



MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

NUMBER SYSTEM

Solved Examples

1. Represents $\frac{4}{3}$ on the number line.

 [View Text Solution](#)

2. Find a rational number between -3 and 8.

 [Watch Video Solution](#)

3. Find three rational number between -1 and 7.

 [Watch Video Solution](#)

4. Find 9 rational number between $\frac{1}{3}$ and $\frac{1}{2}$.

 [Watch Video Solution](#)

5. Find 5 rational numbers between $-\frac{1}{6}$ and $\frac{5}{21}$.

 [Watch Video Solution](#)

6. Find nine rational number between 0 and 0.1.

 [Watch Video Solution](#)

7. Without actual division, find which of the following rational numbers have terminating decimal representation :

(i) $\frac{5}{32}$, (ii) $\frac{3}{320}$, (iii) $\frac{7}{24}$

 [Watch Video Solution](#)

8. Express each of the following recurring decimals into the rational number :

(i) $0.\bar{5}$ (ii) $2.\bar{4}$ (iii) $1.\bar{12}$ (iv) $2.\overline{739}$ (v) $0.\overline{516}$ (vi) $3.\overline{142857}$

 [Watch Video Solution](#)

9. If $\frac{1}{7} = 0.142857$, write the decimal expression of $\frac{2}{7}$, $\frac{3}{7}$, $\frac{4}{7}$, $\frac{5}{6}$ and $\frac{6}{7}$ without actually doing the long division.

 [Watch Video Solution](#)

10. Evaluate $3.\overline{2} - 0.\overline{16}$



Watch Video Solution

11. Express $0.99999 \dots$ in the form $\frac{p}{q}$. Are you surprised by your answer?

With your teacher and classmates discuss why the answer makes sense.



Watch Video Solution

12. Find the decimal representation of $\frac{22}{7}$



Watch Video Solution

13. Prove that $\sqrt{2}$ is an irrational number.



Watch Video Solution

14. Prove that $\sqrt{3}$ is an irrational number.

 [Watch Video Solution](#)

15. Prove that $3 + 2\sqrt{5}$ is irrational.

 [Watch Video Solution](#)

16. Represent $\sqrt{9.37}$ on the number line.

 [View Text Solution](#)

17. Represent $\sqrt{3.8}$ on the number line.

 [View Text Solution](#)

18. Evaluate each of the following :

$$(i) 2^3 \times 2^2$$

$$(ii) 3^5 \div 3^2$$

$$(iii) (5^2)^3$$

$$(iv) \left(\frac{3}{4}\right)^3$$

$$(v) \left(\frac{2}{3}\right)^3$$



Watch Video Solution

19. If $a=2$ and $b=5$, then evaluate $a^b + b^a$.



Watch Video Solution

20. Evaluate each of the following :

$$(i) (32)^{1/5}$$

$$(ii) (27)^{-1/3}$$

$$(iii) \left(\frac{16}{81}\right)^{-1/4}$$



Watch Video Solution

21. Evaluate each of the following :

$$(i) (\sqrt{9})^{-3}$$

$$(ii) (3\sqrt{8})^{-2}$$



Watch Video Solution

22. Simplify each of the following :

$$(i) \frac{(16)^{\frac{5}{4}} \times (8)^{\frac{4}{3}}}{(25)^{\frac{3}{2}} \times (243)^{\frac{3}{5}}}$$

$$(ii) \frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$$



Watch Video Solution

23. Rewrite the following irrational numbers in ascending order of magnitude.

$$(i) 3\sqrt{18}, 6\sqrt{144}, \sqrt{7}$$

$$(ii) 3\sqrt{12}, \sqrt{20}, 6\sqrt{25}, \sqrt{6}, 12\sqrt{112}$$



Watch Video Solution

24. If $3^{3x} = \frac{9}{3^x}$, find the value of x .



Watch Video Solution

25. Find the value of x , if $5^{x-2} \times 3^{2x-3} = 135$



Watch Video Solution

26. Rationalise the denominator of $\frac{1}{\sqrt{5}}$.



Watch Video Solution

27. Rationalise the denominator of $\frac{2 \cdot 3\sqrt{3}}{3\sqrt{25}}$.



Watch Video Solution

28. Rationalise the denominator of $\frac{11}{5 + \sqrt{3}}$.



Watch Video Solution

29. Rationalise the denominator of $\frac{1}{7 + 4\sqrt{3}}$.



Watch Video Solution

30. Rationalise the denominator of $\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$.

 [Watch Video Solution](#)

31. Find the rationalising factor of $5^{\frac{1}{3}} - 2^{\frac{1}{3}}$.

 [Watch Video Solution](#)

32. If $\sqrt{2} = 1.414$, then find the value of $\frac{1}{2 + \sqrt{2}}$

 [Watch Video Solution](#)

33. Simplify each of the following by rationalising the denominator;

$$\frac{1}{5 + \sqrt{2}} \quad \text{(ii)} \quad \frac{5 + \sqrt{6}}{5 - \sqrt{6}} \quad \frac{7 + 3\sqrt{5}}{7 - 3\sqrt{5}} \quad \text{(iv)} \quad \frac{2\sqrt{3} - \sqrt{5}}{2\sqrt{2} + 3\sqrt{3}}$$

 [Watch Video Solution](#)

34. Find the value of a and b if

$$(i) \frac{\sqrt{3} + 1}{\sqrt{3} - 1} = a + b\sqrt{3}$$

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



Watch Video Solution

35. Rationalise the denominator of the following :

$$\frac{1}{\sqrt{3} - \sqrt{2} - 1}$$

$$\frac{1}{\sqrt{2} + \sqrt{3} + \sqrt{10}}$$



Watch Video Solution

36. Find the value of:

$$\frac{1}{1 + \sqrt{2}} + \frac{1}{\sqrt{2} + \sqrt{3}} + \frac{1}{\sqrt{3} + \sqrt{4}} + \dots + \frac{1}{\sqrt{99} + \sqrt{100}}$$



Watch Video Solution

37. Compare the surds

$$(i) A = \sqrt{10} - \sqrt{5}, B = \sqrt{19} - \sqrt{14}$$

$$(ii) P = \sqrt{10} + \sqrt{5}, Q = \sqrt{8} + \sqrt{7}$$



Watch Video Solution

38. Evaluate : (i) $\sqrt{3 - 2\sqrt{2}}$

(ii) $\sqrt{9 - 6\sqrt{2}}$



View Text Solution

39. If 3 rational numbers $x^{1/x}$, $y^{1/y}$ and $z^{1/z}$ are equal and $x^{yz} + y^{zx} + z^{xy} = 729$, then find the value of $x^{1/x}$

A. 6

B. 3

C. 5

D. 4

Answer: B



Watch Video Solution

40. If $x = \sqrt{2} + 1$, then find the values of the following :

(i) $\frac{1}{x}$ (ii) $x + \frac{1}{x}$ (iii) $x - \frac{1}{x}$ (iv) $x^2 + \frac{1}{x^2}$

 [Watch Video Solution](#)

41. If $x = \frac{\sqrt{a+2b} + \sqrt{a-2b}}{\sqrt{a+2b} - \sqrt{a-2b}}$, then prove that $b^2 - ax + b = 0$

 [Watch Video Solution](#)

42. If $x = \frac{1}{2 - \sqrt{3}}$, find the value of $x^3 - 2x^2 - 7x + 5$

 [Watch Video Solution](#)

43. $a = 9 - 4\sqrt{5}, \sqrt{a} - \frac{1}{\sqrt{a}} = ?$

 [Watch Video Solution](#)

1. Write the following in decimal form and say what kind of decimal expansion each has : (i) $\frac{36}{100}$ (ii) $\frac{1}{11}$ (iii) $4\frac{1}{11}$ (iv) $\frac{3}{13}$ (v) $\frac{2}{11}$ (vi) $\frac{329}{400}$

 [Watch Video Solution](#)

2. You know that $\frac{1}{7} = 0.\overline{142857}$ Can you predict what the decimal expansion of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$ are, without actually doing the long division? If so, how? [Hint: Study the remainders while finding the value of $\frac{1}{7}$ carefully.]

 [Watch Video Solution](#)

3. Recall, π is defined as the ratio of the circumference (say c) of a circle to its diameter (say d). That is, $\pi = \frac{c}{d}$. This seems to contradict the fact the π is irrational How will you resolve this contradiction?

 [Watch Video Solution](#)

4. Rationalise the denominators of the following: (i) $\frac{1}{\sqrt{7}}$ (ii) $\frac{1}{\sqrt{7} - \sqrt{6}}$
(iii) $\frac{1}{\sqrt{5} + \sqrt{2}}$ (iv) $\frac{1}{\sqrt{7} - 2}$

 [Watch Video Solution](#)

5. Find which of the variables x, y, z and u represent rational numbers and which irrational numbers: (i) $x^2 = 5$ (ii) $y^2 = 9$ (iii) $z^2 = 0.04$ (iv) $u^2 = \frac{17}{4}$

 [Watch Video Solution](#)

6. Rationalise the denominator of the following :
- (a) $\frac{2}{3\sqrt{3}}$ (b) $\frac{\sqrt{40}}{\sqrt{3}}$ (c) $\frac{3 + \sqrt{2}}{4\sqrt{2}}$ (d) $\frac{16}{\sqrt{41} - 5}$

 [Watch Video Solution](#)

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

$$(a) \frac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} = a - 6\sqrt{3}$$

$$(b) \frac{3 - \sqrt{5}}{3 + 2\sqrt{5}} = a\sqrt{5} - \frac{19}{11}$$

$$(c) \frac{\sqrt{2} + \sqrt{3}}{3\sqrt{2} - 2\sqrt{3}} = 2 - b\sqrt{6}$$

$$(d) \frac{7 + \sqrt{5}}{7 - \sqrt{5}} - \frac{7 - \sqrt{5}}{7 + \sqrt{5}} = a + \frac{7}{11}\sqrt{5}$$



[Watch Video Solution](#)

Exercise 1 A

1. Are the following statements true or false? Give reasons for your answer? Every whole number is a natural number Every integer is a rational number. Every rational number is an integer. Every natural number is a whole number. Every integer is a whole number Every rational number is a whole number



[Watch Video Solution](#)

2. Find a rational number between :

(i) $\frac{3}{7}$ and $\frac{5}{14}$ (ii) $\frac{2}{5}$ and $-\frac{1}{3}$ (iii) $-\frac{1}{3}$ and $-\frac{1}{2}$

 [Watch Video Solution](#)

3. Find two rational number between :

(i) $\frac{2}{3}$ and $\frac{8}{3}$

 [Watch Video Solution](#)

4. Find three rational number between :

(i) $\frac{1}{2}$ and $\frac{7}{3}$ (ii) $-\frac{3}{5}$ and $\frac{2}{7}$ (iii) $\frac{2}{5}$ and $\frac{8}{5}$

 [Watch Video Solution](#)

5. Find 9 rational numbers between $\frac{1}{2}$ and $\frac{3}{5}$.

 [Watch Video Solution](#)

Exercise 1 B

1. without actual division, find which of the following rational numbers have terminating decimal representation :

(i) $\frac{3}{64}$

(ii) $\frac{7}{24}$

(iii) $\frac{17}{400}$

(iv) $\frac{1}{1250}$

(vi) $\frac{7}{80}$

(iv) $\frac{1}{5}$

 [Watch Video Solution](#)

2. Express each of the following recurring decimals into the rational number :

(i) $0.\bar{7}$

(ii) $0.\bar{6}$

(iii) $1.\bar{3}$

(iv) $3.\bar{8}$

 [Watch Video Solution](#)

3. Express each of the following recurring decimals into the rational number :

(i) $0.\overline{32}$

(ii) $0.\overline{56}$

(iii) $3.\overline{18}$

(iv) $10.\overline{13}$



Watch Video Solution

4. Express each of the following recurring decimals into the rational number :

(i) $6.\overline{315}$ (ii) $7.\overline{1641}$



Watch Video Solution

5. Evaluate :

2. $\overline{5} - 0.\overline{35}$



Watch Video Solution

6. Evaluate :

2. $\overline{7} + 1.\overline{3}$



Watch Video Solution

7. Evaluate :

1. $\overline{45} + 0.\overline{3}$



Watch Video Solution

8. Find the decimal representation of $\frac{1}{11}$. Deduce from it the decimal representation of $\frac{2}{11}$, $\frac{3}{11}$ and $\frac{4}{11}$.



Watch Video Solution

Exercise 1 C

1. Fill in the blanks :

(i) Every real number is either Number or number.

(ii) The decimal representation of rational number is either or

(iii) The decimal representation of an irrational number is

(iv) The sum of two rational numbers is always

 [View Text Solution](#)

2. Examine whether the following numbers are rational or irrational :

(i) $\sqrt{5}$

(ii) $\sqrt{9}$

(iii) $1 + \sqrt{2}$

(iv) $2 + \sqrt{4}$

(v) $\sqrt{3} - \sqrt{5}$

(vi) $(2 + \sqrt{2})^2$

(vii) $(5 + \sqrt{2})(5 - \sqrt{2})$

(viii) (

 [View Text Solution](#)

3. Examine whether the following numbers are rational or irrational. Give

the decimal representation of rational numbers :

(i) $\sqrt{2.56}$

(ii) $2\sqrt{3}$

(iii) $\frac{\sqrt{36}}{20}$

(iv) $\sqrt{8}$

 [View Text Solution](#)

4. Give a rational number between 0.272772777 ... And 0.3.

 [Watch Video Solution](#)

5. Give a rational number between 0.103 and $0.112111211112 \dots$

 [Watch Video Solution](#)

6. Give an irrational numbers between $0.505005000 \dots$ and $0.525225222 \dots$

 [Watch Video Solution](#)

7. Find two irrational numbers between 0.6 and 0.66.

 [Watch Video Solution](#)

8. Find two irrational numbers between 0.2 and 0.23.

 [Watch Video Solution](#)

9. Find two rational numbers between $0.565665666 \dots$ and $0.585885888 \dots$

..



Watch Video Solution

10. Find two rational numbers between $0.383383338 \dots$ and $0.404404440 \dots$

....



Watch Video Solution

11. Prove that $5 + \sqrt{3}$ is irrational.



Watch Video Solution

12. Prove that $3 - \sqrt{2}$ is irrational.



Watch Video Solution

13. Give an example of each, of two irrational numbers whose: difference is a rational number. difference is an irrational number. sum is a rational number. sum is an irrational number. product is a rational number. product is an irrational number. quotient is a rational number. quotient is an irrational number.



Watch Video Solution

14. Visualise $5.\bar{3}$ on the number line upto 4 decimal places.



Watch Video Solution

Exercise 1 D

1. Evaluate each of the following :

(i) $16^{1/2}$

(ii) $243^{1/5}$

(iii) $81^{1/4}$



Watch Video Solution

2. Evaluate each of the following :

(i) $4^{3/2}$ (ii) $625^{3/4}$ (iii) $81^{3/4}$

 [Watch Video Solution](#)

3. Simplify :

(i) $3^{1/3} \times (2/5)$ (ii) $\left(\frac{1}{2}\right)^{1/5} \times 2^{3/5}$

 [View Text Solution](#)

4. Evaluate each of the following :

(i) $\left\{(81)^{1/5}\right\}^{5/2}$ (ii) $(3\sqrt{64})^{-2}$ (iii) $9^{3/2} + 3 \times 4^0 - \left(\frac{1}{81}\right)$
(vi) $\sqrt{\frac{1}{9}} + (0.01)^{-1/2} - (27)^{4/3}$ (v) $\left(\frac{125}{64}\right)^{2/3} + \left(\frac{256}{625}\right)^{-1/4}$

 [View Text Solution](#)

5. Simplify :

$$\frac{16 \times 2^{n+1} - 4 \times 2^n}{16 \times 2^{n+2} - 2 \times 2^{n+1}}$$



Watch Video Solution

6. Simplify :

$$\frac{5^{n+4} - 6 \times 5^{n+2}}{9 \times 5^{n+1} - 5^{n+1} \times 4}$$



Watch Video Solution

7. Find the value of x in each of the following cases :

(i) $3^{2x+3} = 1$

(ii) $2^{x-5} \times 5^{x-4} = 5$

(iii) $2^{2x+1} = 2^{2x-1} + 12$

(vi) $3^{2x-3} = 3\sqrt{3}$



Watch Video Solution

1. Rationalise the denominator of each the following

$$(i) \frac{2}{\sqrt{3}}$$

$$(ii) \frac{1}{3\sqrt{5}}$$

$$(iii) \frac{1}{\sqrt{8}}$$

$$(iv) \frac{\sqrt{2} + 1}{\sqrt{3}}$$



Watch Video Solution

2. Rationalise the denominator of each the of the following :

$$(i) \frac{1}{3 + \sqrt{5}}$$

$$(ii) \frac{1}{\sqrt{5} - \sqrt{3}}$$

$$(iii) \frac{16}{\sqrt{41} + 5}$$

$$(iv) \frac{30}{5\sqrt{3} + 3\sqrt{5}}$$



Watch Video Solution

3. Simplify each of the following :

$$(i) \frac{\sqrt{2} + 1}{\sqrt{2} - 1} + \frac{\sqrt{2} - 1}{\sqrt{2} + 1}$$

$$(ii) \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}} + \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} + \sqrt{3}}$$



Watch Video Solution

4. If $\sqrt{2} = 1.414$, $\sqrt{3} = 1.732$, find the value of the following :

(i) $\frac{\sqrt{2} + 1}{\sqrt{2} - 1}$

(ii) $\frac{\sqrt{3} - 1}{\sqrt{3} + 1}$

(iii) $\frac{2 + \sqrt{6}}{\sqrt{2}}$



Watch Video Solution

5. Find the value of a and b in each of the following

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

(ii) $\frac{\sqrt{2} + 1}{\sqrt{2} - 1} = a - b\sqrt{2}$

(iii) $\frac{5 + 4\sqrt{2}}{5 - 4\sqrt{2}}$



Watch Video Solution

6. If $x = 2 + \sqrt{3}$, then find :

(i) $\frac{1}{x}$

(ii) $x + \frac{1}{x}$

(iii) $x - \frac{1}{x}$

(iv) $x^2 + \frac{1}{x^2}$



Watch Video Solution

7. If $x = 3 + 2\sqrt{2}$, then find :

(i) $\frac{1}{x}$

(ii) $x + \frac{1}{x}$

(iii) $x - \frac{1}{x}$

(iv) $x^2 - \frac{1}{x^2}$



Watch Video Solution

8. If $x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ and $y = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$ find $x^2 + y^2$



Watch Video Solution

9. If $a = 1 - \sqrt{2}$, then find the value of $\left(a - \frac{1}{a}\right)^3$



Watch Video Solution

10. Evaluate $\frac{15}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}}$ is being given that $\sqrt{5} = 2.236$ and $\sqrt{10} = 3.162$



Watch Video Solution

11. Write the following surds in decending order of their magnitudes :

(i) $3\sqrt{2}, 6\sqrt{3}, 9\sqrt{4}$

(ii) $3\sqrt{3}, 4\sqrt{5}, \sqrt{2}, 6\sqrt{10}$



Watch Video Solution

12. If $25^{x-1} = 5^{2x-1} - 100$, then find the value of x .



Watch Video Solution

13. Which is greater $\sqrt{11} - \sqrt{6}$ or $\sqrt{17} - \sqrt{12}$?



Watch Video Solution

14. If $x = 7 - 4\sqrt{3}$ then find the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$



Watch Video Solution

15. If $x = 2 + \sqrt{3}$, then find the value of $x^4 - 4x^3 + x^2 + x + 1$.



Watch Video Solution

16. $\sqrt{5 + 2\sqrt{6}} + \sqrt{8 - 2\sqrt{15}}$

 [Watch Video Solution](#)

17. If $\frac{9^n \times 3^2 \times (3^{-n/2})^{-2} - (27)^n}{3^{3m} \times 2^3} = \frac{1}{27}$, prove that $m-n=1$.

 [Watch Video Solution](#)

18. Rationalise the denominator of :

(i) $\frac{5}{3 + \sqrt{5} - 2\sqrt{2}}$

(ii) $\frac{2}{\sqrt{5} + \sqrt{3} + 2}$

 [Watch Video Solution](#)

Revision Exercise Very Shortanswer Questions

1. Find a rational number between $\frac{1}{10}$ and $\frac{1}{30}$.



[Watch Video Solution](#)

 [Watch Video Solution](#)

2. Find a rational number between $-\frac{1}{2}$ and $\frac{1}{6}$.

 [Watch Video Solution](#)

3. Express $\frac{3}{4}$ in the decimal form.

 [Watch Video Solution](#)

4. Find the decimal representation of $\frac{4}{3}$.

 [Watch Video Solution](#)

5. Express $0.\bar{5}$ in the form of $\frac{p}{q}$.

 [View Text Solution](#)

6. What is the rationalisation factor of $\frac{3}{\sqrt{5}}$?

 [Watch Video Solution](#)

7. What is the rationalisation factor of $\frac{1}{3 + \sqrt{5}}$?

A. $3 + \sqrt{5}$

B. $\frac{3 - \sqrt{5}}{4}$

C. $3 - \sqrt{5}$

D. none of these

Answer: C

 [Watch Video Solution](#)

8. Evaluate : $\left[(3\sqrt{8}) - \frac{1}{2} \right]^4$.

 [View Text Solution](#)

9. Simplify $\frac{1}{(625)^{-1/4}}$.

A. 5

B. $\frac{1}{5}$

C. 25

D. $\frac{1}{25}$

Answer: A



Watch Video Solution

10. If $x = \frac{1}{\sqrt{3} + \sqrt{2}}$. Then find $\frac{1}{x}$.



Watch Video Solution

Revision Exercise Short Answer Questions

1. Find two rational numbers between $-\frac{1}{4}$ and $\frac{2}{5}$.

 [Watch Video Solution](#)

2. Find three rational numbers between $\frac{1}{10}$ and $\frac{2}{15}$.

 [Watch Video Solution](#)

3. Express $\frac{13}{7}$ in the decimal form.

 [Watch Video Solution](#)

4. Express $0.\overline{17}$ in the form of $\frac{p}{q}$.

 [Watch Video Solution](#)

5. Express $4.\overline{163}$ in the form of $\frac{p}{q}$.



Watch Video Solution

6. Rationalise the denominator : $\frac{5}{\sqrt{11} + 4}$.



Watch Video Solution

7. Simplify : $\frac{1}{\sqrt{3} + \sqrt{2}} - \frac{1}{\sqrt{3} - \sqrt{2}} + \frac{2}{\sqrt{2} + 1}$



Watch Video Solution

8. Represent $\sqrt{2}$, $\sqrt{3}$ and $\sqrt{5}$ on the real line



Watch Video Solution

9. Represents $\sqrt{9.3}$ on the number line.



Watch Video Solution

10. If $a + b\sqrt{5} = \frac{4 - 3\sqrt{5}}{4 + 3\sqrt{5}}$, then find the values of a and b.

A. $a = \frac{61}{29}, b = \frac{24}{29}$.

B. $a = \frac{60}{29}, b = \frac{20}{29}$.

C. $a = \frac{1}{29}, b = \frac{4}{29}$.

D. NONE OF THESE

Answer: A



Watch Video Solution