CLASS 9th

SUBJECT: MATHEMATICS

SESSION: 2024-2025

Unit 1
Number system

Q 1. Is zero a rational number can you write it in the form of p/q?

Sol. Yes, zero is a rational number.

And , we can write it in the form of p/q?

eg. $\frac{0}{2}, \frac{0}{5}, \frac{0}{8}$ etc.

Q2. Find 6 rational numbers between 3and4?

Sol. We have to find 6 rational numbers.

So our denominator should be $(6 + 1 = 7)$

3= 3x $\frac{7}{7} = \frac{21}{7}$

And 4= 4x $\frac{7}{7} = \frac{28}{7}$

6 rational number s between 3and 4are

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

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

Sol .we have to find 5 rational numbers

So our denominator should be $(5 + 1 = 6)$

now $\frac{3}{5}$ x $\frac{6}{6} = \frac{18}{30}$

and $\frac{4}{5}$ x $\frac{6}{6} = \frac{24}{30}$

5 rational numbers are

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

Q4 Are thefollowing statements true or False ?

(1) Every natural number is a whole number.

Sol. True . As natural numbers are already present in the set of whole numbers

(2) Every integer is a whole number .

Sol. False , As integers can be negative as well as positive but the whole numbers are always positive .

(3) Every rational number is a whole number

Sol. False , as rational numbers can be positive as well as positive but the whole numbers are always positive .

EXERCISE 1.2

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

(1)Every irrational number is a real number .

Sol. True , as real numbers contain both rational numbers as well as irrational numbers.

(2) every point on the number line is of the form $\sqrt{m}$, where m is a natural number .

Sol. False, as $\sqrt{0.04}$ = 0.2 that can be represent on a number line but 0.04 is not a natural number.

(3) every real number is an irrational number .

Sol .False, as real numbers contain both rational numbers as well as irrational numbers.

Q2. Are the square roots of all positive integers irrational ?if no give an example?

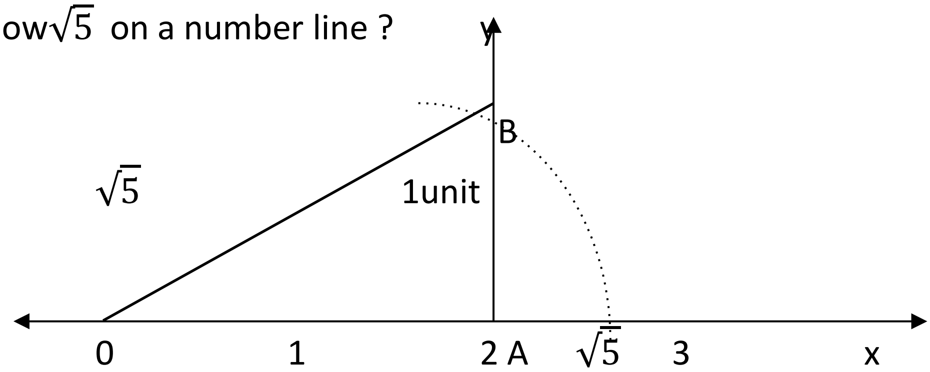
Sol. No , the square roots of all positive integers are not irrational .

Eg.

$\sqrt{4} = 2 \qquad (rational\ number\ )$

Q3. Show $\sqrt{5}$ on a number line ?

Sol.



We can construct $\sqrt{5}$ as the length of hypotenuse of a right triangle whose sides are of lengths 2and 1 unit.

Let ox be a number line on which o represent o and A represent 2 units length .

Draw a line 1 oA and mark points B on it so that AB = 1 unit.

Then $OB^2 = OA^2 + AB^2$

$= 2^2 + 1^2$

$OB^2 = 4+1= 5$

$OB = \sqrt{5}$

Using a compass with centre o and radius OB we mark a point p on the number line corresponds to $\sqrt{5}$ on the number line .

Thus P represents the irrational number $\sqrt{5}$

EXERCISE 1.3

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

Sol.(1) $\frac{36}{100-}$

= 0.36

It is a terminating decimal.

(2) $\frac{1}{11}$

$= 0.\overline{09}$

It is a non – terminating repeating decimal

(3) $4\frac{1}{8}$

$= \frac{33}{8}$

$= 4.125$

It is a terminating decimal

(4) Part (5,6 same as 1,2,3).

Q2. You know that $\frac{1}{7} = 0.\overline{142857}$ can you predict what decimal expansions of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$ are without actually the long division?

Sol : $\frac{1}{7} = 0.\overline{142857}$ (Given)

$\frac{2}{7} = 2 \times \frac{1}{7} = 2 \times 0.\overline{142857} = 0.\overline{285714}$

$\frac{3}{7} = 3 \times \frac{1}{7} = 3 \times 0.\overline{142857} = 0.\overline{428571}$

$\frac{4}{7} = 4 \times \frac{1}{7} = 4 \times 0.\overline{142857} = 0.\overline{571428}$

$\frac{5}{7} = 5 \times \frac{1}{7} = 5 \times 0.\overline{142857} = 0.\overline{714285}$

$\frac{6}{7} = 6 \times \frac{1}{7} = 6 \times 0.\overline{142857} = 0.\overline{857142}$

Q3 . Express the following in the form $\frac{p}{q}$ where p and q are integer and q≠ o.

Sol. Let $X = 0.\overline{6}$ → (1)

Multiplying b/s by 10.

$10 \times X = 10X\ 0.6$ → (2)

$10X = 6.\overline{6}$

Subtracting =n (1) from =n (2)

$10X - X = 6.\overline{6} - 0.\overline{6}$

$9X = 6$

$X = 6/9 = 2/3$

$X = 2/3$

Q4. Express 0.9999 ...... in the form $\frac{p}{q}$. Are you surprised by your Answer?

Sol .let x = 0.999….

$X = 0.\overline{9}$ → (1)

Multiplying =n(1) by 10

$10 \text{x} X = 10 \text{ x } 0.\overline{9}$

$10X = 9.\overline{9}$ → (2)

Subtracting =n (1) from =n (2)

$10X - X = 9.\overline{9} - 0.\overline{9}$

$9X = 9$

$X = 9/9$

$X = 1$

The answer makes sense as 0.9999…..
is apx. Equal to 1.

Q5. What is the maximum number of digits in the repeating block of digits in the quotient while computing?

Sol. $\frac{1}{17}$?

```
17 | 100 |  o.0588235294117647…….
      85
      150
     136
      140
      136
        40
        34
         60
         51
```

90
85
50
34
160
153
70
68
20
17
30
17
130
119
110
102
80
68
120
119
1

The maximum number of digits = (17 – 1) = 16

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 decimals representation ?

$\frac{7}{16}$ is a terminating decimal expansion because 16 = 2^4

(b) $\frac{11}{25}$ is a terminating decimal expansion because 25 = 5^2

for terminating decimal expansion q must have the prime factor only 2,5 or both

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

Sol. The 3 examples are

$\sqrt{2}$ = 1.41.....

$\sqrt{10}$ = 3.162.....

$\sqrt{5}$ = 2.2 ....

Q8. Find three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$.

Sol . $\frac{5}{7}$ = $0.\overline{714285}$

$\frac{9}{11}$ = $0.\overline{81}$

∴ 3 irrational no's are

0.72070070007.......
0.73151151115...
o.7282282228...

Q9. Classify the following numbers as rational or irrational :

Sol. (1) $\sqrt{23}$ irrational number .

(2) $\sqrt{225}$
$=\sqrt{15^2}$
= 15 (rational number)

(3) 0.3796
$=\frac{\mathbf{3796}}{\mathbf{10000}}$ (rational number)

(4) 7.478478…

Rational number (since it is non – terminating repeating decimal)

(5) 1.101001000100001…

Irrational number .

EXERCISE : 1.5

Q1.Classify the following number as rational or irrational ?

(1) $2-\sqrt{5}$

Irrational number .

(2) $(3+\sqrt{23}) - \sqrt{23}$

$3+\sqrt{23} - \sqrt{23}$

= 3 (rational number)

(3) $\frac{2\sqrt{7}}{7\sqrt{7}}$

$= \frac{2}{7}$

(rational number)

(4) (4) $\frac{1}{\sqrt{2}}$ (irrational number)

(5) 2π irrational number

Q5. Simply each of the following expressions:

Sol. (1)

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

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

$6 + 3\sqrt{2} + 2\sqrt{3} + \sqrt{6}$

(2) $(3+\sqrt{3})(3-\sqrt{3})$

Using identity $(a+b)(a-b) = a^2 - b^2$

$= (3)^2 - (\sqrt{3})^2$

$= 9 - 3$

$= 6$

(3) $(\sqrt{5} + \sqrt{2})^2$

$(\sqrt{5} + \sqrt{2})(\sqrt{5} + \sqrt{2})$

$\sqrt{5}(\sqrt{5} + \sqrt{2}) + \sqrt{2}(\sqrt{5} + \sqrt{2})$

$(\sqrt{5})^2 + \sqrt{10} + \sqrt{10} + (\sqrt{2})^2$

$5 + 2\sqrt{10} + 2$

$7 + 2\sqrt{10}.$

(6) $(\sqrt{5} - \sqrt{2})(\sqrt{5} - \sqrt{2})$

Using identity $(a-b)(a+b) = a^2 - b^2$

$(\sqrt{5})^2 - (\sqrt{2})^2$

= 5-2

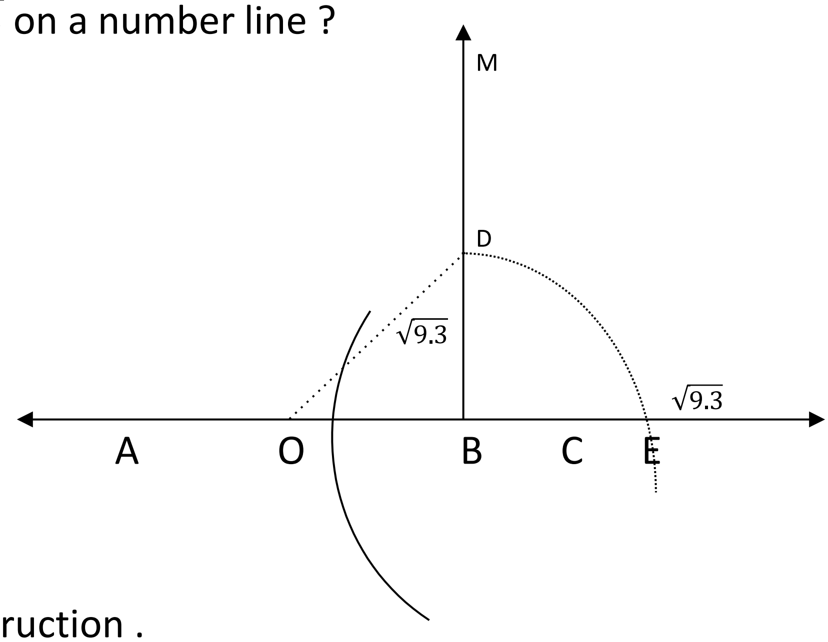
=3

Q3. Recall π is defined as the ratio of the circumference(say c) of a circle to its diameter (say d) . that is , π = $\frac{c}{d}$ .this seems to contradict the fact that π is irrational.How will you resolve this contradiction

Sol. There is no contradiction as if we measure the length of circumference there will be some variation.So either

C or d be an irrational.

Q4. Mark $\sqrt{9.3}$ on a number line ?



Steps of construction .

(1) Draw a line segment AB = 9.3 Unit .
(2) Produce AB to c such that AC = 1O . 3 Units .
(3) Draw a perpendicular bisector an AC Intersecting it at 0. And draw a semi – circle with AC as diameter.
(4) At B ,draw BM perpendicular OC intersecting the semi- circle at D.
(5) Join OD .

(6) With B as centre and radius BD, draw an arc intersecting OB at E.

HENCE E represents $\sqrt{9.3}$ on the number line with origin B.

In rt. Triangle OBD, by PGT

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

$(5.15)^2 = (4.15)^2 + BD^2$

$BD^2 = (5.15)^2 - (4.15)^2$

$BD^2 = (5.15 + 4.15)(5.15 - 4.15)$

$BD^2 = (9.3)(1)$

$BD^2 = 9.3$

$BD = \sqrt{9.3}$

Q5. Rationalise the denominator of the following?

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

$= \frac{1}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$ (rationalization)

$= \frac{\sqrt{7}}{(\sqrt{7})^2}$

$= \frac{\sqrt{7}}{7}$

(2) $\dfrac{1}{\sqrt{7} - \sqrt{6}}$

$= \dfrac{1}{\sqrt{7} - \sqrt{6}} \times \dfrac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}}$ (rationalization)

$\dfrac{\sqrt{7} + \sqrt{6}}{(\sqrt{7})^2 - (\sqrt{6})^2}$

$= \dfrac{\sqrt{7} + \sqrt{6}}{7 - 6}$

$= \dfrac{\sqrt{7} + \sqrt{6}}{1}$

$= \sqrt{7} + \sqrt{6}$

(3) $\dfrac{1}{\sqrt{5} + \sqrt{2}} \times \dfrac{\sqrt{5}-\sqrt{2}}{\sqrt{5}-\sqrt{2}}$

$\dfrac{\sqrt{5} - \sqrt{2}}{(\sqrt{5})^2 - (\sqrt{2})^2} = \dfrac{\sqrt{5} - \sqrt{2}}{5 - 2}$

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

(4) $\frac{1}{\sqrt{7} - 2}$

$= \frac{1}{\sqrt{7} - 2} \times \frac{\sqrt{7} + 2}{\sqrt{7} + 2}$

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

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

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

Q1. Find

Sol. $64^{1/2}$

$= (8)^{2 \times 1/2}$

$= 8^1$

$= 8$

2) $32^{1/5}$

$= (2)^{5x1/5}$

$= 2^1$

$=2$

$125^{1/3}$

$= (5)^{3x\ 1/3}$

$= 5^1$

$= 5$

Find

Sol. $9^{3/2}$

$= (3)^{2x\ 3/2}$

$= (3)^3$

$= 27$

(ii) $32^{2/5}$

$= (2)^{5x2/5}$

$= 2^2$

$=4$

(iii) $16^{3/4}$

$= (2)^{4x3/4}$

$= 2^3$

$=8$

(iv) $125^{-1/3}$

$= (5)^{3x-1/3}$

$= 5^{-1}$

$=1/5$

LAWS OF LOGARITHM

Law 1st:- $\log_a mn = \log_a m + \log_a n$

Proof:- Let $\log_a m = x$ and $\log_a n = y$

$a^x = m$(i) and $a^y = n$(ii)

Multiply i and ii

=> $a^x.a^y = mn$

=> $a^{x+y} = mn$

=> $\log_a(mn) = x+y$

=> $\log_a mn = \log_a m + \log_a n$

Law 2nd :- $\log_a(m/n) = \log_a m - \log_a n$

Proof:- Let $\log_a m = x$ and $\log_a n = y$

$a^x = m$(i) and $a^y = n$(ii)

Divide i and ii

=> $a^x \div a^y = m/n$

=> $a^{x-y} = m/n$

=> $\log_a(m/n) = x-y$

=> $\log_a mn = \log_a m - \log_a n$

Law 3rd :- $\log_a(m)^n = n\log_a m$

Proof:- Let $\log_a m = x$

$a^x = m$

Take power n on both sides

=> $a^{nx} = m^n$

=> $\log_a m^n = nx$

=> $\log_a m^n = n\log_a m$

Exercise 1.7

Q1:-

i) **$2^5 = 32$**

Its logarithm form is

$\text{Log}_2 32 = 5$

ii) **$5^5 = 3125$**

Its logarithm form is

$\text{Log}_5 3125 = 5$

Q2:-

i) **$\text{Log}_3 243 = 5$**

Its exponental form is

$3^5 = 243$

ii) **$\text{Log}_{10} 1000 = 3$**

Its exponental form is

$10^3 = 1000$

Q3:-

To prove log(mnp)=logm+logn+logp

Proof :- log(mn) (p)   (logmn=logm+logn) law i

Log(mn)+log(p)

Log m+log n+log p

Hence proved

Q4:-

i) **Log (½) + log (2/3) + log (3/4) + log (4/5) – log (1/5)=0**

Take L.H.S

Log (½) + log (2/3) + log (3/4) + log (4/5) – log (1/5)   **(log mn=logm+logn)**

Log (½) (2/3) + log (3/4) (4/5) – log (1/5)

Log (1/3) + log (3/5)– log (1/5)

Log (1/3) (3/5)– log (1/5)

log (1/5)- log (1/5)   **log(m/n)=log (m-n)**

log (1/5) / log (1/5)

log (1)

0   **log(1)=0**

∴ L.H.S=R.H.S

ii) **Log360=3log2+2log3+log5**

Take R.H.S

3log2+2log3+log5   **nlogm=logm^n**

Log2^3+log3^2+log5   **logmn=logm+logn**

Log8+log9+log5

Log(8x9)+log5

Log(72)x(5)

Log360

∴ R.H.S=L.H.S

iii) **Log (50/147)=log2+2log5-log3-2log7**

Take R.H.S

log2+2log5-log3-2log7

log2+log5^2-[log3+log7^2]   **nlogm=logm^n**

log2+log25-[log3+log49]   **logmn=logm+logn**

log(2x25)-log(3x49)   **log(m/n)=logm-logn**

log50-log147

log(50/147)

∴ R.H.S=L.H.S

iv) **Log10+log100+log1000+log10000=10**

Take L.H.S

Log10+log100+log1000+log10000

Log(10) (100)+log(1000) (10000)

Log 10^3+log10^7

Log(10

Chapter 3 – Linear Equations in Two Variables

Exercise 3.1

1. The cost of a notebook is twice the cost of a pen. Write a linear equation in two variables to represent this statement.

(Take the cost of a notebook to be ₹ x and that of a pen to be ₹ y)

Solution:

Let the cost of a notebook be = ₹ x

Let the cost of a pen be = ₹ y

According to the question,

The cost of a notebook is twice the cost of a pen.

i.e., cost of a notebook = 2×cost of a pen

$x = 2 \times y$

$x = 2y$

$x-2y = 0$

$x-2y = 0$ is the linear equation in two variables to represent the statement, 'The cost of a notebook is twice the cost of a pen.'

2. Express the following linear equations in the form $ax + by + c = 0$ and indicate the values of a, b and c in each case.

(i) 2x+3y = $9.3\overline{5}$

Solution:

$$2x+3y = 9.3\overline{5}$$

Re-arranging the equation, we get,

$$2x+3y-9.3\overline{5}= 0$$

The equation $2x + 3y - 9.3\overline{5}= 0$can be written as,

$$2x + 3y + (-9.3\overline{5}) = 0$$

Now comparing $2x + 3y + (-9.3\overline{5}) = 0$ with $ax + by + c = 0$

We get,

$a = 2$

$b = 3$

$c = -9.3\overline{5}$

(ii) x −(y/5)−10 = 0

Solution:

The equation $x -(y/5)-10 = 0$ can be written as,

$1x+(-1/5)y +(-10) = 0$

Now comparing $x+(-1/5)y+(-10) = 0$ with $ax+by+c = 0$

We get,

$a = 1$

$b = -(1/5)$

$c = -10$

(iii) −2x+3y = 6

Solution:

$-2x+3y = 6$

Re-arranging the equation, we get,

$-2x+3y-6 = 0$

The equation $-2x+3y-6 = 0$ can be written as,

$(-2)x+3y+(-6) = 0$

Now, comparing $(-2)x+3y+(-6) = 0$ with $ax+by+c = 0$

We get, $a = -2$

$b = 3$

$c = -6$

(iv) $x = 3y$

Solution:

$x = 3y$

Re-arranging the equation, we get,

$x-3y = 0$

The equation $x-3y=0$ can be written as,

$1x+(-3)y+(0)c = 0$

Now comparing $1x+(-3)y+(0)c = 0$ with $ax+by+c = 0$

We get $a = 1$

$b = -3$

$c = 0$

(v) $2x = -5y$

Solution:

$2x = -5y$

Re-arranging the equation, we get,

$2x+5y = 0$

The equation $2x+5y = 0$ can be written as,

$2x+5y+0 = 0$

Now, comparing $2x+5y+0= 0$ with $ax+by+c = 0$

We get $a = 2$

$b = 5$

$c = 0$

(vi) $3x+2 = 0$

Solution:

$3x+2 = 0$

The equation $3x+2 = 0$ can be written as,

$3x+0y+2 = 0$

Now comparing $3x+0+2= 0$ with $ax+by+c = 0$

We get $a = 3$

$b = 0$

$c = 2$

(vii) $y-2 = 0$

Solution:

$y-2 = 0$

The equation $y-2 = 0$ can be written as,

$0x+1y+(-2) = 0$

Now comparing $0x+1y+(-2) = 0$with $ax+by+c = 0$

We get $a = 0$

$b = 1$

$c = -2$

(viii) $5 = 2x$

Solution:

$5 = 2x$

Re-arranging the equation, we get,

$2x = 5$

i.e., $2x-5 = 0$

The equation $2x-5 = 0$ can be written as,

$2x+0y-5 = 0$

Now comparing $2x+0y-5 = 0$ with $ax+by+c = 0$

We get $a = 2$

$b = 0$

$c = -5$

Exercise 3.2

1. Which one of the following options is true, and why?

$y = 3x+5$ has

1. *A unique solution*
2. *Only two solutions*
3. *Infinitely many solutions*

Solution:

Let us substitute different values for x in the linear equation y = 3x+5

x	0	1	2	….	100
y, where y=3x+5	5	8	11	….	305

From the table, it is clear that x can have infinite values, and for all the infinite values of x, there are infinite values of y as well.

Hence, (iii) infinitely many solutions is the only option true.

2. Write four solutions for each of the following equations:

(i) 2x+y = 7

Solution:

To find the four solutions of 2x+y =7, we substitute different values for x and y.

Let x = 0

Then,

2x+y = 7

(2×0)+y = 7

y = 7

(0,7)

Let $x = 1$

Then,

$2x+y = 7$

$(2\times1)+y = 7$

$2+y = 7$

$y = 7-2$

$y = 5$

$(1,5)$

Let $y = 1$

Then,

$2x+y = 7$

$(2x)+1 = 7$

$2x = 7-1$

$2x = 6$

$x = 6/2$

$x = 3$

$(3,1)$

Let $x = 2$

Then,

$2x+y = 7$

$(2\times2)+y = 7$

$4+y = 7$

$y = 7-4$

$y = 3$

$(2,3)$

The solutions are $(0, 7)$, $(1,5)$, $(3,1)$, $(2,3)$

(ii) $\pi x+y = 9$

Solution:

To find the four solutions of $\pi x+y = 9$, we substitute different values for x and y.

Let $x = 0$

Then,

$\pi x+y = 9$

$(\pi \times 0)+y = 9$

$y = 9$

$(0,9)$

Let $x = 1$

Then,

$\pi x +y = 9$

$(\pi \times 1)+y = 9$

$\pi+y = 9$

$y = 9-\pi$

$(1, 9-\pi)$

Let $y = 0$

Then,

$\pi x+y = 9$

$\pi x+0 = 9$

$\pi x = 9$

$x = 9/\pi$

$(9/\pi,0)$

Let $x = -1$

Then,

$\pi x + y = 9$

$(\pi \times -1) + y = 9$

$-\pi+y = 9$

$y = 9+\pi$

$(-1,9+\pi)$

The solutions are $(0,9)$, $(1,9-\pi)$, $(9/\pi,0)$, $(-1,9+\pi)$

(iii) $x = 4y$

Solution:

To find the four solutions of $x = 4y$, we substitute different values for x and y.

Let $x = 0$

Then,

$x = 4y$

$0 = 4y$

$4y = 0$

$y = 0/4$

$y = 0$

(0,0)

Let $x = 1$

Then,

$x = 4y$

$1 = 4y$

$4y = 1$

$y = 1/4$

(1,1/4)

Let $y = 4$

Then,

$x = 4y$

$x = 4 \times 4$

$x = 16$

(16,4)

Let $y = 1$

Then,

$x = 4y$

$x = 4\times1$

$x = 4$

(4,1)

The solutions are (0,0), (1,1/4), (16,4), (4,1)

3. Check which of the following are solutions of the equation $x-2y = 4$ and which are not:

(i) (0, 2)

(ii) (2, 0)

(iii) (4, 0)

(iv) ($\sqrt{2}$, $4\sqrt{2}$)

(v) (1, 1)

Solutions:

(i) (0, 2)

$(x,y) = (0,2)$

Here, $x=0$ and $y=2$

Substituting the values of x and y in the equation $x-2y = 4$, we get,

$x-2y = 4$

$\Rightarrow 0 - (2\times2) = 4$

But, $-4 \neq 4$

$(0, 2)$ is **not** a solution of the equation $x-2y = 4$

(ii) (2, 0)

$(x,y) = (2, 0)$

Here, $x = 2$ and $y = 0$

Substituting the values of x and y in the equation $x - 2y = 4$, we get,

$x - 2y = 4$

$\Rightarrow 2-(2\times 0) = 4$

$\Rightarrow 2 - 0 = 4$

But, $2 \neq 4$

$(2, 0)$ is **not** a solution of the equation $x-2y = 4$

(iii) (4, 0)

Solution:

$(x,y) = (4, 0)$

Here, $x= 4$ and $y=0$

Substituting the values of x and y in the equation $x - 2y = 4$, we get,

$x-2y = 4$

$\Rightarrow 4 - 2\times 0 = 4$

$\Rightarrow 4-0 = 4$

$\Rightarrow 4 = 4$

$(4, 0)$ is a solution of the equation $x-2y = 4$

(iv) $(\sqrt{2}, 4\sqrt{2})$

Solution:

$(x,y) = (\sqrt{2}, 4\sqrt{2})$

Here, $x = \sqrt{2}$ and $y = 4\sqrt{2}$

Substituting the values of x and y in the equation $x-2y = 4$, we get,

$x - 2y = 4$

$\Rightarrow \sqrt{2} - (2 \times 4\sqrt{2}) = 4$

$\sqrt{2} - 8\sqrt{2} = 4$

But, $-7\sqrt{2} \neq 4$

$(\sqrt{2}, 4\sqrt{2})$ is **not** a solution of the equation $x-2y = 4$

(v) (1, 1)

Solution:

$(x,y) = (1, 1)$

Here, $x = 1$ and $y = 1$

Substituting the values of x and y in the equation $x-2y = 4$, we get,

$x - 2y = 4$

$\Rightarrow 1 - (2 \times 1) = 4$

$\Rightarrow 1 - 2 = 4$

But, $-1 \neq 4$

(1, 1) is **not** a solution of the equation $x-2y = 4$

4. Find the value of k, if x = 2, y = 1 is a solution of the equation 2x+3y = k.

Solution:

The given equation is

$2x+3y = k$

According to the question, $x = 2$ and $y = 1$

Now, substituting the values of x and y in the equation$2x+3y = k$,

We get,

$(2\times2)+(3\times1) = k$

$\Rightarrow 4+3 = k$

$\Rightarrow 7 = k$

$k = 7$

The value of k, if $x = 2$, $y = 1$ is a solution of the equation $2x+3y = k$, is 7.

Exercise 3.3

2. Give the equations of two lines passing through (2, 14). How many more such lines are there, and why?

Solution:

We know that an infinite number of lines pass through a point.

The equation of 2 lines passing through (2,14) should be in such a way that it satisfies the point.

Let the equation be $7x = y$

$7x-y = 0$

When $x = 2$ and $y = 14$

$(7\times2)-14 = 0$

$14-14 = 0$

$0 = 0$

L.H.S. = R.H.S.

Let another equation be $4x = y-6$

$4x-y+6 = 0$

When $x = 2$ and $y = 14$

$(4\times2-14+6 = 0$

$8-14+6 = 0$

$0 = 0$

L.H.S. = R.H.S.

Since both the equations satisfy the point (2,14), then we can say that the equations of two lines passing through (2, 14) are $7x = y$ and $4x = y-6$

We know that an infinite number of line passes through one specific point. Since there is only one point (2,14) here, there can be infinite lines that pass through the point.

3. If the point (3, 4) lies on the graph of the equation $3y = ax+7$, find the value of a.

Solution:

The given equation is

$3y = ax+7$

According to the question, $x = 3$ and $y = 4$

Now, substituting the values of x and y in the equation $3y = ax+7$,

We get,

$(3\times4) = (a\times3)+7$

$\Rightarrow 12 = 3a+7$

$\Rightarrow 3a = 12-7$

$\Rightarrow 3a = 5$

$\Rightarrow a = 5/3$

The value of a, if the point (3,4) lies on the graph of the equation $3y = ax+7$ is 5/3.