QB365 Question Bank Software Study Materials

Real Numbers Important 2 Marks Questions With Answers (Book Back and Creative)

9th Standard

Maths

Total Marks : 60

2 Marks

30 x 2 = 60

1) Write the following in the form of 5^n

$\sqrt{5}$

Answer : $5^{\frac{1}{2}}$

2) Find the value of $(243)^{\frac{2}{5}}$

Answer : $(243)^{\frac{2}{5}} = (3^5)^{\frac{2}{5}}$

$= 3^2$

$= 9$

3	243
3	81
3	27
3	9
3	3
	1

3) Use a fractional index to write: $\left(\frac{1}{\sqrt[3]{100}}\right)^7$

Answer : $\left(\frac{1}{\sqrt[3]{100}}\right)^7 = (\frac{1}{100^{\frac{1}{3}}})^7 = (\frac{1^{\frac{1}{3}}}{100^{\frac{1}{3}}})^7 = (\frac{1}{100})^{\frac{7}{3}}$

$= 10^{\frac{-14}{3}}$

4) Given $\sqrt{2}$ = 1.414, find the value of $\frac{8-5\sqrt{2}}{3-2\sqrt{2}}$ (to 3 places of decimals).

Answer : $\frac{8-5\sqrt{2}}{3-2\sqrt{2}} = \frac{(8-5\sqrt{2})\times(3+2\sqrt{2})}{(3-2\sqrt{2})\times(+2\sqrt{2})} = \frac{24-15\sqrt{2}+16\sqrt{2}-10\times2}{3^2-(2\sqrt{2})^2}$

$= \frac{24+\sqrt{2}-20}{9-4\times2} = \frac{4+\sqrt{2}}{1}$ = 4 + 1.414 = 5.414

5) Write the following numbers in decimal form:

(i) 3.459×10^6

(ii) 5.678×10^4

(iii) 1.00005×10^{-5}

(iv) 2.530009×10^{-7}

Answer : (i) 3.459×10^6 = 3459000

(ii) 5.678×10^4 = 56780

(iii) 1.00005×10^{-5} = 0.0000100005

(iv) 2.530009×10^{-7} = 0.0000002530009

6) Simplify: $\left(8.41 \times 10^4\right) \div \left(4.3 \times 10^5\right)$

Answer :
$= \frac{8.41\times10^4}{4.3\times10^5}$

$= \frac{841\times10^2}{43\times10^4}$

$= 19.558 \times 10^{-2}$

$= 1.9558 \times 10^{-1}$

7) Express the following in the form 2^n:

$\frac{1}{4}$

Answer : $\frac{1}{4} = \frac{1}{2\times2} = \frac{1}{2^2}$ = 2^{-2}

8) Express the following in the form 2^n:

$\sqrt{2}$

Answer : $\sqrt{2} = 2^{1/2}$

9) Arrange in ascending order: $\sqrt[3]{2}, \sqrt[2]{4}, \sqrt[4]{3}$

Answer : The order of the surds $\sqrt[3]{2}, \sqrt[2]{4}$ and $\sqrt[4]{3}$ are 3, 2, 4.

L.C.M. of 3, 2, 4 = 12.

$\sqrt[3]{2} = \left(2^{\frac{1}{3}}\right) = \left(2^{\frac{4}{12}}\right) = \sqrt[12]{2^4} = \sqrt[12]{16};$

$\sqrt[2]{4} = \left(4^{\frac{1}{2}}\right) = \left(4^{\frac{6}{12}}\right) = \sqrt[12]{2^6} = \sqrt[12]{4096};$

$\sqrt[3]{3} = \left(3^{\frac{1}{4}}\right) = \left(3^{\frac{3}{12}}\right) = \sqrt[12]{3^4} = \sqrt[12]{27}$

The ascending order of the surds $\sqrt[3]{2}, \sqrt[2]{4}, \sqrt[4]{3}$ is $\sqrt[12]{16} < \sqrt[12]{27} < \sqrt[12]{4096}$, that is, $\sqrt[3]{2}, \sqrt[4]{3}, \sqrt[2]{4}$

10) Express each of the following surds in its simplest form $\sqrt[3]{108}$ and find its order, radicand and coefficient.

Answer : $\sqrt[3]{108} = \sqrt[3]{27 \times 4}$

$= \sqrt[3]{3^3 \times 4}$

$= \sqrt[3]{3^3} \times \sqrt[3]{4}$ (Laws of radicals - ii)

$= 3 \times \sqrt[3]{4}$ (Laws of radicals- i)

order = 3; radicand = 4; coefficient = 3

2	108
2	54
3	27
3	9
3	3
	1

11) Simplify the following: $\sqrt{63} - \sqrt{175} + \sqrt{28}$

Answer : $\sqrt{63} - \sqrt{175} + \sqrt{28} = \sqrt{9 \times 7} - \sqrt{25 \times 7} + \sqrt{4 \times 7}$

$= 3\sqrt{7} - 5\sqrt{7} + 2\sqrt{7}$

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

$= 5\sqrt{7} - 5\sqrt{7}$

$= 0$

12) Multiply $\sqrt[3]{40}$ and $\sqrt[3]{16}$.

Answer : $\sqrt[3]{40} \times \sqrt[3]{16} = \left(\sqrt[3]{2 \times 2 \times 2 \times 5}\right) \times \left(\sqrt[3]{2 \times 2 \times 2 \times 2}\right)$

$= \left(2 \times \sqrt[3]{5}\right) \times \left(2 \times \sqrt[3]{2}\right) = 4 \times \left(\sqrt[3]{2} \times \sqrt[3]{5}\right) = 4 \times \sqrt[3]{2 \times 5}$

$= 4\sqrt[3]{10}$.

13) Compute and give the answer in the simplest form: $2\sqrt{72} \times 5\sqrt{32} \times 3\sqrt{50}$

Answer : $2\sqrt{72} \times 5\sqrt{32} \times 3\sqrt{50} = (2 \times 6\sqrt{2}) \times (5 \times 4\sqrt{2}) \times (3 \times 2\sqrt{2})$

$2 \times 5 \times 3 \times 6 \times 4 \times 5 \times \sqrt{2} \times \sqrt{2} \times \sqrt{2}$

Let us simplify:

$\sqrt{72} = \sqrt{36 \times 2} = 6\sqrt{2}$

$\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$

$\sqrt{50} = \sqrt{25 \times 2} = 5\sqrt{2}$

$= 3600 \times 2\sqrt{2}$

$= 7200\sqrt{2}.$

14) Write the following numbers in decimal form:

6.34×10^4

Answer : 6.34×10^4

$\Rightarrow$ 6 . 3 4 0 0 = 63400

1 2 3 4

15) Write the following in scientific notation: $(0.00000005)^3$

Answer : $(0.00000005)^3 = (5.0 \times 10^{-8})^3$

$= (5.0)^3 \times (10^{-8})^3$

$= (125.0) \times (10)^{-24}$

$= 1.25 \times 10^2 \times 10^{-24}$

$= 1.25 \times 10^{-22}$

16) Write the following in scientific notation: $(300000)^3 \times (2000)^4$

Answer : $(300000)^3 \times (2000)^4$

$= \left(3.0 \times 10^5\right)^3 \times \left(2.0 \times 10^3\right)^4$

$= (3.0)^3 \times \left(10^5\right)^3 \times (2.0)^4 \times \left(10^3\right)^4$

$= (27.0) \times \left(10^{15}\right) \times (16.0) \times \left(10^{12}\right)$

$= \left(2.7 \times 10^1\right) \times \left(10^{15}\right) \times \left(1.6 \times 10^1\right) \times \left(10^{12}\right)$

$= 2.7 \times 1.6 \times 10^1 \times 10^{15} \times 10^1 \times 10^{12}$

$= 4.32 \times 10^{1+15+1+12} = 4.32 \times 10^{29}$

17) Express the rational number $\frac{1}{27}$ in recurring decimal form by using the recurring decimal expansion of $\frac{1}{3}$. Hence write $\frac{59}{27}$ in recurring decimal form.

Answer : We know that $\frac{1}{3} = 0.\overline{3}$

Therefore $\frac{1}{27} = \frac{1}{9} \times \frac{1}{3} \times \frac{1}{9} \times 0333... = 0.037037.. = 0.\overline{037}$

Also, $\frac{59}{27} = 2\frac{5}{27} = 2 + \frac{5}{27} = 2 + \left(5 \times \frac{1}{27}\right)$

$= 2 + (5 \times 0.\overline{037}) = 2 + (5 \times 0.037037037..)$

$= 2 + 0.185185... = 2.185185.. \quad = 2.\overline{185}$

18) Verify that 1 = $0.\overline{9}$

Answer : Let x = $0.\overline{9}$ = 0.99999... (1)

(Multiply equation (1) by 10)

10 x = 9.99999... (2)

Subtract (1) from (2)

9x = 9 or x = 1

Thus, $0.\overline{9}$ = 1

19) Give any two rational numbers lying between 0.5151151115.... and 0.5353353335...

Answer : Two rational numbers between the given two irrational numbers are 0.5152 and 0.5352

20) Find any two rational numbers between $\frac{1}{2}$ and $\frac{2}{3}$

Answer : A rational number between $\frac{1}{2}$ and $\frac{2}{3}$ = $\frac{1}{2}\left(\frac{1}{2} + \frac{2}{3}\right) = \frac{1}{2}\left(\frac{3+4}{6}\right) = \frac{1}{2}\left(\frac{7}{6}\right) = \frac{7}{12}$

A rational number between $\frac{1}{2}$ and $\frac{7}{12}$ = $\frac{1}{2}\left(\frac{1}{2} + \frac{7}{12}\right) = \frac{1}{2}\left(\frac{6+7}{12}\right) = \frac{1}{2}\left(\frac{13}{12}\right) = \frac{13}{24}$

Hence two rational numbers between $\frac{1}{2}$ and $\frac{2}{3}$ are $\frac{7}{12}$ and $\frac{13}{24}$ (of course, there are many more!)

There is an interesting result that could help you to write instantly rational numbers between any two given rational numbers.

21) Express the following in the form $\frac{p}{q}$, where p and q are integers and q $\neq$ 0.

$0.2\overline{45}$

Answer : Let x = 0.2454545 ..... $\rightarrow$ (1)

10x = 2.454545 ..... $\rightarrow$ (2)

1000x = 245.4545 ..... $\rightarrow$ (3)

(3) - (2) $\Rightarrow$ 1000x - = 245.4545

10x .....

= 2.4545

.....

990x = 243.00000

$x = \frac{243}{990}$ (or) $\frac{27}{110}$

$\therefore 0.2\overline{45} = \frac{27}{110}$

22) Find the value of $\left(\frac{1}{27}\right)^{\frac{-2}{3}}$

Answer : $\left(\frac{1}{27}\right)^{\frac{-2}{3}} = (27)^{\frac{2}{3}} = (3^3)^{\frac{2}{3}} = 3^{2\times\frac{2}{-3}} = 3^2 = 9$

23) Evaluate: $\left(\frac{1}{3}\right)^{-2}$

Answer : $\left(\frac{1}{3}\right)^{-2} = \frac{1}{\left(\frac{1}{3}\right)^2} = \frac{1}{\left(\frac{1}{9}\right)}$ = 9

24) Evaluate :$(0.01)^{-2}$

Answer : $(0.01)^{-2} = \left(\frac{1}{100}\right)^2 = \frac{1}{\left(\frac{1}{100}\right)^{-2}} = \frac{1}{\frac{1}{10000}} = 10000$

25) **Express the following in the form 3^n: 243**

Answer : $243 = 3 \times 3 \times 3 \times 3 \times 3 = 3^5$

26) Can you reduce the following to surds of same order $\sqrt[4]{5}$

Answer : $\sqrt[4]{5} = 5^{\frac{1}{2}} = 5^{\frac{3}{12}} = \sqrt[12]{5^3} = \sqrt[12]{125}$

27) Convert the following rational numbers into decimal

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

(ii) $\frac{47}{99}$

(iii) $-\frac{16}{45}$

Answer : (i) $\frac{2}{3}$ = 0.666... = $0.\overline{6}$

```
3)20(0.66
  18
  20
  18
   20
```

(ii) $\frac{47}{99}$ = 0.4747... = $0.\overline{47}$

```
99)470(0.474
  396
   740
   693
    470
    396
     740
     691
      470
```

(iii) $-\frac{16}{45}$ = 0.355.... = $0.3\overline{5}$

```
45)160(0.355
  135
   250
   225
    250
    225
     250
```

28) Find any 4 irrational numbers between $\frac{1}{4}$ and $\frac{1}{3}$

Answer : $\frac{1}{4}$ = 0.25 and $\frac{1}{3}$ = 0.3333..... = $0.\overline{3}$

In between 0.25 and $0.\overline{3}$, there are infinitely many irrational numbers.

Four irrational numbers between 0.25 and $0.\overline{3}$ are

0.2601001000100001.....

0.2701001000100001.....

0.2801001000100001.....

0.3101001000100001.....

29) Simplify

1. $2^{\frac{3}{3}}2^{\frac{1}{3}}$
2. $\left(3^{\frac{1}{5}}\right)^4$
3. $\frac{7^{\frac{1}{5}}}{7^{\frac{1}{3}}}$
4. $13^{\frac{1}{5}} \times 17^{\frac{1}{5}}$

Answer : 1. $2^{\frac{3}{3}} 2^{\frac{1}{3}} = 2^{\left(\frac{2}{3}+\frac{1}{3}\right)}$

$= 2^{\frac{3}{3}} = 2^1 = 2$

2. $\left(3^{\frac{1}{5}}\right)^4 = 3^{\frac{4}{5}}$

3. $\frac{7^{\frac{1}{5}}}{7^{\frac{1}{3}}} = 7^{\frac{1}{5}-\frac{1}{3}}$

$= 7^{\frac{3-5}{15}} = 7^{\frac{-2}{15}}$

4. $13^{\frac{1}{5}} \times 17^{\frac{1}{5}} = (13 \times 17)^{\frac{1}{5}}$

$= (221)^{\frac{1}{5}}$

30) Find

1. $\left(6.53 \times 10^{-3}\right)^2$
2. $\left(6.1 \times 10^5\right) \div \left(1.2 \times 10^{-3}\right)$

Answer : 1. $\left(6.53 \times 10^{-3}\right)^2 = (6.53)^2 \times \left(10^{-3}\right)^2$

$= 42.64 \times 10^{-6} = 4.264 \times 10^{-5}$

2. $\left(6.1 \times 10^5\right) \div \left(1.2 \times 10^{-3}\right)$

$= \frac{6.1}{1.2} \times \frac{10^5}{10^{-3}} = 5.08 \times 10^8$