



MATHS

BOOKS - SURA MATHS (TAMIL ENGLISH)

REAL NUMBERS

Exercise 2 1

1. Which arrow best shows the position of $\frac{11}{3}$ on the number line ?



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2. Find any three rational numbers between $\frac{-7}{11}$ and $\frac{2}{11}$



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3. Find any five rational numbers between $\frac{1}{4}$ and $\frac{1}{5}$



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4. Find any five rational numbers between 0.1 and 0.11



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5. Find any five rational numbers between -1 and -2



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Exercise 2 2

1. Express the following rational numbers into decimal and state the kind of decimal expansion.

$$\frac{2}{7}$$



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2. Express the following rational numbers into decimal and state the kind of decimal expansion.

$$-5\frac{3}{11}$$



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3. Express the following rational numbers into decimal and state the kind of decimal expansion.

$$\frac{22}{3}$$



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4. Express the following rational numbers into decimal and state the kind of decimal expansion.

$$\frac{327}{200}$$



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5. Express $\frac{1}{13}$ in decimal form . Find the length of the period of decimals .



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6. Express the rational number $\frac{1}{33}$ in recurring decimal form by using the recurring decimal expansion of $\frac{1}{11}$. Hence write $\frac{71}{33}$ in recurring decimal form.



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7. Express the following decimal expression into rational numbers.

$$0.\overline{24}$$



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8. Express the following decimal expression into rational numbers.

$$2.\overline{327}$$



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9. Express the following decimal expression into rational numbers.

-5.132



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10. Express the following decimal expression into rational numbers.

3.17̄



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11. Express the following decimal expression into rational numbers.

$$17.\overline{215}$$



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12. Express the following decimal expression into rational numbers.

$$-21.2137$$



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13. Without actual division , find which of the following rational numbers have terminating decimal expansion.

$$\frac{7}{128}$$



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14. Without actual division , find which of the following rational numbers have terminating decimal expansion.

$$\frac{21}{15}$$



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15. Without actual division , find which of the following rational numbers have terminating decimal expansion.

$$4\frac{9}{35}$$



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16. Without actual division , find which of the following rational numbers have terminating decimal expansion.

$$\frac{219}{2200}$$



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Exercise 2 3

1. Represent the following irrational numbers on the number line.

$$\sqrt{3}$$

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2. Represent the following irrational numbers on the number line.

$$\sqrt{4.7}$$



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3. Represent the following irrational numbers on the number line.

$$\sqrt{6.5}$$



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4. Find any two irrational numbers between 0.3010011000111....and 0.3020020002.....



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5. Find any two irrational numbers between $\frac{6}{7}$
and $\frac{12}{13}$



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6. Find any two irrational numbers between $\sqrt{2}$
and $\sqrt{3}$



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7. Find any two rational numbers between 2.2360679....and 2.236505500....



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Exercise 2 4

1. Represent the following numbers on the number line.

5.348



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2. Represent the following numbers on the number line.

6. $\bar{4}$ upto 3 decimal places.



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3. Represent the following numbers on the number line.

4. $\overline{73}$ upto 4 decimal places.



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Exercise 2 5

1. Write the following in the form of 5^n :

625



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2. Write the following in the form of 5^n :

$\frac{1}{5}$



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3. Write the following in the form of 5^n :

$$\sqrt{5}$$



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4. Write the following in the form of 5^n :

$$\sqrt{125}$$



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5. Write the following in the form of 4^n :

$$16$$



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6. Write the following in the form of 4^n :

8



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7. Write the following in the form of 4^n :

32



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8. Find the value of $(49)^{\frac{1}{2}}$



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



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10. Find the value of $9^{\frac{-3}{2}}$



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11. Find the value of $\left(\frac{64}{125}\right)^{\frac{-2}{3}}$



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12. Use a fractional index to write : $\sqrt{5}$



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13. Use a fractional index to write : $\sqrt[2]{7}$



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14. Use a fractional index to write : $(\sqrt[3]{49})^5$



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



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16. Find the 5^{th} root of 32



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17. Find the 5^{th} root of 243



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18. Find the 5^{th} root of 100000



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19. Find the 5^{th} root of $\frac{1024}{3125}$



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Exercise 2 6

1. Simplify the following using addition and subtraction properties of surds :

$$5\sqrt{3} + 18\sqrt{3} - 2\sqrt{3}$$



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2. Simplify the following using addition and subtraction properties of surds :

$$4\sqrt[3]{5} + 2\sqrt[3]{5} - 3\sqrt[3]{5}$$



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3. Simplify the following using addition and subtraction properties of surds :

$$3\sqrt{75} + 5\sqrt{48} - \sqrt{243}$$



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4. Simplify the following using addition and subtraction properties of surds :

$$5\sqrt[3]{40} + 2\sqrt[3]{625} - 3\sqrt[3]{320}$$



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5. Simplify the following using multiplication and division properties of surds :

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



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6. Simplify the following using multiplication and division properties of surds :

$$\sqrt{35} + \sqrt{7}$$



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7. Simplify the following using multiplication and division properties of surds :

$$\sqrt[3]{27} \times \sqrt[3]{8} \times \sqrt[3]{125}$$



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8. Simplify the following using multiplication and division properties of surds :

$$(7\sqrt{a} - 5\sqrt{b})(7\sqrt{a} + 5\sqrt{b})$$



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9. Simplify the following using multiplication and division properties of surds :

$$\frac{\sqrt{\frac{225}{729}} - \sqrt{\frac{25}{144}}}{\sqrt{\frac{16}{81}}}$$



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10.

If

$$\sqrt{2} = 1.414, \sqrt{3} = 1.732, \sqrt{5} = 2.236, \sqrt{10} = 3.162$$

, then find the values of the following correct to 3 places of decimals .

$$\sqrt{40} - \sqrt{20}$$



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11.

If

$$\sqrt{2} = 1.414, \sqrt{3} = 1.732, \sqrt{5} = 2.236, \sqrt{10} = 3.162$$

, then find the values of the following correct to 3 places of decimals .

$$\sqrt{300} + \sqrt{90} - \sqrt{8}$$



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12. Arrange surds in descending order :

$$\sqrt[3]{5}, \sqrt[9]{4}, \sqrt[6]{3}$$



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13. Arrange surds in descending order :

$$\sqrt[2]{\sqrt[3]{5}}, \sqrt[3]{\sqrt[4]{7}}, \sqrt{\sqrt{3}}$$

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14. Can you get a pure surd when you find the sum of two surds

Justify each answer with an example

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15. Can you get a pure surd when you find the difference of two surds

Justify each answer with an example



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16. Can you get a pure surd when you find the product of two surds

Justify each answer with an example



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17. Can you get a pure surd when you find the quotient of two surds

Justify each answer with an example



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18. Can you get a rational number when you compute the sum of two surds

Justify each answer with an example



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19. Can you get a rational number when you compute the difference of two surds.

Justify each answer with an example



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20. Can you get a rational number when you compute the product of two surds

Justify each answer with an example



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21. Can you get a rational number when you compute the quotient of two surds

Justify each answer with an example



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Exercise 2 7

1. Rationalise the denominator

$$\frac{1}{\sqrt{50}}$$



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2. Rationalise the denominator

$$\frac{5}{3\sqrt{5}}$$



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3. Rationalise the denominator

$$\frac{\sqrt{75}}{\sqrt{18}}$$



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4. Rationalise the denominator

$$3(\sqrt{5})/\sqrt{6}$$



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5. Rationalise the denominator and simplify

$$\frac{\sqrt{48} + \sqrt{32}}{\sqrt{27} - \sqrt{18}}$$



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6. Rationalise the denominator and simplify

$$\frac{5\sqrt{3} + \sqrt{2}}{\sqrt{3} + \sqrt{2}}$$



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7. Rationalise the denominator and simplify

$$\frac{2\sqrt{6} - \sqrt{5}}{3\sqrt{5} - 2\sqrt{6}}$$



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8. Rationalise the denominator and simplify

$$\frac{\sqrt{5}}{\sqrt{6} + 2} - \frac{\sqrt{5}}{\sqrt{6} - 2}$$



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9. Find the value of a and b if

$$\frac{\sqrt{7} - 2}{\sqrt{7} + 2} = a\sqrt{7} + b$$



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10. If $x = \sqrt{5} + 2$, then find the value of $x^2 + \frac{1}{x^2}$



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



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Exercise 2 8

1. Represent the following numbers in the scientific notation :

569430000000



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2. Represent the following numbers in the scientific notation :

2000.57



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3. Represent the following numbers in the scientific notation :

0.0000006000



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4. Represent the following numbers in the scientific notation :

0.0009000002



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5. Write the following numbers in decimal form :

$$3.459 \times 10^6$$



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6. Write the following numbers in decimal form :

$$5.678 \times 10^4$$



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7. Write the following numbers in decimal form :

$$1.00005 \times 10^{-5}$$



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8. Write the following numbers in decimal form :

$$2.530009 \times 10^{-7}$$



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9. Write the following numbers in scientific notation :

$$(300000)^2 \times (20000)^4$$



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10. Write the following numbers in scientific notation :

$$\frac{(0.000001)^{11}}{(0.005)^3}$$



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11. Write the following numbers in scientific notation :

$$\frac{(0.00003)^6 \times (0.00005)^4}{(0.009)^3 \times (0.05)^2}$$



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12. Represent the following information in scientific notation :

The world population is nearly 7000,000,000.



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13. Represent the following information in scientific notation :

One light year means the distance 9460528400000000 km.



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16. Simplify :

$$(1.598 \times 10^{17}) - (4.58 \times 10^{15})$$



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17. Simplify :

$$(1.02 \times 10^{10}) \times (1.20 \times 10^{-3})$$



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18. Simplify :

$$(8.41 \times 10^4) \div (4.3 \times 10^5)$$



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Exercise 2 9

1. If n is a natural number then \sqrt{n} is

- A. always a natural number
- B. always an irrational number.
- C. always a rational number
- D. may be rational or irrational .

Answer: D



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2. Which of the following is not true ?

- A. Every rational number is a real number.
- B. Every integer is a rational number.
- C. Every real number is an irrational number.
- D. Every natural number is whole number.

Answer: C



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3. Which one of the following , regarding sum of two irrational number , is true ?

A. always an irrational number

B. may be a rational or irrational number

C. always a rational number

D. always an integer.

Answer: B



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4. Which one of the following has a terminating decimal expansion ?

A. $\frac{5}{64}$

B. $\frac{8}{9}$

C. $\frac{14}{15}$

D. $\frac{1}{12}$

Answer: A



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5. Which one of the following is an irrational number ?

A. $\sqrt{25}$

B. $\frac{\sqrt{9}}{4}$

C. $\frac{7}{11}$

D. π

Answer: D



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6. An irrational number between 2 and 2.5 is

A. $\sqrt{11}$

B. $\sqrt{5}$

C. $\sqrt{2.5}$

D. $\sqrt{8}$

Answer: B



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7. The smallest rational number by which $\frac{1}{3}$ should be multiplied so that its decimal expansion terminates after one place of decimal is

A. $\frac{1}{10}$

B. $\frac{3}{10}$

C. 3

D. 30

Answer: C



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8. if $\frac{1}{7} = 0.\overline{142857}$ then the value of $\frac{5}{7}$ is

A. $0.\overline{142857}$

B. $0.\overline{714285}$

C. $0.\overline{571428}$

D. 0.714285

Answer: B



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9. Find the odd one out of the following

A. $\sqrt{32} \times \sqrt{2}$

B. $\frac{\sqrt{27}}{\sqrt{3}}$

C. $\sqrt{72} \times \sqrt{8}$

D. $\frac{\sqrt{54}}{\sqrt{18}}$

Answer: D



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10. $0.\overline{34} + 0.3\overline{4} =$

A. $0.\overline{687}$

B. $0.\overline{68}$

C. $0.6\overline{8}$

D. $0.68\overline{7}$

Answer: A



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11. Which of the following statement is false ?

A. The square root of 25 is 5 or -5

B. $\sqrt{25} = 5$

C. $-\sqrt{25} = -5$

D. $\sqrt{25} = \pm 5$

Answer: D



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12. Which one of the following is not a rational number ?

A. $\sqrt{\frac{8}{18}}$

B. $\frac{7}{3}$

C. $\sqrt{0.01}$

D. $\sqrt{13}$

Answer: D



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13. $\sqrt{27} + \sqrt{12} =$

A. $\sqrt{39}$

B. $5\sqrt{6}$

C. $5\sqrt{3}$

D. $3\sqrt{5}$

Answer: C



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14. If $\sqrt{80} = k\sqrt{5}$ then $k =$

A. 2

B. 4

C. 8

D. 16

Answer: B



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15. $4\sqrt{7} \times 2\sqrt{3} =$

A. $6\sqrt{10}$

B. $8\sqrt{21}$

C. $8\sqrt{10}$

D. $6\sqrt{21}$

Answer: B



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16. When written with a rational denominator, the

expression $\frac{2\sqrt{3}}{3\sqrt{2}}$ can be simplified as

A. $\frac{\sqrt{2}}{3}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{\sqrt{6}}{3}$

D. $\frac{2}{3}$

Answer: C



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17. When $(2\sqrt{5} - \sqrt{2})^2$ is simplified, we get

A. $4\sqrt{5} + 2\sqrt{2}$

B. $22 - 4\sqrt{10}$

C. $8 - 4\sqrt{10}$

D. $2\sqrt{10} - 2$

Answer: B



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18. $(0.000729)^{\frac{-3}{4}} \times (0.09)^{\frac{-3}{4}} = \underline{\hspace{2cm}}$

A. $\frac{10^3}{3^3}$

B. $\frac{10^5}{3^5}$

C. $\frac{10^2}{3^2}$

D. $\frac{10^6}{3^6}$

Answer: D



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19. If $\sqrt{9^x} = \sqrt[3]{9^2}$ then $x = \dots\dots\dots$

A. $\frac{2}{3}$

B. $\frac{4}{3}$

C. $\frac{1}{3}$

D. $\frac{5}{3}$

Answer: B



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20. The length of breadth of a rectangular plot are 5×10^5 and 4×10^4 metres respectively. Its area is _____

A. $9 \times 10^1 m^2$

B. $9 \times 10^9 m^2$

C. $2 \times 10^{10} m^2$

D. $20 \times 10^{20} m^2$

Answer: C



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Additional Questions And Answers

1. Find out two rational numbers between $\frac{1}{4}$ and $\frac{3}{4}$

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2. Is zero a rational numbers ? Give reasons for you answer .

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3. Express the following decimal expansion is the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

0.75

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4. Express the following decimal expansion is the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

0.625



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5. Express the following decimal expansion is the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

0.5625



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

0.28



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7. Convert $\overline{0.9}$ to a rational number.



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8. Classify the following number as rational or irrational.

$$\sqrt{11}$$



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9. Classify the following number as rational or irrational .

$$\sqrt{81}$$



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10. Classify the following number as rational or irrational .

0.0625



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11. Classify the following number as rational or irrational .

$0.8\bar{3}$



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12. Find the decimal expansion of $\sqrt{3}$



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13. Find any 4 irrational numbers between $\frac{1}{4}$ and $\frac{1}{3}$



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14. Visualise $6.7\bar{3}$ on the number line , upto 4 decimal places.



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15. Find whether x and y are rational or irrational in the following:

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

$$x = a + b, y = a - b$$



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16. Find whether x and y are rational or irrational in the following:

$$(ii) a = \sqrt{2} + 7, b = \sqrt{2} - 7$$

$$x = a + b, y = a - b$$



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17. Evaluate : 10^{-4}



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18. Evaluate : $\left(\frac{1}{9}\right)^{-3}$



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19. Evaluate : $(0.01)^{-2}$



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20. Find the value of $625^{\frac{3}{4}}$:



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21. Find the value of $729^{-\frac{5}{6}}$

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22. Use a fractional index to write : $(5\sqrt{125})^7$

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23. Use a fractional index to write : $\sqrt[3]{7}$

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24. Can you reduce the following numbers to surds of same order .

$$\sqrt{5}$$



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25. Can you reduce the following numbers to surds of same order .

$$\sqrt[3]{5}$$



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26. Can you reduce the following numbers to surds of same order .

$$\sqrt[4]{5}$$



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27. Express the surds in the simplest form

$$\sqrt{27}$$



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28. Express the surds in the simplest form

$$\sqrt[3]{128}$$



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29. Show that $\sqrt[3]{2} > \sqrt[5]{3}$



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30. Express the following surds in its simplest

form $\sqrt[4]{324}$



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31. Simplify $\sqrt{63} - \sqrt{175} + \sqrt{28}$



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



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33. Subtract $6\sqrt{7}$ from $9\sqrt{7}$.Is the answer rational or irrational ?



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34. Simplify : $\sqrt{44} + \sqrt{99} - \sqrt{275}$



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35. Compute and give the answer in the simplest form : $3\sqrt{162} \times 7\sqrt{50} \times 6\sqrt{98}$



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36. Write the scientific notation $(60000000)^4$



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37. Write the scientific notation : $(0.00000004)^3$



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38. Write the scientific notation :

$$(500000)^2 \times (3000)^3$$



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39. Write the scientific notation :

$$(6000000)^3 \div (0.00003)^2$$



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40. A number having non-terminating and recurring decimal expansion is

- A. an integer
- B. a rational number
- C. an irrational number
- D. a whole number

Answer: 2



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41. If a number has a non-terminating and non-recurring decimal expansion , then it is

- A. a rational number
- B. a natural number
- C. an irrational number
- D. an integer

Answer: 3



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42. Decimal form of $\frac{-3}{4}$ is

A. -0.75

B. -0.50

C. -0.25

D. -0.125

Answer: 1



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43. Which one of the following has a terminating decimal expansion ?

A. $\frac{5}{32}$

B. $\frac{7}{9}$

C. $\frac{8}{15}$

D. $\frac{1}{12}$

Answer: 1



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44. Which one of the following is an irrational number ?

A. π

B. $\sqrt{9}$

C. $\frac{1}{4}$

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

Answer: 1



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45. Which one of the following are irrational numbers ?

(i) $\sqrt{2 + \sqrt{3}}$, (ii) $\sqrt{4 + \sqrt{25}}$, (iii) $\sqrt[3]{5 + \sqrt{7}}$, (iv) $\sqrt{8 - \sqrt[3]{8}}$

A. (ii),(iii), and (iv)

B. (i) , (ii) and (iv)

C. (i),(ii) and (iii)

D. (i),(iii) and (iv)

Answer: 4



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46. Which of the following is not an irrational number ?

A. $\sqrt{2}$

B. $\sqrt{5}$

C. $\sqrt{3}$

D. $\sqrt{25}$

Answer: 4



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47. In simple form, $\sqrt[3]{54}$ is ?

A. $3\sqrt[3]{2}$

B. $\sqrt[3]{27}$

C. $3\sqrt{2}$

D. $\sqrt{3}$

Answer: 1



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48. $\sqrt[3]{192} + \sqrt[3]{24}$

A. $3\sqrt[3]{6}$

B. $6\sqrt[3]{3}$

C. $\sqrt[3]{216}$

D. $\sqrt[6]{216}$

Answer: 2



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49. $5\sqrt{21} \times 6\sqrt{10}$

A. $30\sqrt{210}$

B. 30

C. $\sqrt{210}$

D. $210\sqrt{30}$

Answer: 1



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Unit Test

1. Which one of the following , regarding sum of two irrational number , is true ?

A. always an irrational number

B. may be a rational or irrational number

C. always a rational number

D. always an integer.

Answer: 2



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2. Which one of the following is an irrational number ?

A. $\sqrt{25}$

B. $\sqrt{\frac{9}{4}}$

C. $\frac{7}{11}$

D. π

Answer: 1



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3. if $\frac{1}{7} = 0.\overline{142857}$ then the value of $\frac{5}{7}$ is

A. $0.\overline{142857}$

B. $0.\overline{714285}$

C. $0.\overline{571428}$

D. 0.714285

Answer: 2



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4. When written with a rational denominator, the

expression $\frac{2\sqrt{3}}{3\sqrt{2}}$ can be simplified as

A. $\frac{\sqrt{2}}{3}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{\sqrt{6}}{3}$

D. $\frac{2}{3}$

Answer: 3



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5. If $\sqrt{9^x} = \sqrt[3]{9^2}$ then $x = \dots\dots\dots$

A. $\frac{2}{3}$

B. $\frac{4}{3}$

C. $\frac{1}{3}$

D. $\frac{5}{3}$

Answer: 2



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6. Simplify the following using addition and subtraction properties of surds :

$$5\sqrt{3} + 18\sqrt{3} - 2\sqrt{3}$$



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7. Simplify the following using multiplication and division properties of surds :

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



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8. Find any two irrational number between $\frac{6}{7}$ and $\frac{12}{13}$



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9. Find the value of $(49)^{\frac{1}{2}}$



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10. Find the value of $(243)^{2/5}$



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11. Without actual division , find which of the following rational numbers have terminating decimal expansion.

$$\frac{7}{128}$$



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12. Which arrow best shows the position of $\frac{11}{3}$ on the number line ?



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13. Express the following decimal expression into rational numbers.

2. $\overline{327}$



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14. Find any five rational numbers between $\frac{1}{4}$ and $\frac{1}{5}$



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15. Find any five rational numbers between 0.1 and 0.11



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16. Represent $\sqrt{3}$ irrational numbers on the number line.



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17. Represent the following numbers on the number line.

4. $\overline{73}$ upto 4 decimal places.



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18. Arrange surds in descending order :

$$\sqrt[3]{5}, \sqrt[9]{4}, \sqrt[6]{3}$$



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19. Arrange surds in descending order :

$$\sqrt[2]{\sqrt[3]{5}}, \sqrt[3]{\sqrt[4]{7}}, \sqrt{\sqrt{3}}$$



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