CBSE

REAL NUMBERS WS 4

Class 10 - Mathematics

Section A

1. The difference of a rational and an irrational number is always **[1]**

   a) a rational number   b) an irrational number

   c) an integer   d) negative

2. The number $(\sqrt{3} + \sqrt{5})^2$ is **[1]**

   a) an irrational number   b) an integer

   c) a rational number   d) not a real number

3. $2 - \sqrt{3}$ is **[1]**

   a) an irrational number   b) an integer

   c) a rational number   d) a whole number

4. If a is rational and $\sqrt{b}$ is irrational, then $a + \sqrt{b}$ is: **[1]**

   a) an irrational number   b) an integer

   c) a natural number   d) a rational number

5. The sum of two irrational numbers is always **[1]**

   a) a rational number   b) an irrational number

   c) an integer   d) a rational number or an irrational number

6. Which of the following is an irrational number? **[1]**

   i. $\frac{22}{7}$

   ii. 3.1416

   iii. $3.\overline{1416}$

   iv. 3.141141114...

   a) Option (iv)   b) Option (iii)

   c) Option (i)   d) Option (ii)

7. 2.35 is **[1]**

   a) an integer   b) a rational number

   c) an irrational number   d) a natural number

8. $(1 + \sqrt{2}) + (1 - \sqrt{2})$ is **[1]**

   a) a rational number   b) a non-terminating decimal

   c) terminating decimal   d) an irrational number

9. The number 1.732 is **[1]**

a) a whole number b) an integer

c) a rational number d) an irrational number

10. The difference between two distinct irrational numbers is always **[1]**

a) a rational number b) an irrational number

c) an integer d) both rational and irrational number

11. $(2 + \sqrt{2})$ is **[1]**

a) A real number b) an integer

c) a rational number d) an irrational number

12. $2\sqrt{3}$ is **[1]**

a) a rational number b) an irrational number

c) a whole number d) an integer

13. Which of the following is an irrational number? **[1]**

a) Both (π) and $(\frac{22}{7})$ b) π

c) Neither (π) nor $(\frac{22}{7})$ d) $\frac{22}{7}$

14. The product of a rational number and an irrational number is **[1]**

a) both rational and irrational number b) an integer

c) an irrational number only d) a rational number only

Section B

15. Prove that $11 + 3\sqrt{2}$ is an irrational number, given that $\sqrt{2}$ is an irrational number. **[2]**

16. Explain why $2 \times 3 \times 5 + 5$ and $5 \times 7 \times 11 + 7 \times 5$ are composite numbers. **[2]**

17. Prove that $\sqrt{3} + \sqrt{5}$ is irrational. **[2]**

18. Prove that $6 - \sqrt{7}$ is irrational number, given that $\sqrt{7}$ is an irrational number. **[2]**

19. Prove that $10 + 2\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number. **[2]**

20. Show that $\frac{2+3\sqrt{2}}{7}$ is not a rational number, given that $\sqrt{2}$ is an irrational number. **[2]**

21. Prove that $5\sqrt{2}$ is irrational. **[2]**

22. Show that $\frac{3+\sqrt{7}}{5}$ is an irrational number, given that $\sqrt{7}$ is irrational. **[2]**

23. Prove that $4 + 2\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number. **[2]**

24. Show that $5 - 2\sqrt{3}$ is an irrational number. **[2]**

25. Prove that $3 - 2\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number. **[2]**

26. Prove that $4 - 5\sqrt{2}$ is an irrational number, given that $\sqrt{2}$ is an irrational number. **[2]**

27. Prove that $2 - 3\sqrt{5}$ is an irrational number. **[2]**

28. Show that $5 + \sqrt{7}$ is an irrational number, where $\sqrt{7}$ is given to be an irrational number. **[2]**

29. Prove that $2 + 3\sqrt{3}$ is an irrational number. It is given that $\sqrt{3}$ is an irrational number. **[2]**

30. Prove that $(5 - 3\sqrt{2})$ is an irrational number, given that $\sqrt{2}$ is irrational number. **[2]**

31. Prove that $\sqrt{5}$ is an irrational number. **[2]**

32. Prove that $\frac{1}{\sqrt{2}}$ is irrational. **[2]**

33. Prove that $\sqrt{3}$ is an irrational number. **[2]**

34. Prove that $(7 - 2\sqrt{3})$ is an irrational number, given that $\sqrt{3}$ is an irrational number. **[2]**

35. Prove that $\sqrt{2} + \sqrt{3}$ is an irrational number. **[2]**

36. Show that $3\sqrt{2}$ is irrational. **[2]**

37. Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number. **[2]**

38. Explain why $7 \times 11 \times 13 + 13$ is a composite number. **[2]**

39. Prove that $3\sqrt{3}$ - 7 is an irrational number, given that $\sqrt{3}$ is an irrational number. **[2]**

40. Prove that $7 + 4\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number. **[2]**

41. Prove that $6 + \sqrt{2}$ is irrational. **[2]**

42. Prove that $8 + 5\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number. **[2]**

43. Prove that $2 - 3\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number. **[2]**

44. Prove that $\sqrt{3}$ is irrational. **[2]**

45. Prove that $3\sqrt{2}$ is irrational **[2]**

46. Prove that $2\sqrt{3} - 1$ is an irrational number. **[2]**

47. Classify the following numbers as rational or irrational and give justification of your answer. **[2]**

    i. 0.05918

    ii. 1.010010001...

    iii. $\sqrt{\frac{9}{27}}$

    iv. $\sqrt{\frac{12}{75}}$

48. Prove that $\sqrt{2}$ is an irrational number. **[2]**

49. Prove that $\sqrt{p} + \sqrt{q}$ is irrational, where p and q are primes. **[2]**

50. Prove that $5 - \sqrt{3}$ is an irrational number. **[2]**

51. Prove that $\frac{2}{\sqrt{7}}$ is irrational. **[2]**

52. Prove that $\frac{3}{2\sqrt{5}}$ is irrational. **[2]**

53. Show that $5 - 2\sqrt{3}$ is an irrational number. **[2]**

54. Show that $5 + 3\sqrt{2}$ is an irrational number. **[2]**

55. Prove that $5 + 2\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number. **[2]**

56. If $\sqrt{2}$ is given as an irrational number, then prove that $(7 - 2\sqrt{2})$ is an irrational number. **[2]**

57. Show that $3 + \sqrt{2}$ is an irrational number. **[2]**