Solution

PAIR OF LINEAR EQUATION IN TWO VARIABLE WS 4

Class 10 - Mathematics

Section A

1. 57

   Explanation:

   Let the ten's digit of the required number be x and the unit's digit be y.

   As per given condition the sum of the digits of a two-digit number is 12.

   Then, x + y = 12. ...(i)

   Required number = (10x + y).

   Number obtained on reversing the digits = (10y + x).

   As per given condition the number obtained by interchanging its digits exceeds the given number by 18.

   $\therefore$ (10y + x) - (10x + y) = 18

   $\Rightarrow$10y + x - 10x - y = 18

   $\Rightarrow$ 9y -9x = 18

   $\Rightarrow$ y -x = 2. ...(ii)

   On adding (i) and (ii), we get

   (x + y) + (y -x) = 12 + 2

   $\Rightarrow$ 2y = 14

   $\Rightarrow$ y = 7.

   Putting y = 7 in (i), we get

   x + 7 = 12

   $\Rightarrow$ x = 12 - 7 = 5

   $\therefore$ x = 5 and y = 7.

   Hence, the required number is 57.

2. 58

   Explanation:

   Let the unit digit is b and ten's digit is a.

   So, two digit number is 10a + b.

   As per given condition

   The sum of the digits of a two digit number is 13.

   So, a + b = 13 .....(i)

   and the number obtained by interchanging the digits of the given number exceeds the number by 27.

   10b + a = (10a + b) + 27

   $\Rightarrow$ 9b = 9a + 27

   $\Rightarrow$ b = a + 3 .....(ii)

   Putting (ii) in (i), we get :

   a + a + 3 = 13

   $\Rightarrow$ 2a = 10

   $\Rightarrow$ a = 5

   Putting a = 5 in (ii), we get :

   b = 5 + 3 = 8

   Two digit number = 10a + b = 5(10) + 8 = 58

   Therefore, the number is 58.

3. 692

   Explanation:

   Let digit at unit's place = x and digit at hundred's place = y

   $\therefore$ Middle digit =$x+y+1$

   Number = $100y+10(x+y+1)+x$

   Number obtained by reversing the digits = 100x + 10(x + y + 1) + y

   ATQ.,

x + y + (x + y + 1) = 17
⇒ 2x + 2y = 16 ..(i)
and 100x + 10(x + y + 1) = x - 396 .... (ii)
⇒ 99x - 99y = -396
⇒ x - y = -4
By Solving equation (i) and (ii), we get
x = 2, y = 6 and Number = 692

4. 64
Explanation:
Let unit number is y and tenth number is x.
The given number = 10x + y
As per first condition
A number consists of two digits whose sum is 10.
So, x + y = 10.......(i)
The number obtained by interchanging the digits is 10y + x.
As per second condition
If 18 is subtracted from the number, its digits are reversed.
⇒ 10y + x = 10x + y - 18
⇒ 9x - 9y = 18
⇒ x - y = 2.............(ii)
Adding (i) and (ii), we get
x + y + x - y = 10 + 2
⇒ 2x = 12
⇒ x = 6
Substituting in (i), we get y = 4.
So, the given number is 10x + y = 10(6) + 4 = 64
5. 36
Explanation:
Let the tens digit be x and unit place digit be y.
Number = 10x + y
As per given condition
The sum of the digits of a two digit number is 9.
So, x + y = 9........(i)
And the number obtained by reversing the order of digits of the given number exceeds the given number by 27.
10y + x = 10x + y + 27
⇒ -9x + 9y = 27
⇒ -x + y = 3.....(ii)
Adding (i) and (ii), we get
2y = 12
⇒ y = 6
Putting value of y in equation (i), we get
x + 6 = 9
⇒ x = 9 - 6
⇒ x = 3
Two digit number = 10x + y = 10(3) + 6 = 30 + 6 = 36
So, the given number is 36.
6. 36
Explanation:
Let length of the garden = x m and breadth of the garden = y m
A.T.Q. x = y + 12 ⇒ x - y = 12 ..... (i) and
$\frac{1}{2}$ Perimeter = 60
⇒ $\frac{1}{2} \times 2(x + y) = 60$
⇒ x + y = 60..... (ii)

Add (i) and (ii)

2x = 72

x = 36

then put x = 36 in (i)

y = 24

7. 84

Explanation:

Let digit at unit place = x and digit at tens place = y

So, two digit number is = 10y + x

As per given condition

The result of dividing a number of two digits by the number with the digits reversed is $\frac{7}{4}$.

$\frac{10y+x}{10x+y} = \frac{7}{4}$

$\Rightarrow$ 40y + 4x = 70x + 7y

66x - 33y = 0

$\Rightarrow$ 2x - y = 0 ....(i)

And the sum of the digits is 12.

So, x + y = 12 ......(ii)

Adding eq (i) and (ii), we get

2x - y + x + y = 12 + 0

$\Rightarrow$ 3x = 12

$\Rightarrow$ x = 4

When x = 4, eq. (i) becomes

2(4) - y = 0

$\Rightarrow$ y = 8

$\therefore$ Two digit number is = 10(8) + 4 = 80 + 4 = 84

Section B

8. (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

Section C

9. Given, $3x - \frac{y+7}{11} + 2 = 10$

$\Rightarrow \frac{33x-(y+7)+22}{11} = 10$

$\Rightarrow 33x - y - 7 + 22 = 110$

$\Rightarrow 33x - y = 95$ ..(i)

Also, $2y + \frac{x+11}{7}$ = 10

$\Rightarrow$ $\frac{14y+x+11}{7}$ = 10

$\Rightarrow 14y + x + 11 = 70$

$14y + x = 59$

$14y = 59 - x$

$\Rightarrow$ y = $\frac{59-x}{14}$

eq. (i) becomes

33x - $\left(\frac{59-x}{14}\right)$ = 95

$\Rightarrow$ $\frac{462x-59+x}{14}$ = 95

$\Rightarrow$ 463x - 59 = 1330

$\Rightarrow$ x = 3

When x = 3 eq. (i) becomes

33(3) - y = 95

$\Rightarrow$ y =4

10. The given system of equations is

3x - 2y =4 .... (i)

2x + y=5 .... (ii)

Putting x=2 and y=1 in equation (i), we have

LHS= 3 $\times$ 2 - 2$\times$1

= 6 - 2

= 4

= RHS

Putting x=2 and y=1 in equations (ii), we have

LHS=2×2+1×1

= 4 + 1

= 5

= RHS

Thus, x = 2 and y =1 satisfy both the equations of the given system.

Hence, x = 2, y =1 is a solution of the given system.

11. According to the question,

$2x + 5y = \frac{8}{3}$..........(i)

$3x - 2y = \frac{5}{6}$.......(ii)

Multiplying (i) by 2 , we get (iii) and (ii) by 5, we get (iv)

$4x + 10y = \frac{16}{3}$ ....(iii)

$15x - 10y = \frac{25}{6}$ ......(iv)

Solving Eq.(iii) and (iv),

Eq. (iii) + (iv),

$19x = \frac{25}{6} + \frac{16}{3}$

$\Rightarrow 19x = \frac{25+32}{6}$

$\Rightarrow 19x = \frac{57}{6}$

$\Rightarrow x = \frac{3}{6}$

$\Rightarrow x = \frac{1}{2}$

Substituting x = $\frac{1}{2}$ in (iii),

$\Rightarrow 4 \times \frac{1}{2} + 10y = \frac{16}{3}$

$10y = \frac{16}{3} - 2 \Rightarrow 10y = \frac{10}{3}$

y = $\frac{10}{3 \times 10} = \frac{1}{3}$

$\therefore$ Solution is x = $\frac{1}{2}$, y = $\frac{1}{3}$

12. x + y = 12 ...(i)

x - y = 8 ...(ii)

On adding (i) and (ii),

2x = 20

$\Rightarrow$ x = 10

$\therefore$ 10 + y = 12

$\Rightarrow$ y = 2

13. Given pair of linear equations is

- x + py = 1 …(i)

and px - y - 1 = 0 …(ii)

On comparing with standard form, we get

a_1 = - 1, b_1 = p, c_1 =- 1;

And a_2 = p, b_2 = - 1, c_2 =- 1;

a_1 /a_2 = $-\frac{1}{p}$

b_1 /b_2 = - p

c_1 /c_2 = 1

Since, the lines equations has no solution i.e., both lines are parallel to each other.

$a_1/a_2 = b_1/b_2 \neq c_1/c_2$

$-\frac{1}{p}$ = - p $\neq$ 1

Taking last two parts, we get

p $\neq$ - 1

Taking first two parts, we get

p^2 = 1

$p = \pm 1$

Hence, the given pair of linear equations has no solution for p = 1.

14. Let unit's digit be x and ten's digit be y.

    $\therefore$ Number = 10y + x

    $10y + x = 7(x + y) \Rightarrow 3y - 6x = 0$

    y = 2x ...(i)

    10y + x - (10x + y) = 18

    9y - 9x = 18 or y - x = 2 ...(ii)

    On solving (i) and (ii), x = 2, y = 4

    $\therefore$ required number is 42

15. Let the two numbers be x and y (x > y)

    We are given that,

    The difference between two numbers is 26 .

    x - y = 26 ...(i)

    And one number is three times the other.

    x = 3y ...(ii)

    On substituting the value x from eqn. (ii) in eqn. (i), we get

    3y - y = 26

    2y =26

    $\therefore$ y = 13

    Put y = 13 in (ii) we get

    x = 3(13) = 39

    Hence, the two numbers are 39 and 13.

16. Let the ten's digit of the required number be x and the unit's digit be y.

    As per given condition the sum of the digits of a two-digit number is 12.

    Then, x + y = 12. ...(i)

    Required number = (10x + y).

    Number obtained on reversing the digits = (10y + x).

    As per given condition the number obtained by interchanging its digits exceeds the given number by 18.

    $\therefore$ (10y + x) - (10x + y) = 18

    $\Rightarrow$10y + x - 10x - y = 18

    $\Rightarrow$ 9y -9x = 18

    $\Rightarrow$ y -x = 2. ...(ii)

    On adding (i) and (ii), we get

    (x + y) + (y -x) = 12 + 2

    $\Rightarrow$ 2y = 14

    $\Rightarrow$ y = 7.

    Putting y = 7 in (i), we get

    x + 7 = 12

    $\Rightarrow$ x = 12 - 7 = 5

    $\therefore$ x = 5 and y = 7.

    Hence, the required number is 57.

17. Given pair of equations is

    3x + y + 4 = 0 …(i)

    and 6x -2y + 4 = 0…(ii)

    comparing with ax + by + c = 0

    Here, $a_1 = 3$, $b_1 = 1$, $c_1 = 4$;

    And $a_2 = 6$, $b_2 = - 2$, $c_2 = 4$;

    $a_1 /a_2 = 1/2$

    $b_1 /b_2 = -1/2$

    $c_1 /c_2 = 1$

    since $a_1/a_2 \neq b_1/b_2$

so system of equations is consistent with a unique solution.

We have, $3x + y + 4 = 0$

$y = -4 - 3x$

When x = 0, then y = - 4

When x = - 1, then y = - 1

When x = - 2, then y = 2

x	0	-1	-2
y	-4	-1	2
Points	B	C	A

and $6x - 2y + 4 = 0$

$6x + 4 = 2y$

$y = 3x + 2$

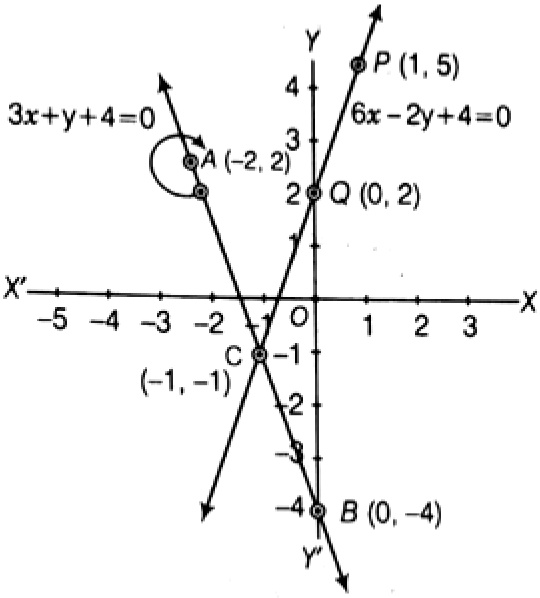
When x = 0, then y = 2

When x = - 1,then y = - 1

When x = 1,then y = 5

x	-1	0	1
y	-1	2	5
Points	C	Q	P

Plotting the points B(0, - 4) and A(- 2,2),we get the straight line AB. Plotting the points Q(0,2) and P(1,5) we get the straight line PQ. The lines AB and PQ intersect at C (-1, -1).



So, (-1, -1) is the required solution.

18. The given system of equations is:

$3x - 5y = -1$ ....(i)

$x - y = -1$ ....(ii)

From (ii), we get

$y = x + 1$

Substituting, $y = x + 1$ in (i), we get

$3x - 5(x + 1) = -1$

$\Rightarrow -2x - 5 = -1$

$\Rightarrow x = -2$

Putting x = -2 in y = x + 1 we get y = -1.

Hence, the solution of the given system of equations is x = -2 and y = -1.

19. The given equations are

2x + y = 23 ....(i)

and 4x - y = 19 ....(ii)

Adding (i) and (ii), we get

6x = 42

⇒ x = 7

Putting the value of x in (i), we get

2(7) + y = 23

⇒ y = 9

1. 5y - 2x = 5(9) - 2(7) = 45 - 14 = 31
2. $\frac{y}{x} - 2 = \frac{9}{7} - 2 = -\frac{5}{7}$

20. let the first number = x

And second number = y

According to given condition

Sum of two numbers is 75.

x + y = 75 ....(1)

And difference of two numbers is 15.

x - y = 15.................. (2)

By solving using substitution method,

x = 75 - y ....(3)

Now using (3) in (2), we get

(75 - y) - y = 15

75 -2y = 15

75 - 15= 2y

2y = 60

y = 30

Put y = 30 in (3), we get

x = 75 - 30

x = 45

So the given numbers are 30 and 45.

21. Given pair of linear equations is

43x + 67y = -24 …(i)

and 67x + 43y = 24 …(ii)

On multiplying Eq. (i) by 43 and Eq. (ii) by 67 and then subtracting both of them, we get

$(67^2x + 43(67y)) - (43^2x + 43(67y)) = (24 \times 67)-(24 \times 43)$

$(67^2 - 43^2)x = 24(67 + 43)$

x = 1

Now, put the value of x in Eq. (i), we get

$43 \times 1 + 67y = -24$

67 y = - 67

y = - 1

Hence, the required values of x and y are 1 and - 1, respectively.

22. x + y = 14 …(1)

x – y = 4 … (2)

If x - y = 4

x = 4 + y .... (3)

Put (3) in (1) we get

4 + y + y = 14

⇒ 4 + 2y = 14

⇒ 2y = 10

⇒ y = 5

Putting value of y in equation (3), we get

x = 4 + y

⇒ x = 4 + 5 = 9

Therefore, x = 9 and y = 5

23. Given, pair of linear equations is - 3x + 5y = 7 and 2px - 3y = 1

On comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we get

Here, a_1 = - 3, b_1 = 5, c_1 = - 7; And a_2 = 2p, b_2 = - 3, c_2 = - 1;

Now,

$a_1 / a_2 = -\frac{3}{2p}$

b_1 / b_2 = - 5/3

c_1 / c_2 = 7

Since, the lines are intersecting at a unique point i.e., it has a unique solution

$\frac{a1}{a2} \neq \frac{b1}{b2}$

so, $-\frac{3}{2p} \neq -\frac{5}{3}$ |

p $\neq$ 9/10

Hence, the lines represented by these equations are intersecting at a unique point for all real values of p except $\frac{9}{10}$

24. Given pair of equations is

x -2y = 6 …(i)

and 3x-6y = 0 …(ii)

On comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we get

Here, a_1 = 1, b_1 = - 2, c_1 = - 6;

And a_2 = 3, b_2 = - 6, c_2 = 0;

a_1 / a_2 = 1/3

b_1 / b_2 = - 2/ - 6 = 1/3

here $a_1/a_2 = b_1/b_2 \neq c_1/c_2$ (parallel lines).

Hence, the lines represented by the given equations are parallel. Therefore, it has no solution. So, the given pair of lines is inconsistent.

25. Let the supplementary angles be x° and y° (x° > y°)

Now, x° + y° = 180 ... (i)

and x° - y° = 18 ... (ii)

From eqn. (ii),

y° = x° - 18 ...(iii)

Put (iii) in (i)

x° + x° - 18° = 180°

⇒ 2x° = 180° + 18°

⇒ 2x° = 198°

⇒ x° = 99°

On substituting $x^\circ = 99^\circ$ in eqn. (iii),

$y^\circ = 99^\circ - 18^\circ = 81^\circ$

$\therefore y^\circ = 81^\circ$

Hence, the angles are 99° and 81°

26. The given equations are

$4x + \frac{6}{y} = 15$ ....(i)

$6x - \frac{8}{y} = 14$ ....(ii)

Multiplying equation (i) by 4 and equation (ii) by 3, we get

$16x + \frac{24}{y} = 60 \ldots\ldots\ldots\ldots\ldots\ldots (iii)$

$18x - \frac{24}{y} = 42 \ldots\ldots\ldots\ldots (iv)$

On adding (iii) and (iv) we get

34x =102

x =3

On putting x= 3 in (i) we get

$4 \times 3 + \frac{6}{y} = 15$

12y+6 = 15y

3y =68. y=2

Putting values of x and y in
y=px-2
2=3p-2
3p=4.
or $p = \frac{4}{3}$

27. Given, pair of linear equations is 2x + 3y - 5 = 0 and px - 6y - 8 = 0
On comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we get
$a_1 = 2$, $b_1 = 3$, $c_1 = -5$;
And $a_2 = p$, $b_2 = -6$, $c_2 = -8$;
$a_1 / a_2 = \frac{2}{p}$
$b_1 / b_2 = -3/6 = -1/2$
$c_1 / c_2 = 5/8$
Since, the pair of linear equations has a unique solution.
$a_1/a_2 \neq b_1/b_2$
so $\frac{2}{p} \neq -1/2$
$p \neq -4$
Hence, the pair of linear equations has a unique solution for all values of p except - 4
i.e., $p \in \mathrm{R} - \{-4\}$

28. Let the ten's and unit's digits of the required number be x and y respectively.
Then, the number = (10x + y).
The number obtained on reversing the digits = (10y + x).
As per given condition
The sum of a two-digit number and the number obtained by reversing the order of its digits is 99.
$\therefore$ (10y + x) + (10x + y) = 99
$\Rightarrow$ 11(x + y) = 99
$\Rightarrow$ x + y = 9.
The digits differ by 3
So, (x - y) = ±3.
Thus, we have
x + y = 9 .... (i)
x - y = 3 .... (ii)
or x + y = 9 .... (iii)
x - y = -3 .... (iv)
From (i) and (ii), we get x = 6, y = 3.
From (iii) and (iv), we get x = 3, y = 6.
Hence, the required number is 63 or 36.

29. x + y = 14 ....(1)
x - y = 4 ....(2)
x = 4 + y from equation (2)
Putting this in equation (1), we get
4+y +y =14
⇒ 2y =10
⇒ y = 5
Putting value of y in equation (1), we get
x + 5 = 14
⇒ x = 14 - 5 = 9
Therefore, x =9 and y =5

30. $3x + 2y = 2x + y + 3 = 4x + 3y - 3$
On solving 1st and 2nd, we get
$x + y = 3$ ..(1)
On solving 2nd and 3rd, we get
$2x + 2y = 6$

$x + y = 3$ ..(ii)

The system of equations has infinitely many solutiions.

31. ax + by = a - b multiply by a

bx - ay = a + b multiply by b

Now, adding the resulting equations gives

$$\begin{aligned} a^2x + aby &= a^2 - ab \\ b^2x - aby &= ab + b^2 \\ \hline (a^2 + b^2)x &= a^2 + b^2 \end{aligned}$$

$\Rightarrow$ x = 1

$\therefore$ a + by = a - b

$\Rightarrow$ by = -b

$\Rightarrow$ y = -1

$\therefore$ x = 1 and y = -1

32. Let the digit at unit's place be x and the digit at ten's place be y. Then,

Number = 10y + x

Number formed by reversing the digits = 10x + y

According to the given conditions

The sum of the digits of a two digit number is 8 .

So, x + y =8 .... (i)

and the difference between the number and that formed by reversing the digits is 18

So, (10y + x) - (10x + y)=18

$\Rightarrow$ 10 y + x - 10x - y = 18

$\Rightarrow$ 9y - 9x = 18

$\Rightarrow$ 9(y - x) =18

$\Rightarrow$y - x =2 .... (ii)

Add equations (i) and (ii), we get

(x + y) + (y - x) = 8 + 2

$\Rightarrow$x + y + y - x = 10

$\Rightarrow$ 2y = 10

$\Rightarrow$ y = 5

Put y = 5 in (i) we get

x + y =8

$\Rightarrow$ x + 5 = 8

$\Rightarrow$ x = 3

So, two digit number = 10y + x =10$\times$5 + 3 = 53

Hence given two digit number is 53.

33. Given linear equations are

x - 3y - 2 = 0 …(i)

and -2x + 6y - 5 = 0 …(ii)

On comparing with ax + by c=0, we get

Here, a_1 =1, b_1 =-3, c_1 = - 2;

And a_2 = -2, b_2 = 6, c_2 =- 5;

$\frac{a_1}{a_2} = \frac{-1}{2}$

$\frac{b_1}{b_2} = -\frac{3}{6} = -\frac{1}{2}$

$\frac{c_1}{c_2} = \frac{2}{5}$

i.e., $\frac{a1}{a2}$ = $\frac{b1}{b2} \neq$ $\frac{c1}{c2}$ [parallel lines]

Hence, two straight paths represented by the given equations never cross each other, because they are parallel to each other.

34. The given system of equations may be written as

$9x - 10y + 12 = 0$ ...(i)

$2x + 3y - 13 = 0$.... (ii)

From (ii), we get $y = \frac{13-2x}{3}$

Substituting $y = \frac{13-2x}{3}$ in (i), we get
$9x - \frac{10(13-2x)}{3} + 12 = 0$
$\Rightarrow 27x - 10(13 - 2x) + 36 = 0$
$\Rightarrow 27x - 130 + 20x + 36 = 0$
$\Rightarrow 47x - 94 = 0$
$\Rightarrow 47x = 94$
$\Rightarrow x = \frac{94}{47} = 2$
Substituting $x = 2$ in (i), we get
$9 \times 2 - 10y + 12 = 0$
$\Rightarrow 10y = 30$
$\Rightarrow y = \frac{30}{10} = 3$
Hence, x = 2 and y = 3 is the required solution.

35. Let the numerator be ‘a’ and denominator be ‘b’.
Given that, sum of a numerator and denominator of a fraction is 18.
$\Rightarrow$ a + b = 18 ......(1)
Also, if the denominator is increased by 2, the fraction reduces to 1/3.
i.e, a/(b + 2) = 1/3
$\Rightarrow 3a - b = 2$ ......(2)
Adding (1) and (2), we get
$\Rightarrow$ 4a = 20
$\Rightarrow$ a = 5
Thus, b = 13
So the required fraction is 5/13.

36. It is given that x = 2 and y = 1 is a solution of the linear equation $2x + 3y = k$, substituting the respective values of *x* and y in the linear equation, $2x + 3y = k$
$\therefore 2(2) + 3(1) = k$
$\Rightarrow k = 4 + 3$
$\Rightarrow k = 7$
Therefore, we can conclude that the value of *k*, for which the linear equation $2x + 3y = k$ has x = 2 and y = 1 as one of its solutions is 7.

37. 3x - y = 3
9x - 3y = 9
The given pair of linear equations is
3x - y = 3..............(1)
9x - 3y = 9.............(2)
From equation(1),
y = 3x - 3...................(3)
9x - 3(3x - 3) = 9
$\Rightarrow$ 9x - 9x + 9 = 9
$\Rightarrow$ 9 = 9
which is true. Therefore, equation (1) and (2) have infinitely many solutions.

38. Given pair of equations is $\frac{2xy}{x+y} = \frac{3}{2}$, Where x + y $\neq$ 0
$x + \frac{y}{2xy} = \frac{2}{3}$
$\frac{x}{xy} + \frac{y}{xy} = \frac{4}{3}$
$\frac{1}{y} + \frac{1}{x} = \frac{4}{3}$
And
$\frac{xy}{2x-y} = -\frac{3}{10}$
$\frac{2x-y}{xy} = -\frac{10}{3}$
$\frac{2x}{xy} - \frac{y}{xy} = -\frac{10}{3}$
$\frac{2}{y} - \frac{1}{x} = -\frac{10}{3}$
Now, put $\frac{1}{x} = u$ and $\frac{1}{y} = v$ then the pair of equations becomes
$\mathrm{u} + \mathrm{v} = \frac{4}{3}$ …(iii)

and $2v - u = -\frac{10}{3}$ …(iv)

On adding both equations, we get

$3v = \frac{4}{3} - \frac{10}{3} = -\frac{6}{3}$

3v = - 2

$v = -\frac{2}{3}$

Now, put the value of v in Eq. (iii), we get

$-\frac{2}{3} + u = \frac{4}{3}$

$u = \frac{4}{3} + \frac{2}{3} = \frac{6}{3} = 2$

$x = \frac{1}{u} = \frac{1}{2}$

and $y = \frac{1}{y} = -\frac{3}{2}$

Hence, the required values of x and y are $\frac{1}{2}$ and $-\frac{3}{2}$ respectively.

39. x + y = a - b .... (i)

and ax - by = $a^2 + b^2$ .... (ii)

Multiply (i) by b and subtract by (ii)

$$bx + by = ab - b^2$$
$$ax \mp by = a^2 + b^2$$
$$(a+b)x = a(a+b)$$

x = a

Put x = 1 in (i)

x + y = a - b

a + y = a - b

y = -b

40. The given system of equations is

2x + 7y=11 ....(i)

x - 3 y = 5 ....(ii)

Putting x = 2, y = 1 in equation (i), we have

LHS = 2 $\times$ 2 +7 $\times$1

= 4 + 7

= 11

= RHS

So, x = 2 and y = 1 satisfy equation (i)

Putting x=2, y=1 in equation (ii), we have,

LHS = 2$\times$1-3$\times$1

= 2 - 3

=-1

$\neq$ RHS

So, x=2 and y=1 is not a solution of the given system of equations.

41. Given that, x, y and 40^o are the angles of a triangle

So, x + y + 40 = 180

[since, the sum of all the angles of a triangle is 180^o]

And hence x + y = 140 …(i)

Also, difference of angles = x – y = 30 …(ii)

On adding Eqs. (i) and (ii), we get

2x = 170

So, x = 85

On putting in Eq. (i), we get

y = 55

Hence, the required values of x and y are 85^o and 55^o, respectively.

42. Given, 2 x -y = 2 ..(i)

x + 3y = 15 ..(ii)

From eqn. (i), we get y = 2x - 2 ... (iii)

Substituting the value of y in eqn. (ii),
x + 3y = 15
x + 3(2x - 2) = 15
x + 6x - 6 = 15
7x = 15 + 6
or, 7x = 21
∴ x = 3
Substituting this value of x in (iii), we get
y = 2x - 2
y = 2 × 3 - 2
y = 6 - 2
y = 4
Hence the value of x and y of given equations are 3 and 4 respectively.

43. Given pair of linear equations are is
x + y = 3.3
and $\frac{0.6}{3x-2y}=-1$
0.6 = - 3x + 2y
3x - 2y = - 0.6
Now, multiplying Eq. (i) by 2 and then adding with Eq. (ii), we get
2x + 2y = 6.6
3x - 2y = - 0.6
5x = 6
$x=\frac{6}{5}$
Now, put the value of x in Eq. (i), we get
1.2 + y = 3.3
y = 2.1
Hence, the required values of x and y are 1.2 and 2.1, respectively.

44. The given equations are
37x + 43y = 123 ... (i)
43x + 37y = 117. ... (ii)
Clearly, the coefficients of x and y in one equation are interchanged in the other.
Adding (i) and (ii), we get
(37x + 43y) + (43x + 37y) = 123 + 117
(37 + 43)x+ (43 + 37)y = (123 +117)
⇒80x + 80y = 240
⇒80(x + y) = 240
⇒ x + y = 3 .... (iii)
Subtracting (i) from (ii), we get
(37x + 43y) - (43x + 37y) = 123 - 117
6x - 6y = -6
⇒ 6 (x - y) = -6
⇒ x - y = -1 ... (iv)
Adding (iii) and (iv), we get
(x + y) + (x - y) = 3 + (-1)
⇒ x + y + x - y = 2
⇒ 2x = 2
⇒ x = 1.
Subtracting (iv) from (iii), we get
(x + y) - (x - y) = 3 - (-1)
⇒x + y - x + y = 4
⇒2y = 4
⇒ y = 2.
Hence, x = 1 and y = 2.

45. Let the numerator and denominator of fraction be x and y respectively.

Then, the fraction is $\frac{x}{y}$.

As per first condition

The sum of the numerator and denominator of a fraction is 4 more than twice the numerator.

x + y = 2x + 4

⇒ -x + y = 4........(i)

According to the second condition,

If the numerator and denominator are increased by 3, they are in the ratio 2 : 3.

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

⇒ 3x + 9 = 2y + 6

⇒3x - 2y = -3.......(ii)

Multiply (i) by -2, we get

-2x + 2y = 8 .... (iii)

Adding (ii) and (iii) , we get

and 3x - 2x = -3 + 8

⇒ x = 5

Substituting x = 5 in (i), we get

5 - y = 4

y = 9

Hence, the required fraction is $\frac{5}{9}$

46. Let the larger number is x and

smaller number is y.

We know that, $Dividend = (Divisor \times Quotient) + Remainder$ ....(i)

When 3x is divided by y, we get 4 as quotient and 3 as remainder.

∴ by using (i), we get

$3x = 4y + 3$

⇒$3x - 4y = 3$ ....(ii)

When 7y is divided by x, we get 5 as quotient and 1 as remainder.

∴ by using (i). we get

$7y = 5x + 1$

⇒$5x - 7y + 1 = 0$ ....(iii)

By Solving equations (ii) and (iii), we get

$\frac{x}{-4-21} = \frac{-y}{3+15} = \frac{1}{-21+20}$

⇒ $\frac{x}{-25} = \frac{-y}{18} = \frac{1}{-1}$

⇒ $x = 25$ and $y = 18$

47. 3x + 2y - 7 = 0 ....(i)

4x + y - 6 = 0 ....(ii)

From eqn. (ii)

4x + y - 6 = 0

4x + y = 6

y = 6 - 4 x ...(iii)

On putting this value of y in eqn. (i)

3x + 2(6 - 4x) - 7 = 0

⇒ 3x + 12 - 8x - 7 = 0

⇒ -5x + 5 = 0

⇒ 5x - 5 = 0

⇒ 5x = 5

⇒ x = 5/5

∴ x = 1

Substituting this value of x in (ii), we get,

4(1) + y - 6 = 0

⇒ y = 6 - 4 × 1

$\Rightarrow$ y = 6 - 4

$\Rightarrow$ y = 2

Hence, values of x and y of given linear equations are 1 and 2 respectively.

48. Let the two numbers be x and y.

Then, by first Condition, ratio of these two numbers = 5:6.

x : y = 5 : 6

$\Rightarrow \quad \frac{x}{y} = \frac{5}{6}$

$\Rightarrow \quad y = \frac{6x}{5}$ .... (i)

As per second condition if 8 is subtracted from each of the numbers, then ratio becomes 4:5.

$\Rightarrow \quad \frac{x-8}{y-8} = \frac{4}{5}$

5x - 40 = 4y - 32

5x - 4y = 8 .... (ii)

Now Put the value of y from (i) to (ii), we get

$5x - 4\left(\frac{6x}{5}\right) = 8$

$\Rightarrow$ 25x - 24x = 40

$\Rightarrow$ x = 40

Put the value of x in equation (i), we get

$y = \frac{6}{5} \times 40$

$= 6 \times 8$

$= 48$

49. Let the common ratio term of income be x and expenditure be y.

So, the income of first person is Rs.9x and the income of second person is Rs.7x.

And the expenditures of first and second person is 4y and 3y respectively.

Then, Saving of first person =9x - 4y

and saving of second person = 7x - 3y

As per given condition

9x - 4y = 200

$\Rightarrow$ 9x - 4y - 200=0 ... (i)

and, 7x - 3y = 200

$\Rightarrow$ 7x - 3y - 200 =0 ..... (ii)

Solving equation (i) and (ii) by cross-multiplication, we have

$\frac{x}{800-600} = \frac{-y}{-1800+1400} = \frac{1}{-27+28}$

$\frac{x}{200} = \frac{-y}{-400} = \frac{1}{1}$

$\Rightarrow$ x =200 and y =400

So, the solution of equations is x = 200 and y = 400.

Thus, monthly income of first person = Rs.9x = Rs.(9 $\times$ 200)= Rs.1800

and, monthly income of second person = Rs.7x = Rs.(7$\times$ 200)= Rs. 1400

50. Given pair of linear equations is

3x - y - 5 = 0 …(i)

and 6x - 2y - p = 0 …(ii)

On comparing with standard form, we get

Here, a_1 = 3, b_1 = - 1, c_1 = - 5;

And a_2 = 6, b_2 = - 2, c_2 = - p;

a_1 / a_2 = 3/6 = 1/2

b_1 / b_2 = 1/2

c_1 / c_2 = 5/p

Since, the lines represented by these equations are parallel, then

$a_1/a_2 = b_1/b_2 \neq c_1/c_2$

Taking last two parts, we get $\frac{1}{2} \neq \frac{5}{\mathrm{p}}$

So, p $\neq$ 10

Hence, the given pair of linear equations are parallel for all real values of p except 10 i.e., $p \in R - \{10\}$

51. 152x - 378y = -74 ..... (1)

-378x + 152y = -604 .... (2)

Adding the equations (1) and (2), we obtain:

(152x - 378y) + (-378x + 152y) = -74 + (-604)

152x - 378y - 378 x + 152 y = -74 - 604

-226x - 226y = -678

$\Rightarrow$ x + y = 3 …(3)

Subtracting the equation (2) from equation (1), we obtain:

(152x - 378y) - (-378x + 152y) = - 74 - (-604)

152 x - 378y + 378x - 153y = -74 + 604

530 x – 530 y = 530

x - y = 1 …..(4)

Adding equations (3) and (4), we obtain:

(x + y) + (x - y) = 3 - 1

x + y + x - y = 2

2 x = 4

$\Rightarrow$ x = 2

Substituting the value of x in equation (3), we obtain:

x + y = 3

2 + y = 3

y = 1

Hence the value of x and y are 2 and 1 respectively.

52. The given equations are

3x - 2y = 5 ....(i)

2x + y = 7 ....(ii)

Putting x = 3 and y = 2 in (i), we get

LHS = 3x - 2y

= (3 $\times$ 3 - 2 $\times$ 2)

= 9 - 4

= 5

= RHS .... (iii)

Putting x = 3 and y = 2 in (ii), we get

LHS = 2x + y

= (2 $\times$ 3 + 2)

= 6 + 2

= 8

$\neq$ RHS............. (iv)

From (iii) and (iv), we observe that the values x = 3, y = 2 do not satisfy (ii).

Hence, x = 3, y = 2 is not a solution of the given system of equations.

53. Let digit at unit's place = x and digit at hundred's place = y

$\therefore$ Middle digit =$x + y + 1$

Number = $100y + 10(x + y + 1) + x$

Number obtained by reversing the digits = 100x + 10(x + y + 1) + y

ATQ.,

x + y + (x + y + 1) = 17

$\Rightarrow$ 2x + 2y = 16 ..(i)

and 100x + 10(x + y + 1) = x - 396 .... (ii)

$\Rightarrow$ 99x - 99y = -396

$\Rightarrow$ x - y = -4

By Solving equation (i) and (ii), we get

x = 2, y = 6 and Number = 692

54. Let $\frac{x}{y}$ be the fraction, where x and y are positive integers.

Given,

A fraction becomes $\frac{9}{11}$, if 2 is added to both the numerator and the denominator.

$\frac{x+2}{y+2} = \frac{9}{11}$

$11 \times (x+2) = 9 \times (y+2)$

11x + 22 = 9y + 18

11x - 9y + 4 = 0...... (i)

If 3 is added to both the numerator and the denominator it becomes $\frac{5}{6}$.

$\frac{x+3}{y+3} = \frac{5}{6}$

$6 \times (x+3) = 5 \times (y+3)$

6x + 18 = 5y + 15

6x - 5y + 3 = 0 .... (ii)

If 6x-5y+3=0

or, $y = \frac{6x+3}{5}$ ...(iii)

On substituting y from eqn. (iii) in eqn. (i),

$11x - 9 \times \left(\frac{6x+3}{5}\right) + 4 = 0$

55x-9 (6x + 3) + 20 = 0

55x - 54x - 27 + 20 = 0

x - 7 = 0

∴ x = 7

On substituting x = 7 in eq^{n}. (iii),

$y = \frac{6\times7+3}{5}$

$y = \frac{45}{5}$

∴ y = 9

Hence, the required fraction = $\frac{7}{9}$

55. The given system of equations is

2x + y = 7 ... (i)

4x - 3y = -1. ...(ii)

From (i), we get

2x + y = 7

⇒ y = (7 - 2x).

Substituting y = (7 - 2x) in (ii), we get

4x - 3y = -1

⇒ 4x - 3 (7 - 2x) = - 1

⇒ 4x - 21+ 6x = -1

⇒ 10x - 21 = -1

⇒ 10x = - 1 + 21

⇒ 10x = 20

⇒ x = $\frac{20}{10}$

⇒ x = 2.

Substituting x = 2 in y = (7 - 2x), we get

y = (7 - 2x)

⇒ y = 7 - 2(2)

⇒ y = 7 - 4

⇒ y = 3.

Hence, the solution is x = 2, y = 3.

56. The given equations are

2x + 3y = 16 ....(i)

x - 2 y = 1 .... (ii)

Putting x = 5 and y = 2 in (i), we get

LHS = 2x + 3y

= (2 ×5 + 3 × 2)

= 10 + 6
= 16
= RHS. .... (iii)
Putting x = 5 and y = 2 in (ii), we get
LHS= x - 2 y
=(5 - 2 $\times$ 2)
= 5 - 4
= 1
= RHS. .... (iv)
From (iii) and (iv), x = 5 and y = 2 satisfy both (i) and (ii).
Hence, x = 5, y = 2 is a solution of the given system of equations.

57. x + y = a + b.......(i)
ax + by = $a^2 + b^2$.......(ii)
multiply (i) by b we have
bx + by = ab + bb......(iii)
subtracting (ii) and (iii)
$\Rightarrow$ (a - b)x = a(a - b)
$\Rightarrow$ x = a put x = a in (i) we get y =b.

58. Let the two numbers be x and y.
Given condition: sum of two numbers is 35.
Then, x + y = 35 ....(i)
and Difference of two numbers is 13.
x - y=13.................(ii)
Adding equations (i) and (ii), we get
(x + y) + (x - y) = 35 + 13
$\Rightarrow$x + y + x - y = 48
$\Rightarrow$ 2x = 48
$\Rightarrow$ x =24
Subtracting equation (ii) from equation (i), we get
(x + y) - (x - y) = 35 - 13
x + y - x + y = 22
2y = 22
$\Rightarrow$ y = 11
Hence, the two numbers are 24 and 11.

59.
$$\begin{array}{l} (a-b)x+(a+b)y=a^2-b^2-2ab \\ \underset{-}{(a+b)x}\underset{-}{+}(a+b)y=\underset{-}{a^2}+b^2 \\ \hline -2bx \qquad\qquad = -2b(b+a) \end{array}$$
x = a + b
$\therefore$ (a - b)(a + b) + (a + b)y = $a^2 - b^2$ - 2ab
$a^2 - b^2$ + (a + b)y = $a^2 - b^2$ - 2ab
$y = \frac{-2ab}{a+b}$

60. x + y = 6, ...(i)
2x - 3y = 4 ...(ii)
Multiplying by 3 in equation (i)
3x + 3y = 18 ...(iii)
Adding equation (ii) and (iii)
5x = 22
x = $\frac{22}{5}$
Putting in equation (i)
$y = 6 - \frac{22}{5} = \frac{30-22}{5} = \frac{8}{5}$

61. **Step 1:** By substitution method, we pick either of the equations and write one variable in terms of the other.
7x – 15y = 2 ...(1)

and x + 2y = 3 ...(2)
Let us consider the Equation (2):
x + 2y = 3
and write it as x = 3 – 2y ...(3)
Step 2: Now substitute the value of x in Equation (1)
We get 7(3 – 2y) – 15y = 2
i.e., 21 – 14y – 15y = 2
i.e., – 29y = –19
Therefore $y = \frac{19}{29}$
Step 3: Substituting this value of y in Equation (3), we get
$x = 3 - 2\left(\frac{19}{29}\right) = \frac{49}{29}$
Therefore, the solution is x = $\frac{49}{29}, y = \frac{19}{29}$

62. Let the digit at units place be x and the digit at ten's place be y.
Then, Number = 10y + x
If a two digit number is obtained by either multiplying sum of the digits by 8 and adding 1 or by multiplying the difference of the digits by 13 and adding 2.
According to the given conditions, we have
10y + x =8(x + y) + 1
$\Rightarrow$ 10y + x = 8x + 8y + 1
$\Rightarrow$ 10y - 8y + x - 8x - 1 = 0
$\Rightarrow$ 7x - 2y + 1=0
and, 10y + x =13(y - x) + 2
10y + x = 13y - 13x + 2
$\Rightarrow$14x - 3y -2=0
By using cross-multiplication, we hvae
$\frac{x}{-2\times-2-(-3)\times1} = \frac{-y}{7\times-2-14\times1} = \frac{1}{7\times-3-14\times-2}$
$\Rightarrow \quad \frac{x}{4+3} = \frac{-y}{-14-14} = \frac{1}{-21+28}$
$\Rightarrow \quad \frac{x}{7} = \frac{y}{28} = \frac{1}{7}$
$\Rightarrow \quad x = \frac{7}{7} = 1 \text{ and } y = \frac{28}{7} = 4$
Hence, the number =10y + x = 10 $\times$ 4 + 1 = 41.

63. Let the unit digit is b and ten's digit is a.
So, two digit number is 10a + b.
As per given condition
The sum of the digits of a two digit number is 13.
So, a + b = 13 .....(i)
and the number obtained by interchanging the digits of the given number exceeds the number by 27.
10b + a = (10a + b) + 27
$\Rightarrow$ 9b = 9a + 27
$\Rightarrow$b = a + 3 .....(ii)
Putting (ii) in (i), we get :
a + a + 3 = 13
$\Rightarrow$ 2a = 10
$\Rightarrow$ a = 5
Putting a = 5 in (ii), we get :
b = 5 + 3 = 8
Two digit number = 10a + b = 5(10) + 8 = 58
Therefore, the number is 58.

64. Let the required numbers be x and y.
As per given condition the sum of two numbers is 8 .
Then, x + y = 8. .... (i)
And the sum of their reciprocals is $\frac{8}{15}$
And, $\frac{1}{x} + \frac{1}{y} = \frac{8}{15}$

$\Rightarrow \frac{x+y}{xy} = \frac{8}{15}$

$\Rightarrow \frac{8}{xy} = \frac{8}{15}$ [Using (i)]

$\Rightarrow xy = 15$

$\therefore \quad (x-y) = \pm\sqrt{(x+y)^2 - 4xy}$

$= \pm\sqrt{8^2 - 4 \times 15} = \pm\sqrt{64-60} = \pm\sqrt{4} = \pm 2$

Thus, we have

x + y = 8..........(i)

x - y = 2.............(ii)

or

x + y = 8.............(iii)

x - y = -2...............(iv)

On solving (i) and (ii), we get x = 5 and y = 3.

On solving (iii) and (iv), we get x = 3 and y = 5.

Hence, the required numbers are 5 and 3.

65. Given, pair of linear equations is $\frac{x}{3} + \frac{y}{4} = 4$

$\Rightarrow 4x + 3y = 48$ ...(i)

and $\frac{5x}{6} - \frac{y}{8} = 4$

$\Rightarrow 20x - 3y = 96$ ...(ii)

Now, adding Eqs. (i) and (ii), we get

24x = 144

x = 6

Now, put the value of x in Eq. (i), we get

4 × 6 + 3y = 48

3y = 24

y = 8

Hence, the required values of x and y are 6 and 8, respectively.

66. Let walking speeds be x km/hr. and y km/hr. (x > y)

In case of walking towards each other

Relative speed = speed of 1^{st} person + speed of 2^{nd} person = x + y

Time = $\frac{\text{Distance between them}}{\text{Relative speed}}$

2 = $\frac{16}{x+y}$

2x + 2y = 16

x + y = 8 ...(i)

In case of walking in same direction

Relative speed = x - y

Time = $\frac{16}{x-y}$

8x - 8y = 16

x - y = 2 ...(ii)

on adding (i) and (ii)

2x = 10

x = 5

Put x = 5 in equation (i), we get y = 3

$\therefore$ speed of first person and 2^{nd} person are 5km/hr and 3km/hr.

67. Let the present age of Aftab and his daughter be x and y years respectively. Then, the pair of linear equations that represent the situation is

x - 7 = 7(y - 7), i.e., x - 7y + 42 = 0 ...(1)

and x + 3 = 3(y + 3), i.e., x - 3y = 6 ...(2)

from equation (2), we get x = 3y + 6

By putting this value of x in equation (1), we get

(3y + 6) -7y + 42 = 0,

i.e., -4y = -48, which gives y = 12

Again by putting this value of y in equation (2), we get

$x = 3 \times 12 + 6 = 42$

So, the present age of Aftab and his daughter are 42 and 12 years respectively.

68. We have,

$2x - y = 4$ ....(i)

$y - z = 6$ ....(ii)

$x - z = 10$ ....(iii)

From equation (iii), we get $z = x - 10$

Substituting the value of z in equation (ii), we get

$y - (x-10)=6$

$\Rightarrow y - x + 10 = 6$

$\Rightarrow -x + y = 6 - 10$

$\Rightarrow -x + y= -4$ ....(iv)

Adding equations (i) and (iv), we get

$(2x - y) +(-x + y) =4 + (-4)$

$\Rightarrow 2x - y - x + y = 0$

$\Rightarrow x = 0$

Putting x = 0 equation in (i) and (iii) we get

$2x - y =4$

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

$\Rightarrow y = -4$

And $x - z =10$

$\Rightarrow 0 - z = 10$

$\Rightarrow z = -10$

So, y = -4 and z = -10

Hence, x = 0, y = -4 , z = -10 is the solution of the given system of equations.

69. The pair of linear equations are given as:

$x + 2y – 4 = 0$ ...(i)

$2x + 4y – 12 = 0$ ...(ii)

We express x in terms of y from equation (i), to get

$x = 4 – 2y$

Now, we substitute this value of x in equation (ii), to get

$2(4 – 2y) + 4y – 12 = 0$

i.e., $8 – 12 = 0$

i.e., $– 4 = 0$

Which is a false statement. Therefore, the equations do not have a common solution. So, the two rails will not cross each other.

70. The given system of equations is

$3x - 2y=4$ ....(i)

$6x - 4y=8$ ....(ii)

Putting x = 2 and y = 1 in equation (i) and (ii) respectively, we get

LHS= $3x - 2y$

$= 3 \times 2 -2 \times 1$

$= 6 - 2$

$= 4$

= RHS

LHS $=6x - 4y$

$= 6\times2-4\times1$

$= 12 - 4$

$=8$

=RHS

So, x = 2, y = 1 is a solution of the given system of equations.

Putting x = 4 and y = 4 in equation (i) and (ii) respectively, we get

LHS= $3x - 2y$

$= 3 \times 4 -2 \times 4$

= 12 - 8

= 4

= RHS

LHS =6x - 4y

= 6×4-4×4

= 24 - 16

=8

=RHS

So, x = 4, y = 4 is a solution of the given system of equations.

Hence x = 2, y = 1 and x = 4, y = 4 are solutions of the given system of equations.

71. Given pair of linear equations is

2x + 3y = 7

and 2px + py = 28 - qy

or 2px + (p + q)y - 28 = 0

On comparing with ax + by + c = 0 we get

Here, a_1 = 2, b_1 = 3, c_1 = - 7;

And a_2 = 2p, b_2 = (p + q), c_2 = - 28;

$\frac{a_1}{a_2} = \frac{2}{2p}$

$\frac{b_1}{b_2} = \frac{3}{p+q}$

$\frac{c_1}{c_2} = \frac{1}{4}$

Since, the pair of equations has infinitely many solutions i.e., both lines are coincident.

$a_1/a_2 = b_1/b_2 = c_1/c_2$

$\frac{1}{p} = \frac{3}{p+q} = \frac{1}{4}$

Taking first and third parts, we get

p = 4

Again, taking last two parts, we get

$\frac{3}{p+q} = \frac{1}{4}$

p + q = 12

Since p = 4

So, q = 8

Here, we see that the values of p = 4 and q = 8 satisfies all three parts.

Hence, the pair of equations has infinitely many solutions for all values of p = 4 and q = 8.

72. The given equations may be written as

$\frac{x+1}{2} + \frac{y-1}{3} = 8$

⇒ 3(x + 1) + 2 (y - 1) = 48

⇒ 3x + 3 + 2y - 2 = 48

⇒ 3x + 2y + 1= 48

⇒ 3x+2y = 47 ... (i)

$\frac{x-1}{3} + \frac{y+1}{2} = 9$

⇒ 2(x -1) + 3(y +1) = 54

⇒ 2x - 2 + 3y + 3 = 54

⇒ 2x + 3y + 1 = 54

⇒ 2x + 3y = 53. ... (ii)

Multiplying (i) by 2 and (ii) by 3 and subtracting, we get

(4 - 9)y = 94-159

$\Rightarrow -5y = -65$

$\Rightarrow y = \frac{-65}{-5}$

$\Rightarrow y = 13$

Putting y = 13 in (i), we get

3x + (2 × 13) = 47

⇒ 3x + 26 = 47

$\Rightarrow$ 3x = (47 - 26)

$\Rightarrow$3x = 21

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

So, x = 7

Hence, x = 7 and y = 13

73. Opposite sides of rectangle are equal.

AB = DC and BC = AD

$\Rightarrow$ x + y = 30....(i)

and x - y = 14....(ii)

Adding (i) and (ii), we get

2x = 44

x = 22

Put x = 22 in (i) , we get

22 + y = 30

y = 30 - 22 = 8

So, x = 22 and y = 8