Class – IX	Topic – Rational and Irrational number

Section A (1 marks each)

Represent each of the following as a decimal number.(Q1 and Q2)

1. $\dfrac{4}{15}$

2. $\dfrac{3}{25}$

Express each of the following as a vulgar fraction.(Q3 and Q4)

3. $3.\overline{146}$

4. $4.\overline{324}$

5. Insert two rational numbers between $\dfrac{3}{4}$ and $\dfrac{1}{5}$.

Express the following rational numbers as decimals(Q6-Q10)

6. $\dfrac{42}{100}$

7. $\dfrac{327}{500}$

8. $\dfrac{15}{4}$

9. $\dfrac{437}{999}$

10. $\dfrac{2157}{625}$

Express each of the following decimals in the form $\dfrac{p}{q}$: (Q11-Q16)

11. 0.39

12. 0.750

13. 2.15

14. 7.010

15. 9.90

16. 1.0001

Write down the decimal expansion of the rational numbers by writing their denominators in the form of $2^m \times 5^n$ given m and n are non-negative integers. (Q17-Q20)

17. $\dfrac{13}{25}$

18. $\dfrac{14588}{625}$

19. $\dfrac{23}{2^3 \times 5^2}$

20. $\dfrac{15}{1600}$

Identify the following as rational or irrational numbers. Give the decimal representation of rational numbers: (Q21-Q25)

21. $\sqrt{4}$

22. $\sqrt{1.44}$

23. $-\sqrt{64}$

24. $\sqrt{100}$

25. $\sqrt{18}$

In the following equations, find which variables x, y, z etc. represent rational or irrational numbers: (Q26-Q30)

26. $x^2 = 5$

27. $y^2 = 9$

28. $z^2 = 0.04$

29. $v^2 = 3$

30. $t^2 = 0.4$

Section B (2 marks each)

Show that the following numbers are irrational: (Q31- Q35)

31. $\dfrac{1}{\sqrt{2}}$

32. $\dfrac{3}{2\sqrt{5}}$

33. $6 + \sqrt{2}$

34. $\sqrt{5} + \sqrt{3}$

35. $\sqrt{2} + \sqrt{3}$

Find two rational numbers between: (Q36-Q40)

36. 1 and 2

37. 3 and 4

38. -2 and 6

39. $\dfrac{3}{5}$ and $\dfrac{4}{5}$

40. $-\dfrac{2}{3}$ and $\dfrac{1}{4}$

Without performing long division, state if the following rational numbers are terminating decimals or non-terminating decimals: (Q41-Q44)

41. $\dfrac{125}{441}$

42. $\dfrac{35}{50}$

43. $\dfrac{129}{2^2 \times 5^7 \times 7^{17}}$

44. $\dfrac{987}{10500}$

What can you say about the prime factorization of the denominators of the following rational number: (Q45-Q46)

45. 43.123456789

46. 327.781

Section C (3 marks each)

47. Show that $\sqrt{5}$ is not a rational number.

48. Use method of contradiction to show that $\sqrt{3}$ is an irrational number.

49. . Insert 12 rational numbers between $-\frac{4}{11}$ and $\frac{9}{11}$

50. Insert 100 numbers between $-\frac{4}{11}$ and $\frac{9}{11}$

51. Find the decimal representation of $\frac{1}{7}$ and $\frac{2}{7}$. Deduce from the decimal representation of $\frac{1}{7}$, without actual calculation, the decimal representation of $\frac{3}{7}, \frac{4}{7}, \frac{5}{7}$ and $\frac{6}{7}$

Rationalize the denominator and simplify. (Q52-Q57)

52. $\dfrac{1}{3 - \sqrt{5}}$

53. $\dfrac{6}{\sqrt{5} - \sqrt{2}}$

54. $\dfrac{1}{2\sqrt{5} - \sqrt{3}}$

55. $\dfrac{7 + 3\sqrt{5}}{3 + \sqrt{5}} - \dfrac{7 - 3\sqrt{5}}{3 - \sqrt{5}}$

56. $\dfrac{1}{1 + \sqrt{5} + \sqrt{3}}$

57. $\dfrac{1}{\sqrt{6} + \sqrt{5} - \sqrt{11}}$

58. What can you say about the prime factorization of the denominators of the following rational number: $43.\overline{123456789}$

Section D (4 marks)

1. Given set $= \{-6, 5\frac{3}{4}, -\sqrt{4}, -\frac{3}{5}, -\frac{3}{8}, 0, 1, 1\frac{2}{3}, \sqrt{8}, 3.01, \pi, 8.47\}$ From the given set find:

    (i) Set of rational numbers

    (ii) Set of irrational numbers

    (iii) Set of integers

    (iv) Set of non-negative integers