Section A Trigonometric Ratios.

1. If $\cot\theta = \frac{1}{3}$.Find all other T ratios.
2. If 17 $\cot\theta = 8$ find all other five T ratios
3. If $\text{cosecA} = \sqrt{10}$ find all other five T ratios
4. If $tan\theta = \frac{4}{3}$, show that $(sin\theta + cos\theta) = \frac{7}{5}$
5. If $cot\theta = \frac{15}{8}$, find the value of $\frac{(2+2sin\theta).(1-sin\theta)}{(1+cos\theta)(2-2cos\theta)}$
6. If $tan\theta = \frac{1}{\sqrt{7}}$ show that $\frac{(cosec^2\theta - sec^2\theta)}{(cosec^2\theta + sec^2\theta)} = \frac{3}{4}$
7. If $cosec\theta = 2$, show that $\left(cot\theta + \frac{sin\theta}{1+cos\theta}\right) = 2$
8. If $\cos\theta = 0.6$, show that $(5sin\theta - 3tan\theta = 0$
9. If $4\sin A = 3$, calculate the value of CosA , tanA
10. If $\cot\theta = \frac{7}{8}$ evaluate(i) $\frac{(1+sin\theta).(1-sin\theta)}{(1-cos\theta)(1+cos\theta)}$ (ii) $cot^2\theta$
11. If $5cot\theta = 3$, evaluate $\frac{5sin\theta - 3cos\theta}{4sin\theta + 3cos\theta}$
12. If $3\sin\theta = 4$, evaluate $\frac{3sin\theta + 2cos\theta}{3sin\theta - 2cos\theta}$
13. If $3cot\theta = 2$, show that $\left(\frac{4sin\theta - 3cos\theta}{2sin\theta + 6cos\theta}\right) = \frac{1}{3}$
14. If $\tan\theta = \frac{a}{b}$ show that $\left(\frac{asin\theta - bcos\theta}{asin\theta + bcos\theta}\right) = \frac{(a^2 - b^2)}{(a^2 + b^2)}$
15. If $7sin^2\theta + 3cos^2\theta = 4$. Show that $tan\theta = \frac{1}{\sqrt{3}}$
16. In ΔABC, rt angled at B , if AB=12cm and BC=5cm find,

(i) sinA & tanA (ii) cosC and cotC

17. In ΔABC, rt angled at B , if AB=24cm and BC=7cm find,

(i) sinA , cosA (ii) SinC , cosC

18. In ΔABC, rt angled at C , $\tan A = \frac{1}{\sqrt{3}}$ find value of $sinA\ cosB + cosAsinB$
19. In ΔABC, rt angled at B , AB = 5cm and$BA + AC = 25$cm.Find the values of sinA , cosA and secC
20. In ΔABC, rt angled at B, AB=7cm and $AC - BC = 1cm$.Find the values of sinC and CosC

Section B Trigonometric Identities.

1. $(1 - \sin^2\theta)\sec^2\theta = 1$
2. $(1 + \tan^2\theta)\cos^2\theta = 1$
3. $(1 - \cos^2\theta)\,\text{cosec}^2\theta = 1$
4. $(1 + \cot^2\theta)\sin^2\theta = 1$
5. $(\sec^2\theta - 1)\cot^2\theta = 1$
6. $(1 - \cos^2\theta)\sec^2\theta = \tan^2\theta$
7. $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta} = 2\sec^2\theta$

8. $\sin^2\theta + \frac{1}{1+\tan^2\theta} = 1$

9. $\cot^2\theta - \frac{1}{\sin^2\theta} = -1$

10. $\tan^2\theta - \frac{1}{\cos^2\theta} = -1$

11. $\frac{1}{1+\tan^2\theta} + \frac{1}{1+\cot^2\theta} = 1$

12. $sec^4A(1 - sin^4A) - 2tan^2A = 1$

13. $(1 + \cot\theta - \mathrm{cosec}\theta).(1 + \tan\theta + \sec\theta) = 2$

14. $(1 + \cos\theta).(1 - \cos\theta).(1 + \cot^2\theta) = 1$

15. $.(1 + \sin\theta)(1 - \sin\theta).(1 + \tan^2\theta) = 1$

16. $\mathrm{cosec}\,\theta\,(1 + \cos\theta).(\mathrm{cosec}\,\theta - \cot\theta) = 1$

17. $\frac{\sin\theta}{1+\cos\theta} + \frac{\cos\theta}{1+\sin\theta} = 2\,\mathrm{cosec}\,\theta$

18. $\frac{\tan^2\theta}{1+\tan^2\theta} + \frac{\cot^2\theta}{1+\cot^2\theta} = 1$

19. $\frac{(1+\tan^2\theta).\cot\theta}{\mathrm{cosec}^2\theta} = \tan\theta$

20. $(\tan\theta + \frac{1}{cos\theta})^2 + (\tan\theta - \frac{1}{cos\theta})^2 = 2\left(\frac{1+\sin^2\theta}{1+\sin^2\theta}\right)$

21. $(1 + \tan^2\theta)(1 + \cot^2\theta) = \frac{1}{\sin^2\theta - \sin^4\theta}$

22. $\cos^4\theta - \cos^2\theta = \sin^4\theta - \sin^2\theta$

23. $\sec^4\theta - \sec^2\theta = \tan^2\theta + \tan^4\theta$

24. $\tan^2\theta - \sin^2\theta = \tan^2\theta.\sin^2\theta$

25. $\sec^2\theta + \mathrm{cosec}^2\theta = \sec^2\theta.\mathrm{cosec}^2\theta$

26. $\sin^4\theta - \cos^4\theta = 1 - 2\cos^2\theta 2\sin^2\theta - 1$

27. $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta\cos^2\theta$

28. $\frac{1-\tan^2\theta}{\cot^2\theta-1} = \tan^2\theta$

29. $\frac{1-\tan^2\theta}{1+\tan^2\theta} = \cos^2\theta - \sin^2\theta$

30. $1 + \frac{\cot^2\theta}{1+\mathrm{cose}\theta} = \mathrm{cose}\theta$

31. $1 + \frac{\tan^2\theta}{1+\mathrm{se}\theta} = \sec\theta$

32. $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta.\mathrm{cosec}\theta$

33. $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} = \cos A + \sin A$

34. $\frac{\cos^2 A}{1-\tan A} + \frac{\sin^3 A}{\sin A-\cos A} = 1 + \sin A\cos A$

35. $\tan\theta - \cot\theta = \frac{2\sin^2\theta}{\sin\theta\cos\theta}$

36. $\frac{\tan\theta+\sin\theta}{\tan\theta-\sin\theta} = \frac{\sec\theta+1}{\sec\theta-1}$

37. $\frac{\sin\theta}{1-\cos\theta} = \mathrm{cosec}\theta + \cot\theta$

38. $\frac{1-\sin\theta}{1+\sin\theta} = (\sec\theta - \tan\theta)^2$

39. $\frac{1+\cos\theta}{1-\cos\theta} = (\mathrm{cosec}\theta + \cot\theta)^2$

40. $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$

41. $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = \mathrm{cosec}\theta - \cot\theta$

42. $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \mathrm{cosec}\theta + \cot\theta$

43. $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = \frac{\sin\theta}{1+\cos\theta}$

44. $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} + \sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = 2\mathrm{cosec}\theta$

45. $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2\sec\theta$

46. $\frac{1}{\sec\theta-\tan\theta} = \sec\theta + \tan\theta$

47. $\frac{\mathrm{cosec}\theta+\cot\theta}{\mathrm{cosec}\theta-\cot\theta} = (\mathrm{cosec}\theta + \cot\theta)^2$

48. $\frac{\sec\theta+\tan\theta}{\sec\theta-\tan\theta} = (\sec\theta + \tan\theta)^2$

49. $\frac{\tan\theta}{\sec\theta-1} + \frac{\tan\theta}{\sec\theta+1} = 2\mathrm{cosec}\theta$

50. $\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 2\sec\theta$

51. $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\mathrm{cosec}\theta$

52. $\frac{\mathrm{cosec}\theta}{\mathrm{cosec}\theta-1} + \frac{\mathrm{cosec}\theta}{\mathrm{cosec}\theta+1} = 2\sec^2\theta$

53. $(\mathrm{cosec}A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A+\cot A}$

54. $\frac{\sin\theta}{\cot\theta+\mathrm{cosec}\theta} = 2 + \frac{\sin\theta}{\cot\theta-\mathrm{cosec}\theta}$

55. $\frac{\sin\theta-2\sin^3\theta}{2\cos^3\theta-\cos\theta} = \tan\theta$

56. $\frac{\sin\theta}{\cot\theta+\mathrm{cosec}\theta} - \frac{\sin\theta}{\cot\theta-\mathrm{cosec}\theta} = 2$

57. $\frac{\cos\theta}{\text{cosec}\theta+1} - \frac{\cos\theta}{\text{cosec}\theta-1} = 2\tan\theta$

58. $\frac{\cot\theta}{\text{cosec}\theta-1} + \frac{\text{cosec}\theta+1}{\cot\theta} = 2\sec\theta$

59. $\frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta} + \frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta} = \frac{2}{2\sin^2\theta-1}$

60. $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta} + \frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta} = \frac{2}{1-2\cos^2\theta}$

61. $\frac{1+\tan^2\theta}{1+\cot^2\theta} = \tan^2\theta = \left(\frac{1+\tan\theta}{1-\tan\theta}\right)^2$

62. $\frac{\sin^3\theta+\cos^3\theta}{\sin\theta+\cos\theta} = 1 - \sin\theta\cos\theta$

63. $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta} + \frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta} = 2$

64. $\frac{\tan\theta}{(1+\tan^2\theta)^2} + \frac{\cot\theta}{(1+\cot^2\theta)^2} = \sin\theta.\cos\theta$

65. $\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)} = \cot\theta$

66. $\frac{1}{\text{cosec}\theta-\cot\theta} - \frac{1}{\sin\theta} = \frac{1}{\sin\theta} - \frac{1}{\text{cosec}\theta+\cot\theta}$

67. $\frac{1}{\sec\theta-\tan\theta} - \frac{1}{\cos\theta} = \frac{1}{\cos\theta} - \frac{1}{\sec\theta+\tan\theta}$

68. $\frac{\tan\theta+\sec\theta-1}{\tan\theta-\sec\theta+1} = \frac{1+\sin\theta}{\cos\theta}$

69. $\frac{\cot\theta+\text{cosec}\theta-1}{\cot\theta-\text{cosec}\theta+1} = \frac{1+\cos\theta}{\sin\theta}$

70. $\frac{\sec\theta+\tan\theta+1}{\tan\theta-\sec\theta+1} = \frac{\cos\theta}{1-\sin\theta}$

71. $\frac{1+\cos\theta+\sin\theta}{1+\cos\theta-\sin\theta} = \frac{1+\sin\theta}{\cos\theta}$

72. $\frac{\sin\theta+1-\cos\theta}{\cos\theta-1+\sin\theta} = \frac{1+\sin\theta}{\cos\theta}$

73. $\frac{\sin\theta-\cos\theta+1}{\sin\theta+\cos\theta-1} = \frac{1}{\sec\theta-\tan\theta}$

74. $\left(\frac{1+\sin\theta-\cos\theta}{1+\sin\theta+\cos\theta}\right)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

75. $\frac{\cos\theta.\text{cosec}\theta-\sin\theta\sec\theta}{\cos\theta+\sin\theta} = \text{cosec}\theta - \sec\theta$

76. $\frac{\cot^2\theta(\sec\theta-1)}{1+\sin\theta} = \sec^2\theta\left(\frac{1-\sin\theta}{1+\sec\theta}\right)$

77. $(\sin\theta + \text{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

78. $(\sin\theta + \sec\theta)^2 + (\cos\theta + \text{cosec}\theta)^2 = (1 + \text{cosec}\theta\sec\theta)^2$

79. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$ show that $m^2 - n^2 = 4\sqrt{mn}$

80. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, show that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

81. If $3\sin\theta + 5\cos\theta = 5$, prove that $5\sin\theta - 3\cos\theta = \pm 3$

82. If $\sin\theta + \cos\theta = p$ and $\sec\theta + \text{cosec}\theta = q$ show that $q.(p^2 - 1) = 2p$

83. If $\sec\theta + \tan\theta = p$ show that $\frac{p^2-1}{p^2+1} = \sin\theta$

84. If $x = a\sec\theta + b\tan\theta$, $y = a\tan\theta + b\sec\theta$ prove that $x^2 - y^2 = a^2 - b^2$

85. If $x = a\sin\theta$ and $y = b\cos\theta$ prove that $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

86. If $x = a\sin\theta$ and $y = b\tan\theta$ prove that $\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1$

87. If $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$ and $\frac{x}{a}\sin\theta - \frac{y}{b}\cos\theta = 1$ prove that $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2$

88. If $\cos A + \cos^2 A = 1$, prove that $\sin^2 A + \sin^4 A = 1$

89. If $\text{cosec}A + \cot A = m$ and $\text{cosec}A - \cot A = n$, prove that $mn=1$

90. Prove that $\frac{\tan A+\tan B}{\cot A+\cot B} = \tan A\tan B$