



# MATHS

## BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

### REAL NUMBERS

#### Thinking Corner

1. Which one of the following is false

(a) The square root of 9 is 3 or -3.

(b)  $\sqrt{9} = 3$

$$(c) -\sqrt{9} = -3$$

$$(d) \sqrt{9} = \pm 3$$



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2. Write two numbers in scientific notation whose product is 2.83104.



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3. Write two numbers in scientific notation whose quotient is 2.83104.



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## Progress Check

1. Identify a rationalising factor for each one of the following surds and verify the same in each case:

(i)  $\sqrt{18}$  (ii)  $5\sqrt{12}$  (iii)  $\sqrt[3]{49}$  (iv)  $\frac{1}{\sqrt{8}}$



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## 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  $\frac{1}{5}$



## Exercise 2 2

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

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

A.  $\frac{2}{7}$

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

C.  $\frac{22}{3}$

D.  $\frac{327}{200}$

**Answer:**



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



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3. 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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4. Express the following decimal expression into rational numbers.

$0.\overline{24}$



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5. Without actual division, find which of the following rational numbers have terminating

decimal expansion.

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



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## Exercise 2 3

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

$$\sqrt{3}$$



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



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3. 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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## Exercise 2 5

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

(i) 625 (ii)  $\frac{1}{5}$  (iii)  $\sqrt{5}$  (iv)  $\sqrt{125}$



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2. Write the following in the form of  $4^n$ :

(i) 16 (ii) 8 (iii) 32



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



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



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5. Find the 5<sup>th</sup> root of 32



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## Exercise 2 6

1. 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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2. 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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3. 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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4. Arrange surds in descending order :

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



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5. Can you get a pure surd when you find:

(i) the sum of two surds

(ii) the difference of two surds

(iii) the product of two surds

(iv) the quotient of two surds

Justify each answer with an example



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

Justify each answer with an example



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## Exercise 2 7

1. Rationalise the denominator

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

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

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

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

D.  $\frac{3\sqrt{5}}{\sqrt{6}}$

**Answer:**



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**2. Rationalise the denominator and simplify**

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



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3. Find the value of a and b if

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



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



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5. 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. Write the following numbers in decimal form :

$$3.459 \times 10^6$$



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3. Write the following numbers in decimal notation :

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



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4. Represent the following information in scientific notation :

The world population is nearly 7000,000,000.



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5. Simplify:

(i)  $(2.75 \times 10^7) + (1.23 \times 10^8)$  (ii)

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

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

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



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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 a whole number

**Answer: C**



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

A. always a 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.  $\sqrt{\frac{9}{4}}$

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

D.  $\pi$

**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: B**



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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: B**



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

A.  $0.6\overline{87}$

B.  $0.\overline{68}$

C.  $0.6\overline{8}$

D.  $0.6\overline{87}$

**Answer: A**



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**11. Solve  $5x - 2x + 15 = 27$**



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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: D**



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

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  $5 \times 10^5$  and  $4 \times 10^4$  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 I Mcq

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

A.  $-0.75$

B.  $-0.50$

C.  $-0.25$

D.  $-0.125$

**Answer: A**



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2. 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: C**





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

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

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

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

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

**Answer: D**



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4. 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: D**



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5. Irrational number has a.....

A. terminating decimal

B. no decimal part

C. non-terminating and recurring decimal

D. non-terminating and non-recurring decimal

**Answer: D**



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6. If  $\frac{1}{7} = 0.142857$  then the value of  $\frac{3}{7}$  is .....

A. 0.285741

B. 0.428571

C. 0.285714

D. 0.574128

**Answer: B**



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7. Which of the following are rational numbers?

A.  $7\sqrt{5}$

B.  $\frac{7}{\sqrt{5}}$

C.  $\sqrt{36} - 9$

D.  $\pi + 2$

**Answer: C**



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**8. The product of  $2\sqrt{5}$  and  $6\sqrt{5}$  is .....**

A.  $12\sqrt{5}$

B. 60

C. 40

D.  $8\sqrt{5}$

**Answer: B**



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9. The rational number lying between  $\frac{1}{5}$  and  $\frac{1}{2}$  is .....

A.  $\frac{7}{20}$

B.  $\frac{2}{10}$

C.  $\frac{2}{7}$

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

**Answer: A**



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**10.** The value of  $0.\overline{03} + 0.\overline{03}$  is .....

A.  $0.\overline{09}$

B.  $0.\overline{0303}$

C.  $0.\overline{06}$

D. 0

**Answer: C**



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11. The sum of  $\sqrt{343} + \sqrt{567}$  is .....

A.  $18\sqrt{3}$

B.  $16\sqrt{7}$

C.  $15\sqrt{3}$

D.  $14\sqrt{7}$



**Answer: B**



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12. If  $\sqrt{363} = x\sqrt{3}$  then  $x = \dots\dots$

A. 8

B. 9

C. 10

D. 11

**Answer: D**



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13. The rationalising factor of  $\frac{1}{\sqrt{7}}$  is .....

A. 7

B.  $\sqrt{7}$

C.  $\frac{1}{7}$

D.  $\frac{1}{\sqrt{7}}$

**Answer: B**



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14. The value of  $\left(\frac{1}{3^5}\right)^4$  is .....

A.  $3^{20}$

B.  $3^{-20}$

C.  $\frac{1}{3^{-20}}$

D.  $\frac{1}{3^9}$

**Answer: B**



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15. What is  $3.9676 \times 10^{-4}$  written form?

A. 0.003976

B. 0.0003976

C. 39760

D. 0.03976

**Answer: B**



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**Additional Questions | Answer The Following Questions**

1. Find any seven rational numbers between

$$\frac{5}{8} \text{ and } -\frac{5}{6}$$



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2. Find any three rational number between

$$\frac{1}{2} \text{ and } \frac{1}{5}.$$



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3. Solve  $(7y + 8) + 7 = 8$



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

(a)  $0.\bar{6}$  (b)  $0.4\bar{7}$  (c)  $0.\overline{001}$



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5. Without actual division, classify the decimal expansion of the following numbers as terminating or non-terminating and recurring

(i)  $\frac{7}{1}$  (ii)  $\frac{13}{150}$  (iii)  $-\frac{11}{15}$  (iv)  $\frac{17}{200}$



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6. Find the value of  $\sqrt{27} + \sqrt{75} - \sqrt{108} + \sqrt{48}$



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



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8. Represent  $\frac{(0.003)^7 \times (0.0002)^5}{(0.001)^3}$  In scientific notation.



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9. Write (a)

$9.87 \times 10^9$ , (b)  $4.134 \times 10^{-4}$  and (c)  $1.432 \times 10^{-9}$

in decimal form.



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## Assignment I Choose The Correct Options

1. The rationalising factor  $\frac{5}{\sqrt{7}}$  is .....



A.  $\frac{1}{\sqrt{7}}$

B.  $\sqrt{7}$

C.  $\sqrt[3]{7}$

D.  $\frac{1}{\sqrt{7}}$

**Answer:**



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2. The simplest form of  $\sqrt{288}$  is .....

A.  $3\sqrt{32}$

B.  $14\sqrt{2}$

C.  $12\sqrt{2}$

D.  $7\sqrt{2}$

**Answer: C**



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**3. If  $a + b\sqrt{5} = 2$  then the value of a and b are resectively .....**

A. 2,0

B. 0,2

C.  $2, \sqrt{5}$

D.  $0, \sqrt{5}$

**Answer: B**



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**4. The scientific notation of 923.4 is .....**

A.  $9.234 \times 10^{-2}$

B.  $9.234 \times 10^2$

C.  $9.234 \times 10^3$

D.  $9.234 \times 10^{-3}$

**Answer:**



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5. The decimal form of  $3.506 \times 10^{-2}$  is

A. 0.03506

B. 0.003506

C. 35.06

D. 350.6

**Answer: C**



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## Assignment II Fill In The Blanks

1. The value of  $3\sqrt{3} + \sqrt{3}$  is .....



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2. The value of  $\left[ (\sqrt{x})^3 \right]^{\frac{2}{3}}$  is .....



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3. If  $\sqrt{10} = 3.1622$ , then the value of  $\frac{1}{\sqrt{10}}$  is .....



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4. The rational number equivalent of  $\frac{5}{9}$  such that its numerator is 25 is



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5. Divide  $15\sqrt{12}$  by  $3\sqrt{3}$  the result is.....



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## Assignment Iii Answer The Following Questions

1. 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



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

(a)  $0.\overline{6}$  (b)  $0.4\overline{7}$  (c)  $0.\overline{001}$



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3. Find three different irrational numbers between the rational numbers  $\frac{5}{7}$  and  $\frac{9}{11}$ .



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4. Visualize  $4.\overline{26}$  on the number line upto 4 decimal places.



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5. Represent  $\sqrt{8.5}$  on a number line.



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6. Simplify the express  $(3 + \sqrt{3})(2 + \sqrt{2})$



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7. Rationalise the denominator of  $\frac{1}{\sqrt{5} + \sqrt{2}}$



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8. Find the sum of

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



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9. The wavelength of ultra violet rays is 0.000042 cm. Convert the above length in scientific notation.



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10. Simplify  $\sqrt{242} + \sqrt{288} + \sqrt{200} - \sqrt{338}$  and find the value also.



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11. Find the value of  $x^2 + \frac{1}{x^2}$  when  $x = 4 + \sqrt{15}$



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12. If  ${}^n a^n$  and  ${}^n b^n$  are rational numbers and

$\frac{3 + \sqrt{5}}{3 - \sqrt{5}} = -a + b\sqrt{5}$ , find the value of

${}^n a^n$  and  ${}^n b^n$ .



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## Text Book Activity Activity 1

1. It is interesting to see this pattern?

$$\sqrt{4\frac{4}{15}} = 4\sqrt{\frac{4}{15}} \quad \text{and} \quad \sqrt{5\frac{5}{24}} = 5\sqrt{\frac{5}{24}} \quad \text{verify}$$

it. Can you frame 4 such new surds?



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## Text Book Activity Activity 3

1. The following list shows the mean distance of the planets of the solar system from the Sun. Complete the following table. Then arrange in order of magnitude starting with the distance of the planet closest to the Sun.

S. No.	Planet	Decimal form (in Km)	Scientific Notation (in Km)
1.	Jupiter	–	$7.78 \times 10^8$
2.	Mercury	58000000	–
3.	Mars	–	$2.28 \times 10^8$
4.	Uranus	2870000000	–
5.	Venus	108000000	–
6.	Neptune	4500000000	–
7.	Earth	–	$1.5 \times 10^8$
8.	Saturn	–	$1.43 \times 10^8$



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