PRACTICE SHEET   CLASS – 9   MARKS – 5

1. Show that $\frac{1}{3-\sqrt{8}} + \frac{1}{\sqrt{7}-\sqrt{6}} + \frac{1}{\sqrt{5}-2} - \frac{1}{\sqrt{8}-\sqrt{7}} - \frac{1}{\sqrt{6}-\sqrt{5}} = 5$

2. If $x = 3 + \sqrt{8}$ find the value of $x^2 + \frac{1}{x^2}$

3. A certain sum of money amounts to ₹ 7260 in 2 years and ₹7986 in 3 years interest being compounded annually. Find the rate percent per annum.

4. The count of bacteria in a culture grows by 10% during 1st hour, decreased by 8% during 2nd hour and again increases by 12% during 3rd hour. If the count of bacteria in the sample is 13125000, what will be the count of bacteria after 3 hours.

5. If $a^2 - 4a + 1 = 0$ find   (i) $a - \frac{1}{a}$ (ii) $a + \frac{1}{a}$ (iii) $a^2 + \frac{1}{a^2}$

6. If $a^2 + \frac{1}{a^2} = 23$ find   (i) $a + \frac{1}{a}$ (ii) $a^3 + \frac{1}{a^3}$

7. If $\log 2 = 0.3010$ find the value of $\log\frac{75}{16} - 2\log\frac{5}{9} + \log\frac{32}{243}$

8. $\log(m + n) = \log m + \log n$ show that $\frac{m}{n-1}$

9. Factorise :   (i) $x^4 + x^2y^2 + y^4$ (ii) $(a^2 - a)(4a^2 - 4a - 5) - 6$
   (iii) $(a + 4)^4 - 5ab - 20b - 6b^2$

10. In the figure, ABCD is a parallelogram, E is the mid - point of BC. DE produced meets AB produced at L. Prove that   (i)   AB = BL   (ii)   AL = 2 DC

11. Show that the perpendiculars drawn from the extremities of the base of an isosceles triangle to the opposite sides are equal.

12. Solve the equation by substitution method : $\frac{7-4x}{3} = y$, $2x + 3y + 1 = 0$

13. Solve the equation by elimination method : $\frac{x+y-8}{2} = \frac{x+2y-14}{3} = \frac{3x+y-12}{11}$

14. Solve the equation by cross multiplication method : $\frac{5}{x+1} - \frac{2}{y-1} = \frac{1}{2}$, $\frac{10}{x+1} + \frac{2}{y-1} = \frac{5}{2}$

15. Simplify : $\frac{7^{2n+3} - 49^{n+2}}{[(343)^{n+1}]^{2/3}}$

16. Prove that $\left(\frac{x^a}{x^b}\right)^{a+b-c} \left(\frac{x^b}{x^c}\right)^{b+c-a} \left(\frac{x^c}{x^a}\right)^{c+a-b} = 1$

17. Solve for x: $5^{x-3} \times 3^{2x-8} = 225$

18. The marks obtained by 40 students of a class in an examination are given below. Present the data in the form of a frequency distribution using equal class – size, one such class being 10 – 15 (15 not included)
    3, 20, 13, 1, 21, 13, 3, 23, 16, 13, 18, 12, 5, 12, 5, 24, 9, 2, 7, 18, 20, 3, 10, 16, 8, 16, 17, 8, 23, 21, 6, 23, 15.
    Form the cumulative frequency distribution of the following data.

19. If $\cos\theta = \frac{2x}{1+x^2}$ find the values of $\sin\theta$ and $\tan\theta$ in terms of x.

20. Construct a frequency table from the following data:

Age (in years)	Number of Students
less than 10	6
less than 20	14
less than 30	30
less than 40	52
less than 50	65
less than 60	70

21. If $\cos\theta + \sec\theta = \sqrt{3}$, show that, $\cos^3\theta + \sec^3\theta = 0$.
22. If α, β, γ are positive acute angles and $\sin(\alpha + \beta - \gamma) = \cos(\beta + \gamma - \alpha) = \tan(\gamma + \alpha - \beta) = 1$, find α, β and γ.
23. Show that the quadrilateral formed by joining the mid – point of the pairs of adjacent sides of a rhombus is a rectangle.
24. In a parallelogram ABCD, E and F are the mid – points of sides AB and CD respectively. Prove that the line segment AF and EC trisect the diagonal BD.
25. In $\triangle$ ABC, if AB = AC and D is a point on BC then prove that $AB^2 - AD^2 = BD \times CD$.
26. If the square of the hypotenuse of an isosceles right triangle is 98cm^2, find the length of each side.
27. Two parallel chords of length 80 cm and 18 cm are drawn on the same side of the centre of a circle of radius 41 cm. Find the distance between the chords.
28. An equilateral triangle of side 9 cm is inscribed in a circle. Find the radius of the circle.