IX Homework (1 mark Questions)

Number Systems

1) A rational number equivalent to 5/7 is (a) 15/17 (b) 25/27 (c) $\frac{10}{14}$ (d) $\frac{10}{27}$

2) An example of a whole number is (a) 0 (b) $-1/2$ (c) $11/5$ (d) -7

3) Given a rational number $-5/9$. This rational number can also be known as (a) a natural number (b) a whole number (c) an integer (d) a real number.

4) The rational number $0.\overline{3}$ can also be written as (a) 0.3 (b) 3/10 (c) 0.33 (d) 1/3

5) If the decimal representation of a number is non-terminating, non-recurring, then the number is (a) a natural number (b) a rational number (c) a whole number (d) an irrational number

6) A rational number between 1/7 and 2/7 is (a) 1/14 (b) 2/21 (c) 5/14 (d) 5/21

7) The number 1.101001000100001.... is (a) a natural number (b) a whole number (c) a rational number (d) an irrational number

8) Irrational number between 1.011243... and 1.012243... is (a) 1.011143... (b) 1.012343... (c) 1.01152243... (d) 1.013243

9) Every point on a number line
(a) can be associated with a rational number
(b) can be associated with an irrational number
(c) can be associated with a natural number
(d) can be associated with a real number.

10) In meteorological department, temperature is measured as a (a) natural number (b) whole number (c) rational no. (d) irrational no.

11) The number of irrational numbers between 15 and 18 is infinite (a) true (b) false

12) Write a rational number between rational numbers 1/9 and 2/9.

13) Write a rational number not lying between $-1/5$ and $-2/5$

14) Write 327/500 in decimal form.

15) Write a rational number which does not lie between the rational numbers $-2/3$ and $-1/5$

16) Write any two irrational numbers.

17) The number 3.142678 is (a) an irrational number (b) a rational number (c) a whole number (d) a natural number.

18) A rational number between $\sqrt{2}$ and $\sqrt{3}$ is (a) 1.1 (b) $\frac{\sqrt{2}\cdot\sqrt{3}}{2}$ (c) 1.5 (d) 1.8

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19) The product of any two irrational numbers is (a) always an irrational number (b) always a rational number (c) always an integer (d) sometimes rational, sometimes irrational.

20) On adding $2\sqrt{3}+3\sqrt{2}$, we get (a) $5\sqrt{5}$ (b) $5(\sqrt{3}+\sqrt{2})$ (c) $2\sqrt{3}+3\sqrt{2}$ (d) none

21) On dividing $6\sqrt{27}$ by $2\sqrt{3}$, we get (a) $3\sqrt{9}$ (b) 6 (c) 9 (d) none of these

22) $2-\sqrt{7}$ is (a) a rational number (b) an irrational number (c) an integer (d) a natural number.

23) $-3+2\sqrt{3}-\sqrt{3}$ is (a) an irrational no. (b) a positive rational no. (c) a negative rational number (d) an integer.

24) $\sqrt{12}+\sqrt{10}-\sqrt{2}$ is (a) a positive rational number (b) equal to zero (c) an irrational number (d) a negative integer.

25) $2\sqrt{3}+\sqrt{3}$ is equal to (a) $2\sqrt{6}$ (b) 6 (c) $3\sqrt{3}$ (d) $4\sqrt{6}$

26) On simplifying $(\sqrt{5}+\sqrt{7})^2$, we get (a) 12 (b) $\sqrt{35}$ (c) $\sqrt{5}+\sqrt{7}$ (d) $12+2\sqrt{35}$

27) For rationalising the denominator of the expression $\frac{1}{\sqrt{12}}$, we multiply and divide by (a) $\sqrt{6}$ (b) 12 (c) $\sqrt{2}$ (d) $\sqrt{3}$.

28) To rationalise the denominator of the expression $\frac{1}{\sqrt{7}-\sqrt{6}}$, we multiply and divide by (a) $\sqrt{7}+\sqrt{6}$ (b) $\sqrt{6}$ (c) $\sqrt{7}\cdot\sqrt{6}$ (d) $\sqrt{7}$.

29) $\sqrt{10}\times\sqrt{15}$ is equal to (a) $6\sqrt{5}$ (b) $5\sqrt{6}$ (c) $\sqrt{25}$ (d) $10\sqrt{5}$

30) $-\frac{\sqrt{28}}{\sqrt{343}}$ is ___ (a) a natural number (b) a fraction (c) an irrational number (d) a rational number.

31) After rationalising the denominator of $\frac{5}{3\sqrt{2}-2\sqrt{3}}$, we get denominator as 7. (a) true (b) false.

32) Addition of expression $5\sqrt{3}-2\sqrt{7}$ and $2\sqrt{3}+\sqrt{5}$ is (a) $5\sqrt{3}-2\sqrt{7}+2\sqrt{3}-\sqrt{5}$ (b) $10\sqrt{6}-2\sqrt{7}+\sqrt{5}$ (c) $7\sqrt{3}-2\sqrt{7}+\sqrt{5}$ (d) none of these

33) The value of $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$ is equal to (a) $\sqrt{2}$ (b) 2 (c) 4 (d) 8

34) Simplify: $\sqrt{72}+\sqrt{800}-\sqrt{18}$

35) State with reason whether $\sqrt{20}\times\sqrt{45}$ is a surd or not?

36) Simplify: $(\sqrt{13}+\sqrt{5})(\sqrt{13}-\sqrt{5})$

37) Simplify: $\sqrt{125}\times\sqrt{5}$

38) $\frac{1}{\sqrt{5}}$ is equal to (a) $\frac{\sqrt{5}}{5}$ (b) $5\sqrt{5}$ (c) $\sqrt{25}$ (d) $\sqrt{5}$

39) On simplifying $(\sqrt{3}-\sqrt{7})^2$, we get (a) $2-\sqrt{21}$ (b) $5-\sqrt{21}$ (c) $2(5-\sqrt{21})$ (d) $10-\sqrt{21}$

40) On simplifying $(3+\sqrt{5})(3-\sqrt{5})$, we get (a) 8 (b) 4 (c) 2 (d) $\sqrt{2}$.

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41) On simplifying $8^3 \cdot 2^4$, we get (a) 16^7 (b) 2^{13} (c) 2^{10} (d) 8^4

42) $(16)^{3/4}$ is equal to (a) 2 (b) 4 (c) 8 (d) 16

43) $(125)^{-1/3}$ can be written as (a) 5 (b) −5 (c) 1/5 (d) none of these

44) $(36)^{3/2}$ is equal to (a) 36 (b) 6 (c) 216 (d) 72

45) Simplified form of $3^{2/3} \cdot 3^{1/5}$ is (a) $3^{2/15}$ (b) $9^{2/15}$ (c) $3^{2/3}$ (d) $3^{13/15}$

46) Simplified value of $(16)^{-1/4} \times \sqrt[4]{16}$ is (a) 16 (b) 4 (c) 1 (d) 0

47) $\left(-\frac{1}{27}\right)^{-2/3}$ is equal to (a) 8 $\left(\frac{1}{27}\right)^{-2/3}$ (b) 9 (c) 1/9 (d) $27\sqrt{27}$

48) Which of the following is equal to x?
(a) $x^{\frac{12}{7}} - x^{\frac{5}{7}}$ (b) $\sqrt[12]{(x^4)^{1/3}}$ (c) $\left(\sqrt{x^3}\right)^{2/3}$ (d) $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

49) Find the value of $\frac{2^\circ + 7^\circ}{5^\circ}$

50) Find the value of $\sqrt{(3^{-2})}$

51) Which is the greatest among $\sqrt{2}$, $\sqrt[3]{4}$ and $\sqrt[4]{3}$?

52) Find the value of $(81)^{0.16} \times (81)^{0.09}$

53) Find the value of $x^{a-b} \times x^{b-c} \times x^{c-a}$

54) Find the value of $(16^{\frac{1}{2}})^{1/2}$

55) Find the value of $\left(\frac{64}{25}\right)^{-3/2}$

56) Simplify $\frac{7^{1/3}}{7^{1/5}}$

57) On simplifying $\sqrt[4]{\sqrt[3]{3^2}}$, we get (a) $3^{1/12}$ (b) $3^{1/8}$ (c) $3^{1/9}$ (d) $3^{1/6}$

58) Value of $(256)^{0.16} \times (256)^{0.09}$ is (a) 4 (b) 16 (c) 64 (d) 256.25

59) To rationalise the denominator of $\frac{1}{\sqrt{7}}$, we multiply and divide by (a) 7 (b) $2\sqrt{2}$ (c) $\sqrt{7}$ (d) $3\sqrt{3}$

60) Value of $\sqrt[4]{(81)^{-2}}$ is (a) 1/9 (b) 1/3 (c) 9 (d) 1/81

61) Is −25 a rational number? Give reason.

62) Find a rational and an irrational number between 0.0001 and 0.001

63) Classify as rational or irrational with justification:
(i) $-\sqrt{0.4}$ (ii) $(1+\sqrt{5}) - (4+\sqrt{5})$

64) Which is greater: $\sqrt[3]{16}$ or $\sqrt[5]{8}$?

65) Give examples of two irrational numbers, the product of which is (a) a rational number (b) an irrational number

66) On simplifying $\left(\sqrt[3]{x^2}\right)^{3/2}$, we get (a) $\sqrt{x}$ (b) x (c) $x^{3/2}$ (d) 1

67) The value of x, if $\sqrt[3]{4x-7} = 5$ is
(a) 23 (b) 39 (c) 33 (d) 34.

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H.W-3 (Solutions)

1) $\frac{5\times2}{7\times2} = \frac{10}{14}$ (c)

2) 0 (a)

3) a real number (d)

4) $\frac{1}{3}$ (d)

5) an irrational number (d)

6) $\frac{1}{7}$ $\frac{2}{7}$

$\frac{1\times3}{7\times3}$ $\frac{2\times3}{7\times3}$

$\frac{3}{21}$ $\frac{6}{21}$

(d) $\frac{5}{21}$

7) an irrational number (d)

8) ~~0~~ 1.01152243 (c)

9) can be associated with a real number (d)

10) rational number (c)

11) true (a)

12) $\frac{1}{9}\times\frac{2}{2}$ $\frac{2}{9}\times\frac{2}{2}$

$\frac{2}{18}$ $\frac{4}{18}$

$\frac{3}{18} = \frac{1}{6}$

13) 0 or $-\frac{3}{5}$

14) ~~$\frac{327}{500}$~~ $\frac{65.4}{100} = 0.654$

15) Write any +ve rational number

16) $\sqrt{7}, \sqrt{5}$

17) a rational number (b)

18) $\sqrt{2} = 1.414\cdots$
$\sqrt{3} = 1.732\cdots$ | 1.5 (c)

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19) eg:- $\sqrt{2}\times\sqrt{8} = \sqrt{16} = 4$, rational
$\sqrt{2}\times\sqrt{3} = \sqrt{6}$, irrational
(a) sometimes rational, sometime irrational

20) $2\sqrt{3}+3\sqrt{2}$ (c)

21) $\frac{6\sqrt{27}}{2\sqrt{3}} = \frac{6\times 3\sqrt{3}}{2\sqrt{3}} = 3\times 3 = 9$ (c)

$3|27$, $3|9$, 3

22) an irrational number (b)

23) $-3+2\sqrt{3}-\sqrt{3} = -3+\sqrt{3}$, an irrational number (a)

24) $\sqrt{12}+\sqrt{10}-\sqrt{2} = 2\sqrt{3}+\sqrt{10}-\sqrt{2}$
an irrational number (c)

$2|12$, $2|6$, 3

25) $2\sqrt{3}+\sqrt{3} = 3\sqrt{3}$ (c)

26) $(\sqrt{5}+\sqrt{7})^2 = (\sqrt{5})^2+(\sqrt{7})^2+2\times\sqrt{5}\times\sqrt{7} = 5+7+2\sqrt{35}$
$= 12+2\sqrt{35}$ (d) $[\because (a+b)^2 = a^2+b^2+2ab]$

27) $\frac{1}{\sqrt{12}} = \frac{1}{2\sqrt{3}} = \frac{1\times\sqrt{3}}{2\sqrt{3}\times\sqrt{3}} = \frac{\sqrt{3}}{6}$
$\sqrt{3}$ (d)

28) $\frac{1}{(\sqrt{7}-\sqrt{6})}\times(\sqrt{7}+\sqrt{6}) = \frac{\sqrt{7}+\sqrt{6}}{(\sqrt{7})^2-(\sqrt{6})^2} = \frac{\sqrt{7}+\sqrt{6}}{7-6} = \sqrt{7}+\sqrt{6}$
$\sqrt{7}+\sqrt{6}$ (a)

29) $\sqrt{10}\times\sqrt{15} = \sqrt{2}\times\sqrt{5}\times\sqrt{3}\times\sqrt{5} = 5\sqrt{6}$ (b)

30) $-\frac{\sqrt{28}}{\sqrt{343}} = -\frac{2\sqrt{7}}{7\sqrt{7}} = -\frac{2}{7}$

$2|28$, $2|14$, 7 ; $7|343$, $7|49$, 7

a rational number (d)

31) $\frac{5\times(3\sqrt{2}+2\sqrt{3})}{(3\sqrt{2}-2\sqrt{3})(3\sqrt{2}+2\sqrt{3})} = \frac{5(3\sqrt{2}+2\sqrt{3})}{(3\sqrt{2})^2-(2\sqrt{3})^2} = \frac{5(3\sqrt{2}+2\sqrt{3})}{18-12}$
$= \frac{5(3\sqrt{2}+2\sqrt{3})}{6}$

false (b)

32) $5\sqrt{3}-2\sqrt{7}+2\sqrt{3}+\sqrt{5} = 7\sqrt{3}-2\sqrt{7}+\sqrt{5}$ (c)

33) $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$
$= \frac{4\sqrt{2}+4\sqrt{3}}{2\sqrt{2}+2\sqrt{3}}$
$= \frac{4(\sqrt{2}+\sqrt{3})}{2(\sqrt{2}+\sqrt{3})} = 2$ (b)

$2|32$, $2|16$, $2|8$, $2|4$, 2 ; $2|48$, $2|24$, $2|12$, $2|6$, 3 ; $2|8$, $2|4$, 2 ; $2|12$, $2|6$, 3

34) $\sqrt{72}+\sqrt{800}-\sqrt{18}$
$= 6\sqrt{2}+20\sqrt{2}-3\sqrt{2}$
$= \underline{23\sqrt{2}}$

$72 = 2\times2\times2\times3\times3$; $800 = 2\times2\times2\times2\times2\times5\times5$

35) $\sqrt{20}\times\sqrt{45} = 2\sqrt{5}\times3\sqrt{5}$
$= 6\times5 = 30$,
which is a rational number and therefore is not a surd.

$20 = 2\times2\times5$; $45 = 3\times3\times5$

36) $(\sqrt{13}+\sqrt{5})(\sqrt{13}-\sqrt{5}) = (\sqrt{13})^2-(\sqrt{5})^2 = 13-5 = \underline{8}$

37) $\sqrt{125}\times\sqrt{5}$
$= 5\sqrt{5}\times\sqrt{5} = 5\times5 = \underline{25}$

$125 = 5\times5\times5$

38) $\frac{1\times\sqrt{5}}{\sqrt{5}\times\sqrt{5}} = \frac{\sqrt{5}}{5}$ (a)

39) $(\sqrt{3}-\sqrt{7})^2 = (\sqrt{3})^2+(\sqrt{7})^2-2\times\sqrt{3}\times\sqrt{7}$
$= 3+7-2\sqrt{21} = 10-2\sqrt{21} = 2(5-\sqrt{21})$ (c)

40) $(3+\sqrt{5})(3-\sqrt{5}) = 3^2-(\sqrt{5})^2 = 9-5 = 4$ (b)

IX (Solutions)

41) $8^3 \cdot 2^4 = (2^3)^3 \cdot 2^4 = 2^9 \cdot 2^4 = 2^{9+4} = 2^{13}$ (b)

42) $(16)^{\frac{3}{4}} = 2^{4 \times \frac{3}{4}} = 2^3 = 8$ (c)

43) $(125)^{-\frac{1}{3}} = 5^{3 \times -\frac{1}{3}} = 5^{-1} = \frac{1}{5}$ (c)

44) $(36)^{\frac{3}{2}} = 6^{2 \times \frac{3}{2}} = 6^3 = 216$ (c)

45) $3^{\frac{2}{3}} \cdot 3^{\frac{1}{5}} = 3^{\frac{2\times5}{3\times5} + \frac{1\times3}{5\times3}}$

$= 3^{\frac{10+3}{15}} = 3^{\frac{13}{15}}$ (d)

46) $(16)^{-\frac{1}{4}} \times \sqrt[4]{16} = (16)^{-\frac{1}{4}} \times (16)^{\frac{1}{4}} = (16)^{-\frac{1}{4}+\frac{1}{4}} = 16^0 = 1$ (c)

47) $\left(-\frac{1}{27}\right)^{-\frac{2}{3}} = -\frac{1}{3^{3 \times -\frac{2}{3}}} = -\frac{1}{3^{-2}} = (-3)^2 = \underline{9}$ (b)

48) $\left(\sqrt{x^3}\right)^{\frac{2}{3}} = \left(x^{\frac{3}{2}}\right)^{\frac{2}{3}} = x^{\frac{3}{2} \times \frac{2}{3}} = x$ (c)

49) $\frac{2^\circ + 7^\circ}{5^\circ} = \frac{1+1}{1} = \frac{2}{1} = \underline{2}$

50) $\sqrt{3^{-2}} = 3^{-2 \times \frac{1}{2}} = 3^{-1} = \underline{\frac{1}{3}}$

51) $\sqrt{2}, \sqrt[3]{4}, \sqrt[4]{3}$

$2^{\frac{1}{2}}, (4)^{\frac{1}{3}}, (3)^{\frac{1}{4}}$ LCM (2,3,4) = 12

$2^{\frac{1\times6}{2\times6}}, 4^{\frac{1\times4}{3\times4}}, 3^{\frac{1\times3}{4\times3}}$

$2^{\frac{6}{12}}, 4^{\frac{4}{12}}, 3^{\frac{3}{12}} \Rightarrow \sqrt[12]{2^6}, \sqrt[12]{4^4}, \sqrt[12]{3^3}$

$= \sqrt[12]{64}, \sqrt[12]{256}, \sqrt[12]{27}$

$\therefore \sqrt[12]{256} > \sqrt[12]{64} > \sqrt[12]{27}$

$\Rightarrow \sqrt[3]{4} > \sqrt{2} > \sqrt[4]{3}$

52) $(81)^{0.16} \times (81)^{0.09} = (81)^{0.16+0.09} = (81)^{0.25} = (81)^{\frac{1}{4}} = 3^{4 \times \frac{1}{4}} = \underline{3}$

53) $x^{a-b} \times x^{b-c} \times x^{c-a} = x^{a-b+b-c+c-a} = x^0 = \underline{1}$

54) $\left(16^{\frac{1}{2}}\right)^{\frac{1}{2}} = 16^{\frac{1}{4}} = 2^{4 \times \frac{1}{4}} = \underline{2}$

55) $\left(\frac{64}{25}\right)^{-\frac{3}{2}} = \left(\frac{8^2}{5^2}\right)^{-\frac{3}{2}} = \frac{8^{2 \times -\frac{3}{2}}}{5^{2 \times -\frac{3}{2}}} = \frac{8^{-3}}{5^{-3}} = \frac{5^3}{8^3} = \underline{\frac{125}{512}}$

56) $\frac{7^{\frac{1}{3}}}{7^{\frac{1}{5}}} = 7^{\frac{1\times5}{3\times5}-\frac{1\times3}{5\times3}} = 7^{\frac{5-3}{15}} = 7^{\frac{2}{15}}$

57) $\sqrt[4]{\sqrt{3\sqrt{3^2}}} = 3^{\frac{1}{2}\times\frac{1}{3}\times\frac{1}{4}\times2} = 3^{\frac{1}{6}}$ (d)

58) $(256)^{0.16}\times(256)^{0.09} = (256)^{0.16+0.09} = (256)^{0.25} = (256)^{\frac{1}{4}} = 4^{\frac{4\times1}{4}} = 4$ (a)

59) $\sqrt{7}$ (c)

60) $\sqrt[4]{(81)^{-2}} = 81^{-\frac{2}{4}\times\frac{1}{2}} = (81)^{-\frac{1}{2}} = 9^{2\times-\frac{1}{2}\times1} = \frac{1}{9}$ (a)

61) -25 can be written as $-\frac{25}{1}$, which is in the form $\frac{p}{q}$; where $q\neq0$. Hence -25 is a rational number.

62) 0.0001 and 0.001

$\frac{1}{10000}$ $\quad$ $\frac{1\times10}{1000\times10}$

$\frac{1}{10000}$ $\quad$ $\frac{10}{10000}$

Rational number $= \frac{9}{10000} = 0.0009$

Irrational number $= 0.000919119111911111\cdots$

63) $\sqrt[3]{16}$, $\sqrt[5]{8}$

$(16)^{\frac{1}{3}}$, $(8)^{\frac{1}{5}}$ $\quad$ LCM = 15

$16^{\frac{1\times5}{3\times5}}$, $8^{\frac{1\times3}{5\times3}}$

$16^{\frac{5}{15}}$, $8^{\frac{3}{15}}$

$\sqrt[15]{16^5}$, $\sqrt[15]{8^3}$

$\sqrt[15]{16^5} > \sqrt[15]{8^3} \Rightarrow \sqrt[3]{16} > \sqrt[5]{8}$

64)(i) $-\sqrt{0.4} = -\sqrt{\frac{4}{10}} = -\frac{2}{\sqrt{10}} = -\frac{2\sqrt{10}}{\sqrt{10}\times\sqrt{10}} = \frac{-2\sqrt{10}}{10} = -\frac{1}{5}\sqrt{10}$, irrational

(ii) $(1+\sqrt{5})-(4+\sqrt{5}) = 1+\sqrt{5}-4-\sqrt{5} = 1-4 = -3$, rational.

65) $\sqrt{2} \times \sqrt{8} = \sqrt{16} = 4$, rational number

$\sqrt{2} \times \sqrt{3} = \sqrt{6}$, irrational number.

66) $\left(\sqrt[3]{x^2}\right)^{\frac{3}{2}} = x^{\frac{2}{1} \times \frac{1}{3} \times \frac{3}{2}} = x$ (b)

67) $\sqrt[3]{4x-7} = 5$

$(4x-7)^{\frac{1}{3}} = 5$

Taking cubes on both sides, $(4x-7)^{\frac{3}{3}} = 5^3$

$\Rightarrow 4x - 7 = 125$

$\Rightarrow 4x = 132$

$x = \frac{132}{4} = 33$ (c)