

1. Represent (i) $2\frac{3}{8}$ and (ii) $-1\frac{5}{7}$ on real line.
2. Find a rational number lying between $\frac{1}{3}$ and $\frac{1}{2}$.
3. Find three rational number between $-\frac{3}{7}$ and $-\frac{1}{7}$.
4. Find six rational numbers between 4 and 5.
5. Are the following statements true or false? Give reason for your answers:
 - (i) Every whole number is a natural number
 - (ii) Every integer is a rational number
6. Find the decimal representation of $\frac{22}{7}$.
7. Express each of the following numbers in the form $\frac{p}{q}$
 - (i) 0.15 (ii) 0.625 (iii) 0.00036
8. Represent $\sqrt{2}$ on the number line.
9. Represent $\sqrt{3}$ on the number line.
10. Find three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$.
11. Show that the product of a rational number and an irrational number is always irrational. (Give example)
12. Are the following statements true or false? Justify your answer.
 - (i) Every irrational number is a real number.
 - (ii) Every point on the number line is of the form, \sqrt{p} , where p is a natural number.
 - (iii) Every real number is an irrational number.
13. Are the square root of all positive integers irrational? If no, give an example of the square root of a number that is a rational number.
14. Find two irrational numbers between 2 and 2.5.
15. Find two irrational numbers between 0.12 and 0.13.
16. Give an example each of two irrational numbers, whose
 - (i) difference is a rational number.
 - (ii) difference is an irrational number.
 - (iii) sum is a rational number.
 - (iv) sum is an irrational number.
 - (v) product is an irrational number.
 - (vi) product is a rational number.
 - (vii) quotient is a rational number.
 - (viii) quotient is an irrational number.

17. Examine, whether the following numbers are rational or irrational.

(i) $(\sqrt{2} + 2)^2$ (ii) $(5 + \sqrt{5})(5 - \sqrt{5})$ (iii) $\frac{6}{2\sqrt{3}}$

18. Prove that $(2 + \sqrt{3})$ is an irrational number.

19. Show that the product of two irrational numbers need not be irrational, giving examples in support of answer.

20. Express the following in the form $\frac{p}{q}$:

(i) 0.6666 ... (ii) $0.\overline{001}$...

21. Express the following in the form $\frac{p}{q}$:

22. Represent $\sqrt{9.3}$ on the number line.

23. Expand each of the following.

(i) $(2\sqrt{2} - \sqrt{6})(2\sqrt{2} + \sqrt{6})$ (ii) $(2\sqrt{2} + 3\sqrt{3})^2$

(iii) $(2\sqrt{15} + \sqrt{5})(\sqrt{15} + 3\sqrt{5})$

24. Find the product of $(x + \sqrt{2})$ and $(\sqrt{2}x + 1)$.

25. Rationalise the denominator of the following:

(i) $\frac{1}{\sqrt{7}}$ (ii) $\frac{1}{\sqrt{7} - \sqrt{6}}$ (iii) $\frac{1}{\sqrt{5} + \sqrt{2}}$

26. Find the values of a and b in each of the following:

(i) $\frac{3 + \sqrt{2}}{3 - \sqrt{2}} = a + b\sqrt{2}$ (ii) $\frac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} = a + b\sqrt{3}$

27. Express $\frac{1}{\sqrt{6} + \sqrt{5} - \sqrt{11}}$ with rational denominator:

28. Prove that:

$$\frac{1}{1 + \sqrt{2}} + \frac{1}{\sqrt{2} + \sqrt{3}} + \frac{1}{\sqrt{3} + \sqrt{4}} + \frac{1}{\sqrt{4} + \sqrt{5}} + \frac{1}{\sqrt{5} + \sqrt{6}} + \frac{1}{\sqrt{6} + \sqrt{7}} + \frac{1}{\sqrt{7} + \sqrt{8}} + \frac{1}{\sqrt{8} + \sqrt{9}} = 2$$

29. If $x = (3 + \sqrt{8})$, find the value of $\left(x^2 + \frac{1}{x^2}\right)$.

30. Simplify:

(i) $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}}$ (ii) $\left(\frac{1}{3^5}\right)^4$ (iii) $\frac{7^{\frac{1}{5}}}{7^{\frac{1}{3}}}$ (iv) $13^{\frac{1}{5}} \cdot 17^{\frac{1}{5}}$

31. Evaluate each of the following by removing negative indices wherever they occur:

(i) $(27)^{-2/3}$ (ii) $\left(\frac{64}{25}\right)^{-3/2}$

32. Simplify each of the following:

(i) $\left(\frac{243}{32}\right)^{-4/5}$ (ii) $\sqrt[5]{(32)^{-3}}$

33. If $2^{2x+2} = 2^{3x-1}$, then find the value of x.

34. Find the value of x, if $5^{x-3} \cdot 3^{2x-8} = 225$

35. Simplify : $\frac{(25)^{3/2} \times (243)^{3/5}}{(16)^{5/4} \times (8)^{4/3}}$

36. Simplify : $\left(\frac{81}{16}\right)^{-3/4} \times \left[\left(\frac{25}{9}\right)^{-3/2} + \left(\frac{5}{2}\right)^{-3}\right]$