1. Prove that: $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}+\frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta}=\frac{2\sec^2\theta}{\tan^2\theta-1}$ **(CBSE 2005-06, 4 marks)**

2. Evaluate without using Trigonometric Tables:
$\frac{\sec^2(90^\circ-\theta)-\cot^2\theta}{(\sin^2 25^\circ+\sin^2 65^\circ)}+\frac{2\cos^2 60^\circ\tan^2 28^\circ\tan^2 62^\circ}{3(\sec^2 43^\circ-\cot^2 47^\circ)}$ **(CBSE 2005-06, 4 marks)**

3. Prove that $\left(1+\frac{1}{\tan^2\theta}\right)\left(1+\frac{1}{\cot^2\theta}\right)=\frac{1}{\sin^2\theta-\sin^4\theta}$ **(CBSE 2006-07, 3 marks)**

4. If A, B and C are the interior angles of a triangle ABC, show that $\cos\left(\frac{B+C}{2}\right)=\sin\frac{A}{2}$ **(CBSE 2006-07, 3 marks)**

5. If $\tan A=\frac{5}{12}$, find the value of $(\sin A+\cos A)\sec A$ **(CBSE 2007-08, 1 mark)**

6. In a ΔABC, right angled at C, if $\tan A=\frac{1}{\sqrt{3}}$, find the value of $\sin A\cos B+\cos A\sin B$. **(CBSE 2007-08, 2 marks)**

7. Without using trigonometric tables, evaluate the following:
$2\left(\frac{\cos 58^\circ}{\sin 32^\circ}\right)-\sqrt{3}\left(\frac{\cos 38^\circ\,\text{cosec}\,52^\circ}{\tan 15^\circ\tan 60^\circ\tan 75^\circ}\right)$ **(CBSE 2007-08, 3 marks)**

8. If $\sin\theta=\frac{1}{3}$, then find the value of $(2\cot^2\theta+2)$ **(CBSE 2008-09, 1 mark)**

9. Simplify : $\frac{\sin^3\theta+\cos^3\theta}{\sin\theta+\cos\theta}+\sin\theta\cos\theta$ **(CBSE 2008-09, 2 mark)**

10. If $\sin(A+B)=\cos(A-B)=\frac{\sqrt{3}}{2}$ and A, B (A > B) are acute angles, find the values of A and B. **(CBSE 2010-11, 2 marks)**

11. Find the value of $\sin 30^\circ$ geometrically. **(CBSE 2008-09, 3 marks)**

12. Without using trigonometrical tables, evaluate:
$\frac{\cos 58^\circ}{\sin 32^\circ}+\frac{\sin 22^\circ}{\cos 68^\circ}-\frac{\cos 38^\circ\,\text{cosec}\,52^\circ}{\tan 18^\circ\tan 35^\circ\tan 60^\circ\tan 72^\circ\tan 55^\circ}$ **(CBSE 2008-09, 3 marks)**

13. **(CBSE 2009-10, 1 mark)**
If $\theta=45^\circ$, the value of $\text{cosec}^2\theta$ is
(A) $\frac{1}{\sqrt{2}}$ (B) 1 (C) $\frac{1}{2}$ (D) 2

14. $\sin(60^\circ + \theta) - \cos(30^\circ - \theta)$ is equal to (CBSE 2009-10, 1 mark)

(A) $2\cos\theta$ (B) $2\sin\theta$ (C) 0 (D) 1

15. If $\sin A + \sin^2 A = 1$, then the value of $\cos^2 A + \cos^4 A$ is (CBSE 2009-10, 1 mark)

(A) 2 (B) 1 (C) –2 (D) 0

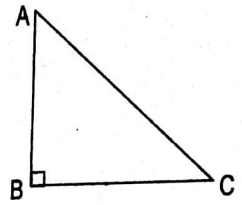
16. The value of $[(\sec A + \tan A)(1 - \sin A)]$ is equal to (CBSE 2009-10, 1 mark)

(A) $\tan^2 A$ (B) $\sin^2 A$ (C) $\cos A$ (D) $\sin A$

17. If $\sec 4A = \operatorname{cosec}(A - 20^\circ)$ where 4A is an acute angle, find the value of A. (CBSE 2009-10, 2 marks)

18. If $5\tan\theta = 4$ find the value of $\dfrac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$ (CBSE 2009-10, 2 marks)

19. In figure, ΔABC is right angled at B, BC = 7 cm and AC – AB = 1 cm. Find the value of $\cos A - \sin A$ (CBSE 2009-10, 3 marks)



20. Prove that $\dfrac{\tan w - \cot w}{\sin w \cos w} = \tan^2 w - \cot^2 w$ (CBSE 2009-10, 3 marks)

21. Without using trigonometric tables, evaluate the following:

$$\frac{\sec 37^\circ}{\operatorname{cosec} 53^\circ} + 2\cot 15^\circ \cot 25^\circ \cot 45^\circ \cot 75^\circ \cot 65^\circ - 3\left(\sin^2 18^\circ + \sin^2 72^\circ\right)$$

(CBSE 2009-10, 4 marks)

22. Prove that : $\dfrac{\tan\theta}{1 - \cot\theta} + \dfrac{\cot\theta}{1 - \tan\theta} = 1 + \sec\theta \operatorname{cosec}\theta$ (CBSE 2009-10, 4 marks)

23. If $2\cos\theta - \sin\theta = x$ and $\cos\theta - 3\sin\theta = y$. Prove that $2x^2 + y^2 - 2xy = 5$. (CBSE 2009-10, 4 marks)

24. If $\sin\theta = \cos\theta$, then value of θ is: (CBSE 2010-11, 1 mark)

(A) 0° (B) 45°

(C) 30° (D) 90°

25. If $a\cot\theta + b\operatorname{cosec}\theta = p$ and $b\cot\theta + a\operatorname{cosec}\theta = q$ then $p^2 - q^2$ is equal to: (CBSE 2010-11, 1 mark)

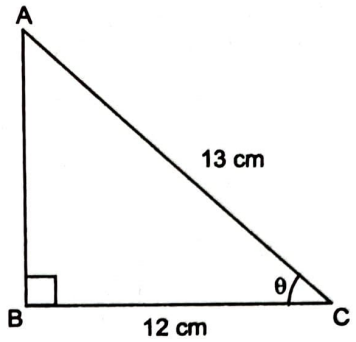
(A) $a^2 - b^2$ (B) $b^2 - a^2$

(C) $a^2 + b^2$ (D) $b - a$

26. In figure, AC = 13 cm, BC = 12 cm, then $\sec\theta$ equals:

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

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



(CBSE 2010-11, 1 mark)

27. The value of $\tan 1^\circ.\tan 2^\circ.\tan 3^\circ.....\tan 89^\circ$ is **(CBSE 2010-11, 1 mark)**

(A) 0 (B) 1 (C) 2 (D) $\frac{1}{2}$

28. If $\tan(A+B)=\sqrt{3}$ and $\tan(A-B)=\frac{1}{\sqrt{3}}$, $0^\circ < A+B \le 90^\circ$; $A > B$, find A and B.

(CBSE 2010-11, 2 marks)

29. Prove that $(\operatorname{cosec} A-\sin A)\times(\sec A-\cos A)=\frac{1}{\tan A+\cot A}$ **(CBSE 2010-11, 3 marks)**

30. If $\operatorname{cosec}(A-B)=2$, $\cot(A+B)=\frac{1}{\sqrt{3}}$, $0^\circ < (A+B) \le 90^\circ$, $A > B$, then find A and B.

(CBSE 2010-11, 3 marks)

31. Prove that $=\sqrt{\frac{\operatorname{cosec} A-\cot A}{\operatorname{cosec} A+\cot A}}=\frac{1-\cos A}{\sin A}$ **(CBSE 2010-11, 4 marks)**

32. Prove that $\tan^2\theta+\cot^2\theta+2=\sec^2\theta\operatorname{cosec}^2\theta$ **(CBSE 2010-11, 4 marks)**

33. Find the value of $\frac{1}{3}.\frac{\cos 36^\circ}{\sin 54^\circ}-\frac{3}{2}.\frac{\sec 16^\circ}{\operatorname{cosec} 74^\circ}$ **(CBSE 2013-14, 1 mark)**

34. If $\tan\theta=\frac{1}{\sqrt{3}}$, find the value of $\sin(90^\circ-\theta)$ **(CBSE 2013-14, 1 mark)**

35. Simplify: $\frac{\tan 28^\circ}{\cot 62^\circ}\div\frac{1}{\sqrt{3}}\left[\tan 20^\circ.\tan 60^\circ.\tan 70^\circ\right]$ **(CBSE 2013-14, 2 marks)**

36. Prove that: $(1+\tan A+\cot A).(\sin A-\cos A)=\sin A.\tan A-\cot A.\cos A$

(CBSE 2013-14, 3 marks)

37. Evaluate: $\frac{\sec\theta.\operatorname{cosec}(90^\circ-\theta)-\tan\theta.\cot(90^\circ-\theta)+\sin^2 55^\circ+\sin^2 35^\circ}{\tan 10^\circ.\tan 20^\circ.\tan 60^\circ.\tan 70^\circ.\tan 80^\circ}$

(CBSE 2013-14, 3 marks)

38. Given that $\tan(A-B)=\dfrac{\tan A-\tan B}{1+\tan A.\tan B}$; evaluate $\tan 15^\circ$ in two ways.

(a) Taking $A=60^\circ, B=45^\circ$

(b) Taking $A=45^\circ, B=30^\circ$

(CBSE 2013-14, 4 marks)

39. If $\tan\theta+\dfrac{4}{\tan\theta}=5$, find $\sin\theta$ and $\cos\theta$ **(CBSE 2013-14, 4 marks)**

40. If $x=\cot A+\cos A, y=\cot A-\cos A$; prove that $\left(\dfrac{x-y}{x+y}\right)^2+\left(\dfrac{x-y}{2}\right)^2=1$

(CBSE 2013-14, 4 marks)

41. Find the value of $\cos\theta+\sec\theta$, when it is given that $\cos\theta=\dfrac{1}{2}$ **(CBSE 2014-15, 1 mark)**

42. If $\sin\theta=\dfrac{1}{\sqrt{3}}$, find the value of $\dfrac{\sin\theta.\tan\theta(1+\cot\theta)}{\sin\theta+\cos\theta}$ **(CBSE 2014-15, 1 mark)**

43. Prove that: $\dfrac{1}{1+\sin A}+\dfrac{1}{1-\sin A}=2\sec^2 A$ **(CBSE 2014-15, 2 marks)**

44. Prove that: $(\sin A+\operatorname{cosec} A)^2+(\cos A+\sec A)^2=7+\tan^2 A+\cot^2 A$

(CBSE 2014-15, 3 marks)

45. If, $\theta=30^\circ$, verify the following:

(i) $\cos 3\theta=4\cos^3\theta-3\cos\theta$

(ii) $\sin 3\theta=3\sin\theta-4\sin^3\theta$

(CBSE 2014-15, 4 marks)

46. Prove that: $(\sec\theta-\tan\theta)^2=\dfrac{\operatorname{cosec}\theta-1}{\operatorname{cosec}\theta+1}$ **(CBSE 2014-15, 4 marks)**

47. $(\operatorname{cosec}\theta-\sin\theta)(\sec\theta-\cos\theta)=\sin\theta\cos\theta=\dfrac{1}{\tan\theta+\cot\theta}$ **(CBSE 2014-15, 4 marks)**

48. What is the value of $(\cos^2 67^\circ-\sin^2 23^\circ)$? **(CBSE 2017-18, 1 mark)**

49. If $4\tan\theta=3$, evaluate $\left(\dfrac{4\sin\theta-\cos\theta+1}{4\sin\theta+\cos\theta-1}\right)$

OR

If $\tan 2A=\cot(A-18^\circ)$, where 2A is an acute angle, find the value of A

(CBSE 2017-18, 3 marks)

50. Prove that : $\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$. **(CBSE 2017-18, 4 marks)**

51. Find A if tan 2A = cot(A – 24°) **(CBSE 2018-19, 1 mark)**

52. Prove that $(\sin\theta + \text{cosec}\,\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$ **(CBSE 2018-19, 3 marks)**

53. Prove that $\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{1}{\sec A - \tan A}$. **(CBSE 2018-19, 4 marks)**

54. $\frac{\cos 80^\circ}{\sin 10^\circ} + \cos 59^\circ \,\text{cosec}\, 31^\circ =$ _____ **(CBSE 2019-20, 1 mark)**

55. The value of $\left(\sin^2\theta + \frac{1}{1+\tan^2\theta}\right) =$ _____ **(CBSE 2019-20, 1 mark)**

56. The value of $(1+\tan^2\theta)(1-\sin\theta)(1+\sin\theta) =$ _____ **(CBSE 2019-20, 1 mark)**

57. If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$. **(CBSE 2019-20, 3 marks)**

58. If $\cot\theta = \frac{1}{\sqrt{3}}$, the value of $\sec^2\theta + \text{cosec}^2\theta$ is **(CBSE 2021-22, TERM-I, 1 mark)**

(A) 1
(B) $\frac{40}{9}$
(C) $\frac{38}{9}$
(D) $5\frac{1}{3}$

59. In ΔABC right angled at B, $\sin A = \frac{7}{25}$, then the value of cos C is **(CBSE 2021-22, TERM-I, 1 mark)**

(A) $\frac{7}{25}$
(B) $\frac{24}{25}$
(C) $\frac{7}{24}$
(D) $\frac{24}{7}$

60. Given that $\sec\theta = \sqrt{2}$, the value of $\frac{1+\tan\theta}{\sin\theta}$ is **(CBSE 2021-22, TERM-I, 1 mark)**

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

61. If θ is an acute angle and $\tan\theta + \cot\theta = 2$, then the value of $\sin^3\theta + \cos^3\theta$ is **(CBSE 2021-22, TERM-I, 1 mark)**

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

(C) $\frac{\sqrt{2}}{2}$ (D) $\sqrt{2}$

62. If $a\cot\theta + b\operatorname{cosec}\theta = p$ and $b\cot\theta + a\operatorname{cosec}\theta = q$, then $p^2 - q^2 =$ **(CBSE 2021-22, TERM-I, 1 mark)**

(A) $a^2 - b^2$ (B) $b^2 - a^2$

(C) $a^2 + b^2$ (D) $b - a$

63. If $\sec\theta + \tan\theta = p$, then $\tan\theta$ is **(CBSE 2021-22, TERM-I, 1 mark)**

(A) $\frac{p^2+1}{2p}$ (B) $\frac{p^2-1}{2p}$

(C) $\frac{p^2-1}{p^2+1}$ (D) $\frac{p^2+1}{p^2-1}$

64. $\frac{\cos^2\theta}{\sin^2\theta} - \frac{1}{\sin^2\theta}$, in simplified form is: **(CBSE 2022-23, 1 mark)**

(A) $\tan^2\theta$ (B) $\sec^2\theta$

(C) 1 (D) –1

65. If q is an acute angle of a right angled triangle, then which of the following equation is not true? **(CBSE 2022-23, 1 mark)**

(A) $\sin\theta\cot\theta = \cos\theta$ (B) $\cos\theta\tan\theta = \sin\theta$

(C) $\operatorname{cosec}^2\theta - \cot^2\theta = 1$ (D) $\tan^2\theta - \sec^2\theta = 1$

66. If 2 tan A = 3, then the value of $\frac{4\sin A + 3\cos A}{4\sin A - 3\cos A}$ is _____. **(CBSE 2022-23, 1 mark)**

(A) $\frac{7}{\sqrt{13}}$ (B) $\frac{1}{\sqrt{13}}$

(C) 3 (D) does not exist

67. $\left[\frac{5}{8}\sec^2 60° - \tan^2 60° + \cos^2 45°\right]$ is equal to _____. **(CBSE 2022-23, 1 mark)**

(A) $\frac{-5}{3}$ (B) $\frac{-1}{2}$f

(C) 0 (D) $\frac{-1}{4}$

68. $\sec\theta$ when expressed in terms of $\cot\theta$, is equal to: **(CBSE 2022-23, 1 mark)**

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

(C) $\frac{\sqrt{1+\cot^2\theta}}{\cot\theta}$ (D) $\frac{\sqrt{1-\cot^2\theta}}{\cot\theta}$

69. If $\tan A = \frac{2}{5}$, then the value of $\frac{1-\cos^2 A}{1-\sin^2 A}$ is : **(CBSE 2022-23, 1 mark)**

(A) $\frac{25}{4}$ (B) $\frac{4}{25}$ (C) $\frac{4}{5}$ (D) $\frac{5}{4}$

70. The value of $\frac{\sin 90° + \cos 60°}{\sec 45° + \tan 45°}$ is : **(CBSE 2022-23, 1 mark)**

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

71. $9\sec^2 A - 9\tan^2 A$ is equal to: **(CBSE 2022-23, 1 mark)**

(A) 9 (B) 0 (C) 8 (D) $\frac{1}{9}$

DIRECTIONS (72): In the question number 9, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option out of the following:

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

72. **Assertion (A):** For $0 < \theta \leq 90°$, $\operatorname{cosec}\theta - \cot\theta$ and $\operatorname{cosec}\theta + \cot\theta$ are reciprocal of each other.
Reason (R): $\operatorname{cosec}^2\theta - \cot^2\theta = 1$ **(CBSE 2022-23, 1 mark)**

73. If $\sin\theta + \cos\theta = \sqrt{3}$, then find the value of $\sin\theta \times \cos\theta$. **(CBSE 2022-23, 2 marks)**

74. If $\sin\alpha = \frac{1}{\sqrt{2}}$ and $\cot\beta = \sqrt{3}$, then find the value of $\operatorname{cosec}\alpha + \operatorname{cosec}\beta$. **(CBSE 2022-23, 2 marks)**

75. If A and B are acute angles such that $\sin(A - B) = 0$ and $2\cos(A + B) - 1 = 0$, then find angles A and B. **(CBSE 2022-23, 2 marks)**

(CBSE 2022-23, 3 marks)

76. Prove that: $\frac{1+\sec A}{\sec A} = \frac{\sin^2 A}{1-\cos A}$. **(CBSE 2022-23, 3 marks)**

77. Prove that $(\operatorname{cosec} A - \sin A)(\sec A - \cos A)\frac{1}{\cot A + \tan A}$.

(CBSE 2022-23, 3 marks)

78. Prove that: $\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$ **(CBSE 2022-23, 3 marks)**

79. Prove that $\sec A(1 - \sin A)(\sec A + \tan A) = 1$

80. Prove that:

$$\left(1+\frac{1}{\tan^2 A}\right)\left(1+\frac{1}{\cot^2 A}\right)=\frac{1}{\sin^2 A-\sin^4 A}$$

(CBSE 2022-23, 3 marks)

81. If $\sec\theta - \tan\theta = m$, then the value of $\sec\theta + \tan\theta$ is: **(CBSE 2023-24, 1 Mark)**

(A) $1-\frac{1}{m}$ (B) $m^2 - 1$

(C) $\frac{1}{m}$ (D) $-m$

82. If $\cos(\alpha + \beta) = 0$, then value of $\cos\left(\frac{\alpha+\beta}{2}\right)$ is equal to: **(CBSE 2023-24, 1 Mark)**

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

(C) 0 (D) $\sqrt{2}$

83. If $\sin\theta - \cos\theta$, $(0° < \theta < 90°)$, then value of $(\sec\theta \times \sin\theta)$ is: **(CBSE 2023-24, 1 Mark)**

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

(C) 1 (D) 0

84. If $\cos\theta = \frac{\sqrt{3}}{2}$ and $\sin\phi = \frac{1}{2}$, then $\tan(\theta+\phi)$ is: **(CBSE 2023-24, 1 Mark)**

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

(C) 1 (D) not defined

85. If $\sin\theta = 1$, then the value of $\frac{1}{2}\sin\left(\frac{\theta}{2}\right)$ is: **(CBSE 2023-24, 1 Mark)**

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

(C) $\frac{1}{2}$ (D) 0

86. If $\frac{x}{3} = 2\sin A$, $\frac{y}{3} = 2\cos A$, then the value of $x^2 + y^2$ is: **(CBSE 2023-24, 1 Mark)**

(A) 36 (B) 9

(C) 6 (D) 18

87. If $4\sec\theta - 5 = 0$, then the value of $\cot\theta$ is: **(CBSE 2023-24, 1 Mark)**

(A) $\frac{3}{4}$ (B) $\frac{4}{5}$

(C) $\frac{5}{3}$ (D) $\frac{4}{3}$

Directions: In Q. No 88 is a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

(A) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(B) Both, Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

88. **Assertion (A):** If $\sin A = \frac{1}{3}\left(0° < A < 90°\right)$, then the value of cos A is $\frac{2\sqrt{2}}{3}$ **(CBSE 2023-24, 1 Mark)**

Reason (R): For every angle θ, $\sin^2\theta + \cos^2\theta = 1$.

89. (a) Evaluate: $2\sqrt{2}\cos 45° \sin 30° + 2\sqrt{3}\cos 30°$ **(CBSE 2023-24, 2 Marks)**

OR

(b) If A = 60° and B = 30°, verify that:
Sin(A + B) = sin A cos B + cos A sin B

90. Evaluate: $\frac{2\tan 30° \cdot \sec 60° \cdot \tan 45°}{1 - \sin^2 60°}$ **(CBSE 2023-24, 2 Marks)**

91. Evaluate: $\frac{\cos 45° + \sin 60°}{\sec 30° + \operatorname{cosec} 30°}$ **(CBSE 2023-24, 2 Marks)**

92. (a) Evaluate: $\frac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \sin^2 60°}$ **(CBSE 2023-24, 2 Marks)**

OR

(b) If $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$; $0 < A + B \leq 90°$, $A > B$; find $\angle A$ and $\angle B$.

93. Prove that: $\frac{\tan\theta}{1 - \cot\theta} + \frac{\cot\theta}{1 - \tan\theta} = 1 + \sec\theta \operatorname{cosec}\theta$ **(CBSE 2023-24, 3 Marks)**

94. Prove that: $\frac{1 + \sec\theta - \tan\theta}{1 + \sec\theta + \tan\theta} = \frac{1 - \sin\theta}{\cos\theta}$ **(CBSE 2023-24, 3 Marks)**

95. Prove that: $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$ **(CBSE 2023-24, 3 Marks)**

96. Prove that: $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$ **(CBSE 2023-24, 3 Marks)**