, then $\sin\alpha.\sec\beta$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

109. If $\sin^2 x + \sin^2 y = 1$, then $\cos x.\ \text{cosec}\, y$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

110. If $\sin^2 A + \sin^2 B = 1$, then $\frac{\tan A}{\cot B}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

111. If $\sin^2\alpha + \sin^2\beta = 1$, then $\frac{\cos A}{\sin B}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

112. If $\sin^2\alpha + \sin^2\beta = 1$, then $\frac{\sec\pi}{\text{cosec}\,\pi}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

113. If $\sin^2 3\theta + \sin^2 6\theta = 1$, then $\tan 3\theta$ = ?
(a) $\frac{\sqrt{3}}{4}$ (b) $\frac{\sqrt{3}}{2}$
(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

114. $\cos^2 43° + \cos^2 47°$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

115. $\cos^2 39° + \cos^2 49° + \cos^2 41° + \cos^2 51°$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

116. $\cos^2 1° + \cos^2 2° + \cos^2 3° \ldots\ldots\ldots + \cos^2 88° + \cos^2 89°$ = ?
(a) $\frac{45}{2}$ (b) 44
(c) $\frac{89}{2}$ (d) $\frac{25}{2}$

117. $\cos^2 1° + \cos^2 3° + \cos^2 5° \ldots\ldots\ldots + \cos^2 89°$ = ?
(a) $\frac{45}{2}$ (b) 44
(c) $\frac{89}{2}$ (d) $\frac{25}{2}$

118. $\cos^2 2° + \cos^2 4° + \cos^2 6° \ldots\ldots\ldots + \cos^2 88°$ =?
(a) $\frac{45}{2}$ (b) 22
(c) $\frac{89}{2}$ (d) $\frac{25}{2}$

119. $\cos^2 5° + \cos^2 10° + \ldots\ldots + \cos^2 85° + \cos^2 90°$ = ?
(a) $\frac{45}{2}$ (b) 44
(c) $\frac{19}{2}$ (d) $\frac{25}{2}$

120. $\cos^2\frac{\pi}{12} + \cos^2\frac{5\pi}{12}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

121. $\cos^2\frac{\pi}{20} + \cos^2\frac{3\pi}{20} + \cos^2\frac{7\pi}{20} + \cos^2\frac{9\pi}{20}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

122. If $\cos^2\theta + \cos^2 57° = 1$, then θ = ?
(a) 23° (b) 33°
(c) 34° (d) 53°

123. If $\cos^2\frac{\pi}{10} + \cos^2\theta = 1$, then θ = ?
(a) $\frac{2\pi}{5}$ (b) $\frac{4\pi}{5}$
(c) $\frac{3\pi}{5}$ (d) $\frac{\pi}{5}$

124. If $\cos^2\theta + \cos^2 2\theta = 1$, then $\cos\theta.\cos 2\theta$ = ?
(a) $\frac{\sqrt{3}}{4}$ (b) $\frac{\sqrt{3}}{2}$
(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

125. If $\cos^2(x - y) + \cos^2(x + y) = 1$, then $\cos x + \cos x$ = ?
(a) $\frac{\sqrt{3}}{4}$ (b) $\sqrt{2}$
(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

126. If $\cos^2(\alpha + 2\beta) + \cos^2(\alpha - 2\beta) = 1$, then $\tan\alpha$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

127. If $\cos^2\alpha + \cos^2\beta = 1$, then $\tan\alpha.\tan\beta$ = ?
(a) 0 (b) 1
(c) 2
(d) 3

Maths by Aditya Ranjan sir

128. If $\cos^2 x + \cos^2 y = 1$, then $\cot x.\cot y$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

129. If $\cos^2 A + \cos^2 B = 1$, then $\frac{\cos A}{\cos B}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

130. If $\cos^2\alpha + \cos^2\beta = 1$, then $\cos\alpha.\sec\beta$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

131. If $\cos^2 x + \cos^2 y = 1$, then $\cos x.\text{cosec}\, y$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

132. If $\cos^2 A + \cos^2 B = 1$, then $\frac{\tan A}{\cot B}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

133. If $\cos^2\alpha + \cos^2\beta = 1$, then $\frac{\cos A}{\cos B}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

134. If $\cos^2\alpha + \cos^2\beta = 1$, then $\frac{\sec\alpha}{\text{cosec}\beta}$ = ?
(a) 0 (b) 1
(c) 2 (d) 3

135. If $\cos^2 3\theta + \cos^2 6\theta = 1$, then $\tan 3\theta$ = ?
(a) $\frac{\sqrt{3}}{4}$ (b) $\frac{\sqrt{3}}{2}$
(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

136. The value of $\frac{\sin^2 24^\circ + \sin^2 66^\circ}{\cos^2 24^\circ + \cos^2 66^\circ} + \sin^2 61^\circ + \cos 61^\circ.\sin 29^\circ$ is
SSC CGL 13 June 2019 (Evening)
(a) 3 (b) 1
(c) 2 (d) 0

137. The value of $\frac{(\cos 9^\circ + \sin 81^\circ)(\sec 9^\circ + \text{cosec}\, 81^\circ)}{\sin 56^\circ.\sec 34^\circ + \cos 25^\circ.\text{cosec}\, 65^\circ}$ is :
SSC CHSL 2 July 2019 (Evening)
(a) $\frac{1}{2}$ (b) 4
(c) 2 (d) 1

138. The simplified value of $\frac{\sin^2 25^\circ + \sin^2 65^\circ}{\cos^2 24^\circ + \cos^2 66^\circ} + \sin^2 71^\circ + \cos 71^\circ.\sin 19^\circ$ is
SSC CHSL 2 July 2019 (Afternoon)
(a) 0 (b) 1
(c) 2 (d) 3

139. If $6(\sec^2 59^\circ - \cot^2 31^\circ) + \frac{2}{3}\sin 90^\circ - 3\tan^2 56^\circ$ $y\tan^2 34^\circ = \frac{y}{3}$, then the value of y is
SSC CHSL 5 July 2019 (Afternoon)
(a) $\frac{2}{3}$ (b) $-\frac{2}{3}$
(c) 2 (d) -2

140. If $6(\sec^2 59^\circ - \cot^2 31^\circ) - \frac{2}{3}\sin 90^\circ - 3\tan^2 56^\circ$ $y\tan^2 34^\circ = \frac{y}{3}$, then the value of y is
SSC CHSL 5 July 2019 (Evening)
(a) $\frac{8}{5}$ (b) $-\frac{8}{5}$
(c) $\frac{2}{3}$ (d) $-\frac{2}{3}$

141. If $2(\text{cosec}^2 39^\circ - \tan^2 51^\circ) - \frac{2}{3}\sin 90^\circ - \tan^2 56^\circ$ $y\tan^2 34^\circ = \frac{y}{3}$, then the value of y is:
SSC CHSL 8 July 2019 (Morning)
(a) 1 (b) $\frac{2}{3}$
(c) $-\frac{2}{3}$ (d) -1

142. If $4(\text{cosec}^2 66^\circ - \tan^2 24^\circ) + \frac{1}{2}\sin 90^\circ - 4\tan^2 66^\circ$ $y\tan^2 24^\circ = \frac{y}{2}$, then the value of y is
SSC CHSL 8 July 2019 (Afternoon)
(a) $\frac{1}{2}$ (b) 1
(c) $-\frac{1}{2}$ (d) -1

143. Find the simplified value of $\frac{\sin^3 21^\circ + \cos^3 19^\circ}{\sin 21^\circ + \cos 19^\circ} + \sin^2 69^\circ + \cos^2 71^\circ + \frac{1}{\sec 69^\circ.\text{cosec}\, 71^\circ}$.
SSC CGL 11 June 2019 (Morning)
(a) 3 (b) 1
(c) 4 (d) 2

144. The value of $\frac{\sin^2 24^\circ + \sin^2 66^\circ}{\cos^2 24^\circ + \cos^2 66^\circ} + \sin^2 61^\circ + \cos 61^\circ \sin 29^\circ$ is equal to :
SSC CPO 2018 12 March 2019 (Morning)
(a) 2 (b) 3
(c) 1 (d) 0

Maths by Aditya Ranjan sir

145. The value of

$$\frac{2\sin^2 38^\circ \sec^2 52^\circ + \cos 64^\circ \sin 26^\circ + \sin^2 64^\circ}{\tan^2 23^\circ + \cot^2 23^\circ - \sec^2 67^\circ - \operatorname{cosec}^2 67^\circ}$$ is :

SSC CGL 2019 Tier-II (15/10/2020)

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

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

146. If $x = \sec 57^\circ$, then $\cot^2 33^\circ + \sin^2 57^\circ + \sin^2 33^\circ + \operatorname{cosec}^2 57^\circ \cos^2 33^\circ + \sec^2 33^\circ . \sin^2 57^\circ$ is equal to :

SSC CGL 2019 Tier-II (16/10/2020)

(a) $x^2 + 2$ (b) $2x^2 + 1$

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

147. The value of $\frac{\sin^2 52^\circ + 2 + \sin^2 38^\circ}{4\cos^2 43^\circ - 5 + 4\cos^2 47^\circ}$ is :

SSC CPO 24/11/2020 (Evening)

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

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

148. The value of

$$\left(\sin^2 7\frac{1}{2} + \sin^2 82\frac{1}{2} + \tan^2 2^\circ . \tan^2 88^\circ\right)$$ is :

(a) 1 (b) 2

(c) 0 (d) 4

149. The value of $\sin^2 65^\circ + \sin^2 25^\circ + \cos^2 35^\circ + \cos^2 55^\circ$ is :

(a) 0 (b) 1

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

150. The value of $\sin^2 22^\circ + \sin^2 68^\circ + \cot^2 30^\circ$ is :

(a) 4 (b) 3

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

151. The value of $\sin^2 1^\circ + \sin^2 5^\circ + \sin^2 9^\circ + \ldots\ldots + \sin^2 89^\circ$ is :

(a) $11\frac{1}{2}$ (b) $11\sqrt{2}$

(c) 11 (d) $\frac{11}{\sqrt{2}}$

152. The value of $\sin^2 38^\circ + \sin^2 52^\circ + \sin^2 30^\circ - \tan^2 45^\circ$ is equal to :

(a) 0.5 (b) 0.25

(c) 1 (d) 0.75

$a \sin\theta + b \cos\theta = \sqrt{a^2 + b^2}$

153. If $3\sin\theta + 4\cos\theta = 5$, then $\tan\theta = ?$

(a) $\frac{3}{4}$ (b) $\frac{5}{4}$

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

154. If $5\sin\theta + 12\cos\theta = 13$, then $\tan\theta = ?$

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

(c) $\frac{5}{13}$ (d) $\frac{13}{5}$

155. $2xy \sin\theta + (x^2 - y^2)\cos\theta = x^2 + y^2$, then $\tan\theta = ?$

(a) $\frac{2xy}{x^2 - y^2}$ (b) $\frac{2xy}{x^2 + y^2}$

(c) $\frac{x^2 - y^2}{x^2 + y^2}$ (d) 1

156. If $12\sin\theta + 35\cos\theta = 37$, then $\operatorname{cosec}\theta = ?$

(a) $\frac{12}{37}$ (b) $\frac{37}{12}$

(c) $\frac{35}{37}$ (d) $\frac{12}{35}$

157. $(a^2 - 1)\sin\theta + 2a\cos\theta = a^2 + 1$, then $\tan\theta = ?$

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

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

158. If $10\sin^4\alpha + 15\cos^4\alpha = 6$, then find the value of $27\operatorname{cosec}^6\alpha + 8\sec^6\alpha$.

(a) 150 (b) 125

(c) 200 (d) 250

159. If $15\sin^3\alpha + 20\cos^3\alpha = 12$, then find the value of $10\sin\alpha + 15\cos\alpha$.

(a) 8 (b) 17

(c) 9

(d) None of these

If $a\sin_\theta + b\cos_\theta = x$ & $a\cos_\theta - b\sin_\theta = y$ then $a^2 + b^2 = x^2 + y^2$

Maths by Aditya Ranjan sir

160. If a sinA + b cosA = c, then a cosA – b sinA is equal to :

SSC CHSL 18/03/2020 (Evening)

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

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

161. If 3 sin$x$ + 4 cos$x$ = 2, then the value of 3cos$x$ – 4sin$x$ is equal to :

SSC CGL 2019, Tier-II (18/10/2020)

(a) $\sqrt{21}$ (b) $\sqrt{23}$

(c) 21 (d) $\sqrt{29}$

162. If $2\cos\theta - \sin\theta = \frac{1}{\sqrt{2}}$, $(0° < \theta < 90°)$ the value of $2\sin\theta + \cos\theta$ is :

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

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

163. The climination of θ from $x\cos\theta - y\sin\theta = 2$ and $x\sin\theta + y\cos\theta = 4$ will give

(a) $x^2 + y^2 = 20$ (b) $3x^2 + y^2 = 20$

(c) $x^2 - y^2 = 20$ (d) $3x^2 - y^2 = 20$

164. If $3\sin\theta + 5\cos\theta = 5$, then $5\sin\theta - 3\cos\theta$ is equal to :

(a) ± 3 (b) ± 5

(c) 1 (d) ± 2

165. If $x = a\sin\theta - b\cos\theta$, $y = a\cos\theta + b\sin\theta$, then which of the following is true?

(a) $\frac{x^2}{y^2} + \frac{a^2}{b^2} = 1$

(b) $x^2 + y^2 = a^2 - b^2$

(c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

(d) $x^2 + y^2 = a^2 + b^2$

166. If $p\sec\theta - q\tan\theta = 10$ and $p\tan\theta - q\sec\theta = 8$, then find $p^2 - q^2 + 4$.

(a) 24 (b) 54

(c) 40 (d) 36

167. If $3\,\text{cosec}\,\theta - 7\cot\theta = 3$, then find $3\cot\theta - 7\,\text{cosec}\,\theta$ = ?

(a) ± 3 (b) ± 7

(c) ± 5 (d) ± 2

168. If $\sin\theta + \cos\theta = \frac{17}{13}$, then $\sin\theta - \cos\theta$ = ?

(a) $\pm\frac{17}{7}$ (b) $\pm\frac{13}{7}$

(c) $\pm\frac{7}{17}$ (d) $\pm\frac{7}{13}$

169. If $\sin\theta - \cos\theta = \frac{7}{17}$, then $\sin\theta + \cos\theta$ = ?

(a) $\frac{23}{17}$ (b) $\frac{8}{17}$

(c) $\frac{17}{23}$ (d) $\frac{17}{8}$

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Answer Key

1.(a)	**2.**(a)	**3.**(b)	**4.**(a)	**5.**(c)	**6.**(a)	**7.**(b)	**8.**(c)	**9.**(a)	**10.**(b)
11.(d)	**12.**(a)	**13.**(a)	**14.**(b)	**15.**(a)	**16.**(a)	**17.**(a)	**18.**(a)	**19.**(a)	**20.**(a)
21.(a)	**22.**(a)	**23.**(b)	**24.**(a)	**25.**(c)	**26.**(a)	**27.**(b)	**28.**(c)	**29.**(a)	**30.**(b)
31.(d)	**32.**(a)	**33.**(a)	**34.**(b)	**35.**(a)	**36.**(a)	**37.**(a)	**38.**(a)	**39.**(a)	**40.**(a)
41.(a)	**42.**(d)	**43.**(b)	**44.**(a)	**45.**(d)	**46.**(c)	**47.**(c)	**48.**(c)	**49.**(d)	**50.**(b)
51.(b)	**52.**(b)	**53.**(b)	**54.**(b)	**55.**(b)	**56.**(b)	**57.**(b)	**58.**(a)	**59.**(a)	**60.**(b)
61.(c)	**62.**(b)	**63.**(b)	**64.**(b)	**65.**(b)	**66.**(b)	**67.**(b)	**68.**(a)	**69.**(a)	**70.**(b)
71.(d)	**72.**(c)	**73.**(b)	**74.**(d)	**75.**(c)	**76.**(b)	**77.**(a)	**78.**(b)	**79.**(c)	**80.**(b)
81.(a)	**82.**(a)	**83.**(a)	**84.**(b)	**85.**(b)	**86.**(d)	**87.**(b)	**88.**(b)	**89.**(c)	**90.**(a)
91.(b)	**92.**(b)	**93.**(c)	**94.**(c)	**95.**(a)	**96.**(b)	**97.**(c)	**98.**(b)	**99.**(c)	**100.**(b)
101.(a)	**102.**(a)	**103.**(b)	**104.**(b)	**105.**(b)	**106.**(b)	**107.**(b)	**108.**(b)	**109.**(b)	**110.**(b)
111.(b)	**112.**(b)	**113.**(d)	**114.**(b)	**115.**(c)	**116.**(c)	**117.**(a)	**118.**(b)	**119.**(c)	**120.**(b)
121.(c)	**122.**(b)	**123.**(a)	**124.**(a)	**125.**(b)	**126.**(b)	**127.**(b)	**128.**(b)	**129.**(b)	**130.**(b)
131.(b)	**132.**(b)	**133.**(b)	**134.**(b)	**135.**(d)	**136.**(c)	**137.**(c)	**138.**(c)	**139.**(c)	**140.**(a)
141.(a)	**142.**(b)	**143.**(d)	**144.**(a)	**145.**(d)	**146.**(a)	**147.**(c)	**148.**(b)	**149.**(c)	**150.**(a)
151.(a)	**152.**(b)	**153.**(a)	**154.**(b)	**155.**(a)	**156.**(b)	**157.**(a)	**158.**(d)	**159.**(b)	**160.**(b)
161.(a)	**162.**(c)	**163.**(a)	**164.**(a)	**165.**(d)	**166.**(c)	**167.**(b)	**168.**(d)	**169.**(a)	

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