Exercise 1.1 Page: 5

Q1. Is zero a rational number? Can you write it in the form p/q where p and q are integers and q ≠ 0?

Answer: We know that a number is said to be rational if it can be written in the form p/q , where p and q are integers and q ≠ 0.

Taking the case of '0',

Zero can be written in the form 0/1, 0/2, 0/3 … as well as , 0/1, 0/2, 0/3 ..

Since it satisfies the necessary condition, we can conclude that 0 can be written in the p/q form, where q can either be positive or negative number.

Hence, 0 is a rational number.

Q2. Find six rational numbers between 3 and 4.

Answer:

The rational numbers between 3 and 4.

We have, $3 = 3 \times \frac{(6+1)}{(6+1)} = \frac{21}{7}$ and $4 = 4 \times \frac{(6+1)}{(6+1)} = \frac{28}{7}$

We know that $21 < 22 < 23 < 24 < 25 < 26 < 27 < 28$

$\Rightarrow \frac{21}{7} < \frac{22}{7} < \frac{23}{7} < \frac{24}{7} < \frac{25}{7} < \frac{26}{7} < \frac{27}{7} < \frac{28}{7}$

Hence, six rational numbers between $3 = \frac{21}{7}$ and $4 = \frac{28}{7}$ are

$\frac{22}{7}, \frac{23}{7}, \frac{24}{7}, \frac{25}{7}, \frac{26}{7}$ and $\frac{27}{7}$

Q3. Find five rational numbers between 3/5 and 4/5.

Answer:

Since we want 5 rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$, so we write

$$\frac{3}{5} = \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$$

and

$$\frac{4}{5} = \frac{4 \times 6}{5 \times 6} = \frac{24}{30}$$

We know that $18 < 19 < 20 < 21 < 22 < 23 < 24$

$\Rightarrow \frac{18}{30} < \frac{19}{30} < \frac{20}{30} < \frac{21}{30} < \frac{22}{30} < \frac{23}{30} < \frac{24}{30}$

Hence, 5 rational numbers between $\frac{3}{5} = \frac{18}{30}$ and $\frac{4}{5} = \frac{24}{30}$

are : $\frac{19}{30}, \frac{20}{30}, \frac{21}{30}, \frac{22}{30}$ and $\frac{23}{30}$

Since, we need to find five rational numbers, therefore, multiply numerator and denominator by 6.

Q4. State whether the following statements are true or false. Give reasons for your answers.

(i) Every natural number is a whole number - *True*

∵ The collection of all natural numbers and 0 is called whole numbers.

(ii) Every integer is a whole number - *False*

∵ Negative integers are not whole numbers.

(iii) Every rational number is a whole number - *False*

∵ Rational numbers are of the form p/q, q ≠ 0 and q does not divide p completely that are not whole numbers.

Exercise 1.2 Page: 8

Q1. State whether the following statements are true or false. Justify your answers.

(i) Every irrational number is a real number – True

Because all rational numbers and all irrational numbers form the group (collection) of real numbers.

(ii) Every point on the number line is of the form √m, where m is a natural number – False

Because negative numbers cannot be the square root of any natural number.

(iii) Every real number is an irrational number - False

Because rational numbers are also a part of real numbers.

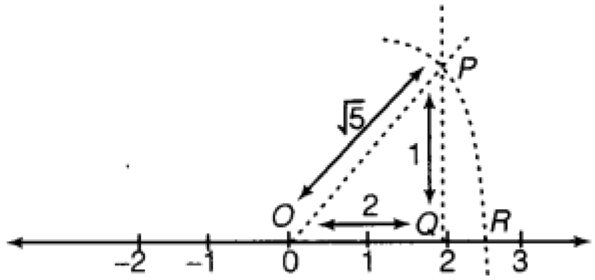
Q2. Are the square roots of all positive integers irrational? If not, give an example of the square root of a number that is a rational number.

Answer: No, if we take a positive integer, say 9, its square root is 3, which is a rational number.

Q3. Show how √5 can be represented on the number line.

Answer:

We know that, $\sqrt{5} = \sqrt{4+1} = \sqrt{2^2+1^2}$



Draw of right angled triangle OQP, such that

OQ = 2 units

PQ= 1 unit

and ∠OQP = 90°

Now, by using Pythagoras theorem, we have

OP2 = $OQ^2 + PQ^2$

= $2^2 + 1^2$

➔ op= $\sqrt{4+1} = \sqrt{5}$

Now, take O as centre OP = 45 as radius, draw an arc, which intersects the line at point R.

Hence, the point R represents √5.

4. Classroom activity (Constructing the 'square root spiral') : Take a large sheet of paper and construct the 'square root spiral' in the following fashion. Start with a point O and draw a line segment OP1 of unit length. Draw a line segment P1P2 perpendicular to OP_1 of unit length (see Fig. 1.9). Now draw a line segment P_2P_3 perpendicular to OP_2. Then draw a line segment P_3P_4 perpendicular to OP_3. Continuing in Fig. 1.9 :

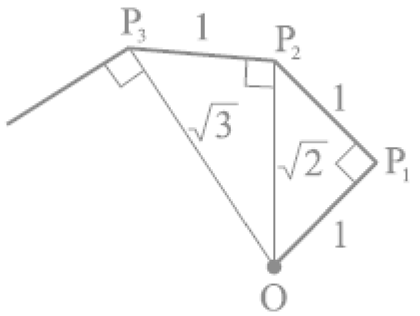
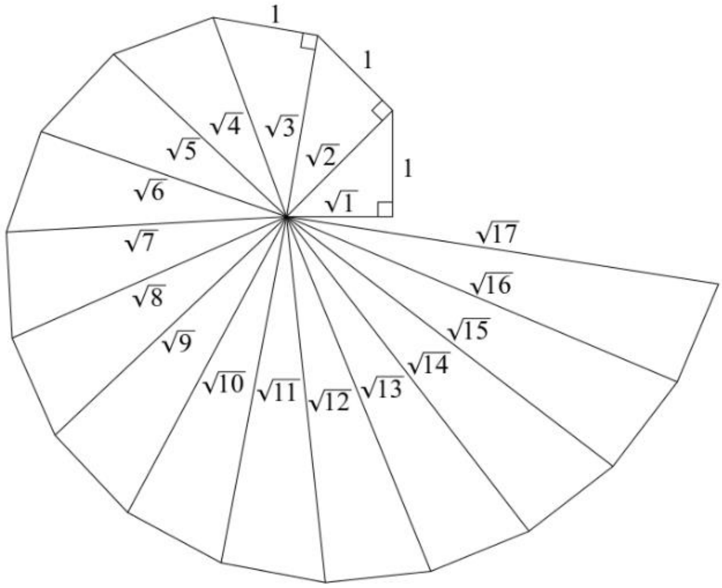


Fig. 1.9 : Constructing square root spiral

Constructing this manner, you can get the line segment P_{n-1}Pn by square root spiral drawing a line segment of unit length perpendicular to OP_{n-1}. In this manner, you will have created the points P_2, P_3,….,Pn,… ., and joined them to create a beautiful spiral depicting √2, √3, √4, …

Solution:



Step 1: Mark a point O on the paper. Here, O will be the center of the square root spiral.

Step 2: From O, draw a straight line, OA, of 1cm horizontally.

Step 3: From A, draw a perpendicular line, AB, of 1 cm.

Step 4: Join OB. Here, OB will be of √2

Step 5: Now, from B, draw a perpendicular line of 1 cm and mark the end point C.

Step 6: Join OC. Here, OC will be of √3

Step 7: Repeat the steps to draw √4, √5, √6….

Exercise 1.3 Page: 14

Q1.Write the following in decimal form and say what kind of decimal expansion each has

(i) $\frac{36}{100}$ (ii) $\frac{1}{11}$ (iii) $4\frac{1}{8}$ (iv) $\frac{3}{13}$ (v) $\frac{2}{11}$ (vi) $\frac{329}{400}$

Answer (i)

```
       00.36
100 | 360-
    | 300
    |  600-
    |  600
    |   0
```

= 0.36 (Terminating)

Answer (ii) $\frac{1}{11}$

```
      0.090909
  11) 100
       99
        100
         99
          100
           99
            1
```

$\therefore \frac{1}{11} = 0.090909\ldots = 0.\overline{09}$, non-terminating and repeating.

Answer (iii) $4\frac{1}{8}$

$4\frac{1}{8} = \frac{4 \times 8 + 1}{8} = \frac{33}{8}$

By long division, we have

```
     4.125
  8) 33.000
     32
      10
       8
       20
       16
        40
        40
         0
```

$\therefore \frac{33}{8} = 4.125$, terminating.

Answer (iii) $\frac{3}{13}$

By long division, we have

```
      0.23076923...
  13) 30
      26
       40
       39
        100
         91
          90
          78
          120
          117
            30
            26
             40
             39
              1
```

Here, the repeating block of digits is 230769

$\therefore \frac{3}{13} = 0.23076923 = 0.\overline{230769}$

Thus, the decimal expansion of $\frac{3}{13}$ is non-terminating repeating.

Answer (iv): $\frac{2}{11}$

By long division, we have

```
      0.181818...
  11)20
     11
     --
      90
      88
      --
       20
       11
       --
        90
        88
        --
         20
         11
         --
          90
          88
          --
           2
          --
```

Here, the repeating block of digits is 18.

$\therefore \frac{2}{11}$= 0.1818...= $0.\overline{18}$, =

Thus, the decimal expansion of $\frac{2}{11}$ is non-terminating repeating.

Answer (v): $\frac{329}{400}$

By long division, we have

```
        0.8225
  400) 3290
       3200
       ----
         900
         800
         ----
         1000
          800
          ----
          2000
          2000
          ----
             0
          ----
```

$\therefore \frac{329}{400}$ = 0.8225, terminating.

Q2. You know that 1/7 = 0.142857. Can you predict what the decimal expansions of 2/7, 3/7, 4/7, 5/7, 6/7 are, without actually doing the long division? If so, how?

[Hint: Study the remainders while finding the value of 1/7 carefully.]

Answer:

We have, $\frac{1}{7} = 0.\overline{142857}$

$\therefore \quad \frac{2}{7} = 2 \times \frac{1}{7} = 2 \times 0.\overline{142857}$

$\Rightarrow \quad \frac{2}{7} = 0.\overline{285714}$; $\frac{3}{7} = 3 \times \frac{1}{7} = 3 \times 0.\overline{142857}$

$\Rightarrow \quad \frac{3}{7} = 0.\overline{428571}$; $\frac{4}{7} = 4 \times \frac{1}{7} = 4 \times 0.\overline{142857}$

$\Rightarrow \quad \frac{4}{7} = 0.\overline{571428}$; $\frac{5}{7} = 5 \times \frac{1}{7} = 5 \times 0.\overline{142857}$

$\Rightarrow \quad \frac{5}{7} = 0.\overline{714285}$; $\frac{6}{7} = 6 \times \frac{1}{7} = 6 \times 0.\overline{142857}$

$\Rightarrow \quad \frac{6}{7} = 0.\overline{857142}$

Thus, without actually doing the long division we can predict the decimal expansions of the given rational numbers.

Q3.Express the following in the form pq where p and q are integers and q ≠ 0.

1. $0.\overline{6}$
2. $0.4\overline{7}$
3. $0.\overline{001}$

Answer (i) $\mathbf{0.\overline{6}}$

$0.\overline{6} = 0.666\ldots$

Assume that $x = 0.666\ldots$

Then, $10x = 6.666\ldots$

$10x = 6 + x$

$9x = 6$

$x = \frac{2}{3}$

Answer (ii) $0.4\overline{7}$

Let x = $0.4\overline{7}$ = 0.4777… … (1)

As there is only one repeating digit, multiplying (1) by lo on both sides, we get

10x = 4.777

Subtracting (1) from (2), we get

10x – x = 4.777…… – 0.4777…….

⇒ 9x = 4.3 ⇒ x = 4390

Thus, 0.47¯ = 4390

(iii) $0.\overline{001}$

$0.\overline{001} = 0.001001\ldots$

Assume that $x = 0.001001\ldots$

Then, $1000x = 1.001001\ldots$

$1000x = 1 + x$

$999x = 1$

$x = \frac{1}{999}$

Thus, $0.\overline{001} = \frac{1}{999}$

Q4. Express 0.99999…. in the form p/q . Are you surprised by your answer? With your teacher and classmates discuss why the answer makes sense.

Answer:

Let x = 0.99999….. …. (i)

As there is only one repeating digit,

multiplying (i) by 10 on both sides, we get

10x = 9.9999 … (ii)

Subtracting (i) from (ii), we get

10x – x = (99999) — (0.9999)

⇒ 9x = 9 ⇒ x = 99 = 1

Thus, 0.9999 =1

As 0.9999... goes on forever, there is no such a big difference between 1 and 0.9999

Hence, both are equal.

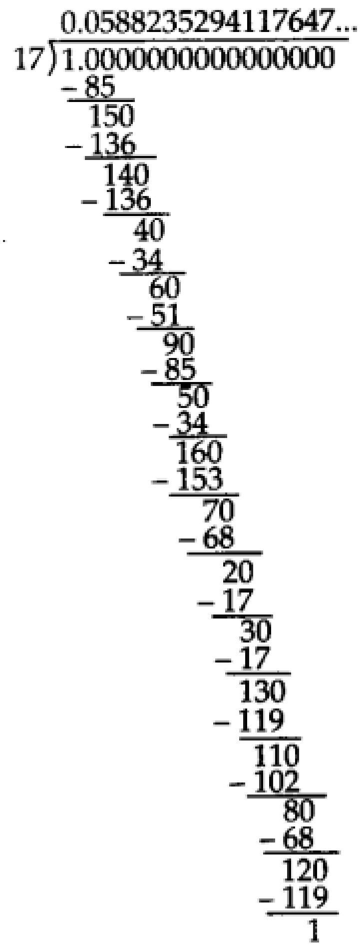
Q5. What can the maximum number of digits be in the repeating block of digits in the decimal expansion of $\frac{1}{17}$? Perform the division to check your answer.

Answer: $\frac{1}{17}$

In $\frac{1}{17}$, In the divisor is 17.

Since, the number of entries in the repeating block of digits is less than the divisor, then the maximum number of digits in the repeating block is 16.

Dividing 1 by 17, we have



The remainder I is the same digit from which we started the division.

∴ $\frac{1}{17} = 0.\overline{0588235294117647}$

Thus, there are 16 digits in the repeating block in the decimal expansion of $\frac{1}{17}$.Hence, our answer is verified.

Q6. Look at several examples of rational numbers in the form $\frac{p}{q}$ (q ≠ 0), where p and q are integers with no common factors other than 1 and having terminating decimal representations (expansions). Can you guess what property q must satisfy?

Answer:

Let us look decimal expansion of the following terminating rational numbers:

$\frac{3}{2} = \frac{3\times5}{2\times5} = \frac{15}{10} = 1.5$ [Denominator = 2 = 2^1]

$\frac{1}{5} = \frac{1\times2}{5\times2} = \frac{2}{10} = 0.2$ [Denominator = 5 = 5^1]

$\frac{7}{8} = \frac{7\times125}{8\times125} = \frac{875}{1000} = 0.875$

[Denominator = 8 = 2^3]

$\frac{8}{125} = \frac{8\times8}{125\times8} = \frac{64}{1000} = 0.064$

[Denominator = 125 = 5^3]

$\frac{13}{20} = \frac{13\times5}{20\times5} = \frac{65}{100} = 0.65$

[Denominator = 20 = $2^2 \times 5^1$]

$\frac{17}{16} = \frac{17\times625}{16\times625} = \frac{10625}{10000} = 1.0625$

[Denominator = 16 = 2^4]

We observe that the prime factorisation of q (i.e. denominator) has only powers of 2 or powers of 5 or powers of both.

Q7.Write three numbers whose decimal expansions are non-terminating non-recurring.

Answer:

√2 = 1.414213562 ………..

√3 = 1.732050808 …….

√5 = 2.23606797 …….

Q8.Find three different irrational numbers between the rational numbers 57 and 911 .

Answer:

To find irrational numbers, firstly we shall divide 5 by 7 and 9 by 11,

So,

$$\begin{array}{r|l} & 0.714285\ldots \\ 7 & 50 \\ & \underline{49} \\ & 10 \\ & \underline{7} \\ & 30 \\ & \underline{28} \\ & 20 \\ & \underline{14} \\ & 60 \\ & \underline{56} \\ & 40 \\ & \underline{35} \\ & \underline{5} \end{array} \qquad \begin{array}{r|l} & 0.8181\ldots \\ 11 & 90 \\ & \underline{88} \\ & 20 \\ & \underline{11} \\ & 90 \\ & \underline{88} \\ & 20 \\ & \underline{11} \\ & \underline{9} \end{array}$$

Thus, $\frac{5}{7} = 0.714285\ldots. = 0.\overline{714285}$

$\therefore \quad \frac{5}{7} = 0.\overline{714285}$ and $\frac{9}{11} = 0.\overline{81}$

Three irrational numbers between $0.\overline{714285}$ and $0.\overline{81}$ are

(i) 0.750750075000 …..

(ii) 0.767076700767000 ……

(iii) 0.78080078008000 ……

Q9. Classify the following numbers as rational or irrational:

(1) √23

(2) √225

(3) 0.3796

(4) 478478…

(5) 1.101001000100001…

Answer:

(1) √23 is an irrational number as 23 is not a perfect square.

(2) √225−−−√ 3x3x5x5 ; ∴ 225 is a perfect square.

3	225
3	75
5	25
5	5
	1

Thus, 225 is a rational number.

(iii) ∵ 0.3796 is a terminating decimal.

∴ It is a rational number.

(iv) 7.478478… = $7.\overline{478}$

Since, $7.\overline{478}$ is a non-terminating recurring (repeating) decimal.

∴ It is a rational number.

(v) Since, 1.101001000100001… is a non-terminating, non-repeating decimal number.

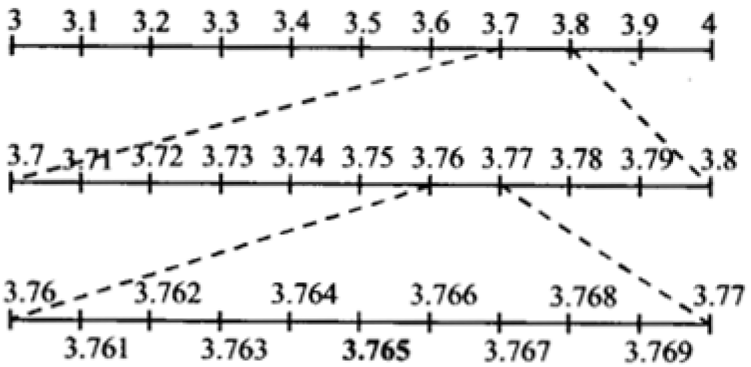
∴ It is an irrational number.

Exercise 1.4 Page: 18

Q1. Visualise 3.765 on the number line, using successive magnification.

Answer:

3.765 lies between 3 and 4.



(i) 3.7 lies between 3 and 4

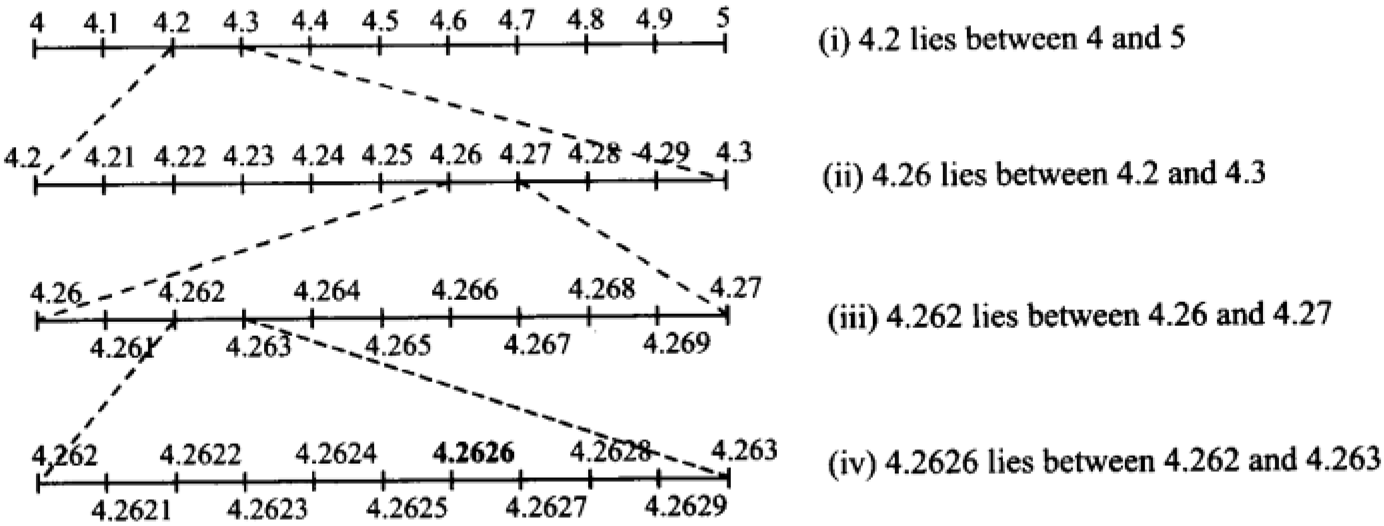
(ii) 3.76 lies between 3.7 and 3.8

(iii) 3.765 lies between 3.76 and 3.77

Q2.Visualise on $4.\overline{26}$ the number line, up to 4 decimal places.

Answer:

Or $4.\overline{26}$ 4.2626 lies between 4 and 5.



Exercise 1.5 Page: 24

Q1. Classify the following numbers as rational or irrational:

(i) 2 –√5

Answer:

We know that, √5 = 2.2360679…

Here, 2.2360679…is non-terminating and non-recurring.

Now, substituting the value of √5 in 2 –√5, we get,

2-√5 = 2-2.2360679… = -0.2360679

Since the number, – 0.2360679…, is non-terminating non-recurring, 2 –√5 is an irrational number.

(ii) (3 +√23)- √23

Answer:

(3 +√23) –√23 = 3+√23–√23

= 3

= 3/1

Since the number 3/1 is in p/q form, (3 +√23) - √23 is rational.

(iii) 2√7/7√7

Solution:

2√7/7√7 = (2/7)× (√7/√7)

We know that (√7/√7) = 1

Hence, (2/7)× (√7/√7) = (2/7)×1 = 2/7

Since the number, 2/7 is in p/q form, 2√7/7√7 is rational.

(iv) 1/√2

Answer:

Multiplying and dividing numerator and denominator by √2 we get,

(1/√2) ×(√2/√2)= √2/2 (since √2×√2 = 2)

We know that, √2 = 1.4142…

Then, √2/2 = 1.4142/2 = 0.7071..

Since the number , 0.7071..is non-terminating non-recurring, 1/√2 is an irrational number.

Q2. Simplify each of the following expressions:

(i) (3 + √3) (2 + √2)

(ii) (3 + √3) (3 - √3)

(iii) (√5 + √2)^2

(iv) (√5 - √2) (√5 + √2)

Answer:

(i) $$(3+\sqrt{3})(2+\sqrt{2}) = 3(2+\sqrt{2}) + \sqrt{3}(2+\sqrt{2})$$
$$= 6 + 3\sqrt{2} + 2\sqrt{3} + \sqrt{6}$$

(ii) $$(3+\sqrt{3})(3-\sqrt{3}) = (3)^2 - (\sqrt{3})^2 \qquad [\because (a+b)(a-b) = a^2 - b^2]$$
$$= 9 - 3 = 6$$

(iii) $$(\sqrt{5}+\sqrt{2})^2 = (\sqrt{5})^2 + 2 \times \sqrt{5} \times \sqrt{2} + (\sqrt{2})^2$$
$$[\because (a+b)^2 = a^2 + 2ab + b^2]$$
$$= 5 + 2\sqrt{10} + 2$$
$$= 7 + 2\sqrt{10}$$

(iv) $$(\sqrt{5}-\sqrt{2})(\sqrt{5}+\sqrt{2}) = (\sqrt{5})^2 - (\sqrt{2})^2 = 5 - 2 = 3$$
$$[\because (a-b)(a+b) = a^2 - b^2]$$

Q3. Recall, π is defined as the ratio of the circumference (say c) of a circle to its diameter, (say d). That is, π =c/d. This seems to contradict the fact that π is irrational. How will you resolve this contradiction?

Answer:

When we measure the length of a line with a scale or with any other device, we only get an approximate fractional value, i.e. c and d both are irrational.

$\therefore \frac{c}{d}$ is irrational and hence π is irrational. Thus, there is no contradiction in saying that it is irrational.

Q4. Represent (√9.3) on the number line.

Answer:

Step 1: Draw a 9.3 units long line segment, AB. Extend AB to C such that BC=1 unit.

Step 2: Now, AC = 10.3 units. Let the centre of AC be O.

Step 3: Draw a semi-circle of radius OC with centre O.

Step 4: Draw a BD perpendicular to AC at point B intersecting the semicircle at D. Join OD.

Step 5: OBD, obtained, is a right angled triangle.

Here, OD $\frac{10.3}{2}$ (radius of semi-circle), OC = $\frac{10.3}{2}$, BC = 1

OB = OC – BC

$\Longrightarrow (\frac{10.3}{2})-1 = \frac{8.3}{2}$

Using Pythagoras theorem,

We get,

$OD^2=BD^2+OB^2$

$\Longrightarrow (\frac{10.3}{2})^2 = BD2+(\frac{8.3}{2})^2$

$\Longrightarrow BD^2 = (\frac{10.3}{2})^2- (\frac{8.3}{2})^2$

$\Longrightarrow (BD)^2 = (\frac{10.3}{2})-(\frac{8.3}{2})(\frac{10.3}{2})+(\frac{8.3}{2})$

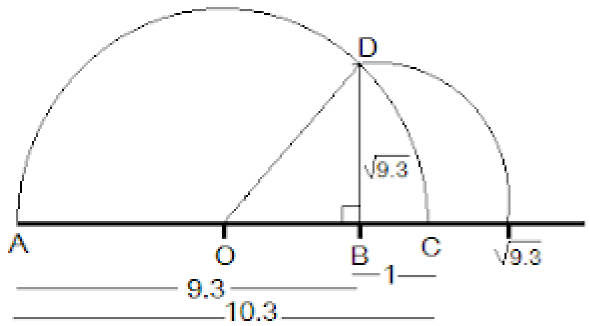
⟹ $BD^2 = 9.3$

⟹ $BD = \sqrt{9.3}$

Thus, the length of BD is $\sqrt{9.3}$.

Step 6: Taking BD as radius and B as centre draw an arc which touches the line segment.

The point where it touches the line segment is at a distance of $\sqrt{9.3}$ from O as shown in the figure.



Alternative solution:

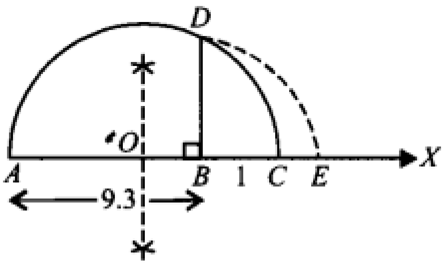
Draw a line segment AB = 9.3 units and extend it to C such that BC = 1 unit.

Find midpoint of AC and mark it as O.

Draw a semicircle taking O as centre and AO as radius. Draw BD ⊥ AC.

Draw an arc taking B as centre and BD as radius meeting AC produced at E such that

BE = BD = 9.3 units.



Q5.Rationalise the denominator of the following:

(i) $\frac{1}{\sqrt{7}}$ (ii) $\frac{1}{\sqrt{7}-\sqrt{6}}$ (iii) $\frac{1}{\sqrt{5}+\sqrt{2}}$ (iv) $\frac{1}{\sqrt{7}-2}$

Answer:

(i) $\frac{1}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{7}}{7}$ (Multiplying and dividing by $\sqrt{7}$)

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

(Multiplying and dividing by $\sqrt{7}+\sqrt{6}$)

(iii) $\frac{1}{\sqrt{5}+\sqrt{2}} \times \frac{\sqrt{5}-\sqrt{2}}{\sqrt{5}-\sqrt{2}} = \frac{\sqrt{5}-\sqrt{2}}{(\sqrt{5})^2-(\sqrt{2})^2} = \frac{\sqrt{5}-\sqrt{2}}{5-2} = \frac{\sqrt{5}-\sqrt{2}}{3}$

(Multiplying and dividing by $\sqrt{5}-\sqrt{2}$)

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

(Multiplying and dividing by $\sqrt{7}+2$)

$= \frac{\sqrt{7}+2}{7-4} = \frac{\sqrt{7}+2}{3}$

Exercise 1.6 Page: 26

1. Find:

(i) $64^{1/2}$
(ii) $32^{1/5}$
(iii) $125^{1/3}$

Answer:

(i) $64^{\frac{1}{2}} = (8\times 8)^{\frac{1}{2}} = 8^{2\times\frac{1}{2}} = 8$ $[\because (a^m)^n = a^{mn}]$

(ii) $32^{\frac{1}{5}} = (2\times 2\times 2\times 2\times 2)^{\frac{1}{5}} = 2^{5\times\frac{1}{5}} = 2$

(iii) $125^{\frac{1}{3}} = (5\times 5\times 5)^{\frac{1}{3}} = 5^{3\times\frac{1}{3}} = 5$

Q2. Find :

(i) $9^{\frac{3}{2}}$ (ii) $32^{\frac{2}{5}}$ (iii) $16^{\frac{3}{4}}$ (iv) $125^{-\frac{1}{3}}$

Answer:

(i) $9^{\frac{3}{2}} = (3^2)^{\frac{3}{2}} = 3^3 = 27$

(ii) $32^{\frac{2}{5}} = (2^5)^{\frac{2}{5}} = 2^2 = 4$

(ii) $16^{\frac{3}{4}} = (2^4)^{\frac{3}{4}} = 2^3 = 8$

(iv) $125^{-\frac{1}{3}} = (5^3)^{-\frac{1}{3}} = 5^{-1} = \frac{1}{5}$

Q3. Simplify:

(i) $2^{\frac{2}{3}} \cdot 2^{\frac{1}{5}}$ (ii) $\left(\frac{1}{3^3}\right)^7$ (iii) $\frac{11^{1/2}}{11^{1/4}}$ (iv) $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$

Answer:

(i) $2^{\frac{2}{3}} \cdot 2^{\frac{1}{5}} = 2^{\frac{2}{3}+\frac{1}{5}} = 2^{\frac{10+3}{15}} = 2^{\frac{13}{15}}$ $(\because x^a \cdot x^b = x^{a+b})$

(ii) $\left(\frac{1}{3^3}\right)^7 = \frac{1}{3^{3\times7}} = \frac{1}{3^{21}} = 3^{-21}$ $[\because (x^a)^b = x^{ab}]$

(iii) $\frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}} = 11^{\frac{1}{2}} \times 11^{\frac{-1}{4}} = 11^{\frac{1}{2}-\frac{1}{4}} = 11^{\frac{2-1}{4}} = 11^{\frac{1}{4}}$ $\left(\because \frac{x^a}{x^b} = x^{a-b}\right)$

(iv) $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}} = (7 \cdot 8)^{\frac{1}{2}} = (56)^{\frac{1}{2}}$ $[\because x^a \cdot y^a = (xy)^a]$