Pair of Linear Equations in Two Variables

1. Which of the following is a linear equation?
(a) $x-2y=7$ (b) $x^3-1=0$
(c) $x+\frac{6}{x}=12$ (d) $\frac{x}{2}+\frac{3}{x}=14$

2. Which of the following is a solution of $2p+3q=5$?
(a) $p=-1, q=1$ (b) $p = 1, q = -1$
(c) $p=1, q=1$ (d) $p=-1, q=-1$

3. Which of the following is the other name for a pair of linear equations in two variables?
(a) Consistent equations
(b) Simultaneous equations
(c) Inconsistent equations
(d) Dependent equations

4. What is the condition that a system of simultaneous equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ must satisfy to have exactly one solution?
(a) $\frac{a_1}{a_2}=\frac{b_1}{b_2}$ (b) $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$
(c) $\frac{a_1}{a_2}=\frac{c_1}{c_2}$ (d) $\frac{b_1}{b_2}=\frac{c_1}{c_2}$

5. How many solutions do the equations satisfying $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$ have?
(a) One (b) Two
(c) Three (d) Infinitely many

6. What is a system of simultaneous equations called if it has no solution?
(a) Consistent system
(b) independent system
(c) Inconsistent system
(d) Dependent system

7. How many solutions does the system of equations $p+2q=4$ and $2p+4q-12=0$ have?
(a) 0 (b) 1
(c) 2 (d) 3

8. What is a system of simultaneous equations called if its graph has intersecting lines?
(a) Inconsistent system
(b) Consistent system
(c) Dependent system
(d) Independent system

9. IHI What is the nature of the graphs of a dependent system?
(a) Parallel lines
(b) Perpendicular lines
(c) Intersecting lines
(d) Coincident lines

10. What is the nature of the graphs of a system of linear equations with exactly one solution?
(a) Parallel lines
(b) Perpendicular lines
(c) Coincident lines
(d) Intersecting lines

11. What is the number of solutions of the pair of linear equations $4p-6q+18=0$ and $2p-3q+9=0$?
(a) 0
(b) 1
(c) 2
(d) Infinitely many

12. Which of the following is a consistent system of simultaneous equations?
(a) $m+3n=6$, $2m+6n=12$ (b) $a + 3b = 6$, $2a-3b=12$
(c) $x-4y=6$, $2x-8y=12$ (d) $l-2m=6$, $3l-6m=12$

13. Find the unique solution of the system of simultaneous equations $2x-y=2$ and $4x-y=4$.
(a) $x=0, y=1$
(b) $x=0, y=0$
(c) $x=1, y=0$
(d) $x=1, y=1$

14. The sum of a two-digit number and the number obtained by reversing its digits is 154. If the digits differ by 4, find the number.
(a) 95 (b) 73
(c) 84 (d) 62

15. Choose the dependent system from the following.
(a) $m+n=7$, $3m+3n=21$ (b) $3x-2y=5$, $2x-3y=7$
(c) $3x-3y=18$, $x-y=10$ (d) $2x+y=6$, $4x-2y=4$

16. Five years ago, a father's age was seven times his son's age. Five years from now, the father's age will be thrice the son's age. What are the respective present ages of father and son?
(a) 40 years, 10 years
(b) 10 years, 40 years
(c) 25 years, 5 years
(d) 30 years, 8 years

17. Rajesh buys 7 books and 6 pens for `3800 and Amar buys 3 books and 5 pens of the same kind for `1750. What are the respective costs of a book and a pen?
(a) `350, `50 (b) `500, `75
(c) `250, `100 (d) `500, `50

18. The system of simultaneous equations $3m+n=1 \text{and} (2k-1)m+(k-1)n=2k+1$, is inconsistent. What is the value of 'k'?
(a) 3 (b) 1
(c) 2 (d) 0

19. What type of a system of equations is the pair of linear equations 2x - 3y = 8 and 4x - 6y = 9?
(a) Consistent system
(b) Inconsistent system
(c) Dependent system
(d) Independent system

20. If the pair of linear equations $2x+ky-3=0$ and $6x+\frac{2}{3}y+7=0$ has a unique solution, which of the following is true?
(a) $k=\frac{2}{3}$ (b) $k\neq\frac{2}{3}$
(c) $k=\frac{2}{9}$ (d) $k\neq\frac{2}{9}$

21. If the length of a rectangle is increased by 2 m and breadth is reduced by 2 m, its area decreases by 28 sq. m. If the length is reduced by 1 m and the breadth is increased by 2 m, the area increases by 33 sq m. Find the actual measurements of the rectangle.
(a) $l=13m, b=11$ m
(b) $l=23$ m, $b=11$ m
(c) $l=23m, b=20m$
(d) $l=12$ m, $b=10$ m

22. The side of a square is 4m more than the side of another square. The sum of their areas is 208 sq. m. What is the side of the larger square?
(a) 12m (b) 8m
(c) 9m (d) 5m

23. Two numbers are in the ratio 2 :7. If 6 is added to each of the numbers, the ratio becomes 1 :3. Find the numbers.
(a) 14, 49 (b) 16, 56
(c) 18, 63 (d) 24, 84

24. If the pair of equations $3x+5y=k$ and $9x+12y=6$ has infinitely many solutions, which of the following is true?
(a) k = 2 (b) k = 6
(c) $k\neq6$ (d) k = 3

25. If the pair of linear equations $3x+5y=3$ and $6x+ky=6$ do not have any solution, which of the following is true?
(a) k = 5 (b) k=10
(c) $k\neq10$ (d) $k\neq5$

26. When is the pair of linear equations $7x-3y=4; 3x\frac{k}{7}y=4$ consistent?
(a) k = 9 (b) $k=-9$
(c) $k\neq-9$ (d) $k\neq7$

27. When does the pair of linear equations $7x+ky=k;14x+2y=k+1$ have infinitely many solutions?
(a) k = 1 (b) $k \neq 1$
(c) k = 2 (d) k = 4

28. The pair of linear equations $x+y=3$; $2x+5y=12$ has a unique solution $x=x_1$, $y=y_1$ Find the value of x_1.
(a) 1 (b) 2
(c) -1 (d) -2

29. Which of the following solutions does the pair of linear equations $x+2y=5$; $3x+12y=10$ have?
(a) A unique solution
(b) No solution
(c) More than two solutions
(d) Infinitely many solutions

30. If the sum of the ages (in years) of a father and his son is 65 and twice the difference of their ages (in years) is 50, what is the age of the father?
(a) 45 years (b) 40 years
(c) 50 years (d) 55 years

31. Three chairs and two tables cost `1850.Five chairs and three tables cost `2850. Find the total cost of one chair and one table.
(a) `800 (b) `850
(c) `900 (d) `950

32. If $a+b=5$ and $3a+2b=20$, find $3a+b$.
(a) 25 (b) 20
(c) 15 (d) 10

33. Which of the respective values of 'x' and 'y' satisfy the following equations I and II?

(I) $3x+y=19$	**(II)**
$x-y=9$	

(a) 7, 2 (b) 7, -2
(c) -7, 2 (d) -7, -2

34. If $3x-5y=5$ and $\frac{x}{x+y}=\frac{5}{7}$, what is the value of $x-y$?
(a) 9 (b) 6
(c) 4 (d) 3

35. If $12a+3b=1$ and $7b-2a=9$, find the average (arithmetic mean) of 'a' and 'b'.
(a) 2.5 (b) 1
(c) 0.1 (d) 0.5

36. If $4x+6y=32$ and $4x-2y=4$, find the value of 8y.
(a) 24 (b) 28
(c) 36 (d) 42

37. For the equations $(p+2)\left(q-\frac{1}{2}\right)=pq-5$ and $(p-2)\left(q-\frac{1}{2}\right)=pq-5$, find the solution set (p, q).
(a) $\left(-10,-\frac{1}{2}\right)$ (b) $\left(-10,\frac{1}{2}\right)$
(c) $\left(10,-\frac{1}{2}\right)$ (d) $\left(10,\frac{1}{2}\right)$

38. Identify the solution of $\frac{2}{3}x-\frac{3}{4}y=1$ and $8x-9y=16$.
(a) $x=6, y=4$
(b) Infinitely many solutions
(c) $x=4, y=6$
(d) No solution

39. Find the values of 'x' and y for $x-y=0.9$; $\frac{11}{x+y}=2$
(a) 3.2, 5.6
(b) 3.2, 2.3
(c) 5.6, 2.3
(d) 4.5, 6.4

40. What is the solution of the equations, $\frac{3x-y+1}{3}=\frac{2x+y+2}{5}=\frac{3x+2y+1}{6}$?
(a) $x=-1, y=-1$
(b) $x=1,\ y=1$
(c) $x=1,\ y=2$
(d) $x=2, y=1$

41. The course of an enemy submarine as plotted on a set of rectangular axes gives the equation $2x+3y=5$. On the same axes. the course of a destroyer is indicated by the equation $x-y=10$. Find the point (x,y) at which the submarine can be destroyed.
(a) (-7, 3) (b) (7, -3)
(c) (-3, 7) (d) (3, -7)

42. Find the solution of the equations $8x-9y=6xy$ $10x+6y=19xy$.
(a) $x=\frac{3}{2},y=\frac{3}{2}$ (b) $x=\frac{2}{3},y=\frac{3}{2}$
(c) $x=\frac{3}{2},y=\frac{2}{3}$ (d) $x=3,y=2$

43. Find the values of 'x' and y, for the equations $\frac{a^2}{x}-\frac{b^2}{y}=0;\frac{a^2b}{x}+\frac{b^2a}{y}=a+b$ where $x,y\neq 0$.
(a) $x=a^2,y=b^2$ (b) $x=b^2,y=a^2$
(c) $x=\frac{b}{a},y=\frac{a}{b}$ (d) $x=\frac{1}{b},y=\frac{1}{a}$

44. If $x+\frac{1}{y}=5$ and $2x+\frac{3}{y}=13$, what is the value of $(2x-3y)$?
(a) 1 (b) 2
(c) 3 (d) 5

45. Which of the following is the solution of the system of equations $\frac{4}{x}+5y=7$ and $\frac{3}{x}+4y=5$?
(a) $x=-\frac{1}{3},y=-1$ (b) $x=\frac{1}{3},y=-1$
(c) $x=-\frac{1}{3},y=1$ (d) $x=\frac{1}{3},y=1$

46. The solution of $2x+3y=2$ and $3x+2y=2$ can be represented by a point. In which of the following parts of the coordinate plane does the point lie?
(a) First quadrant (b) Second quadrant
(c) Third quadrant (d) Fourth quadrant

47. cm Find 'x' and 'y' for the equations $\frac{x}{3}+\frac{y}{4}=4$ and $\frac{5x}{3}+\frac{y}{4}=8$.
(a) $x=8,y=6$ (b) $x=3,y=4$
(c) $x=6,y=8$ (d) $x=4,y=-6$

48. How many solutions does the system of equations, $3x-4y=5$ and $12x-16y=20$ have?
(a) More than two solutions
(b) Exactly two solutions
(c) Exactly one solution
(d) No solution

49. Find the number of solutions of the equations $x+\frac{1}{y}=2$ and $2xy-3y=-2$.
(a) 0 (b) 1
(c) 2 (d) Infinitely many

50. Which of the following solutions do the system of equations $2x+y=5$ and $x+2y=4$ have?
(a) Consistent and a unique solution
(b) Consistent and infinitely many solutions
(c) Inconsistent
(d) No solution

51. If the equations $4x+7y=10$ and $10x+ky=25$ represent coincident lines, what is the value of 'k'?
(a) 5 (b) $\frac{17}{2}$
(c) $\frac{27}{2}$ (d) $\frac{35}{2}$

52. For what value of 'k', will the equations $4x+6y=11$ and $2x+ky=7$ be inconsistent?
(a) 2 (b) 3
(c) 4 (d) 8

53. For what value of 'k' will the system of equations $3x+5y=2$ and $kx+10y=0$ have a non zero solution?
(a) 0 (b) 2
(c) 6 (d) 8

54. If the cost of 3 audio cassettes and 2 VCDs is ` 350 and that of 2 audio cassettes and 3 VCDs is `425, what is the cost of a VCD?
(a) ` 140 (b) ` 125
(c) ` 115 (d) ` 110

55. The difference between two numbers is 5 and the difference between their squares is 65. Find the larger number.
(a) 9 (b) 10
(c) 11 (d) 12

56. `49 was divided among 150 children. Each girl got 50 paise and a boy 25 paise. How many boys were there?
(a) 100 (b) 102
(c) 104 (d) 105

57. The area of a rectangle increases by 76 square units, if the length and breadth are each increased by 2 units. However, if the length is increased by 3 units and breadth is decreased by 3 units, the area gets reduced by 21 square units. Find the sum of the length and breadth of the rectangle.
(a) 40 units (b) 42 units
(c) 4 units (d) 36 units

58. What number must be added to each of the numbers, 5, 9, 17, 27 to make them proportionate?
(a) 2 (b) 1
(c) 3 (d) 5

59. Two numbers differ by 3 and their product is 54. Find the numbers.
(a) 9 and 6
(b) -9 and -6
(c) Both (a) and (b)
(d) 9 and -4

60. A part of the monthly expenses of a family is constant and the remaining varies with the price of wheat. When the price of wheat is ` 250 per quintal, the monthly expenses of the family is ` 1000 and when it is ` 240 per quintal, the monthly expenses is ` 980. Find the monthly expenses of the family on wheat when the cost of wheat is ` 350 a quintal.
(a) ` 900 (b) ` 350
(c) ` 650 (d) ` 700

61. The angles A, B, C and D in order in a cyclic quadrilateral are $(2x+y)^o, (2(x+y))^o$, $(3x+2y)^o$, and $(4x-2y)^o$. Find their measures in the same order.
(a) 70°, 110°, 80°, 100°
(b) 70°, 80°, 110°, 100°
(c) 70°, 80°, 100°, 110°
(d) 80°, 100°, 110°, 70°

62. The smallest angle of a triangle is one-fifth the sum of the other two and the largest angle exceeds the sum of the other two by $20°$. Find the largest angle of the triangle.
(a) 100° (b) 90°
(c) 120° (d) 110°

63. The sum of Raju's age and half of Sameer's age is 4. One-third Raju's age added to twice Sameer's age is 5. Find the sum of their ages.
(a) 7 years (b) 3 years
(c) 5 years (d) 2 years

Answer - Keys

1. A	**2.** C	**3.** B	**4.** B	**5.** D	**6.** C
7. A	**8.** B	**9.** D	**10.** D	**11.** D	**12.** B
13. C	**14.** A	**15.** A	**16.** A	**17.** D	**18.** C
19. B	**20.** D	**21.** B	**22.** A	**23.** D	**24.** A
25. B	**26.** C	**27.** A	**28.** A	**29.** A	**30.** A
31. B	**32.** A	**33.** B	**34.** D	**35.** D	**36.** B
37. D	**38.** D	**39.** B	**40.** B	**41.** B	**42.** C
43. A	**44.** D	**45.** B	**46.** A	**47.** C	**48.** A
49. A	**50.** A	**51.** D	**52.** B	**53.** C	**54.** C
55. A	**56.** C	**57.** D	**58.** C	**59.** C	**60.** D
61. B	**62.** A	**63.** C			

Solutions

1. (a) A linear equation is of degree 1. The standard form of a linear equation is $ax+by+c=0$.

2. (c) Substitute the given values of 'p' and 'q' in 2p + 3q = 5 and check whether the equation is satisfied.
Substituting p = 1 and q = 1 in 2p + 3q = 5, makes it true.

3. (b) The pair of linear equations in two variables is also known as simultaneous equations.

4. (b) The system of simultaneous equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$, have exactly one (unique) solution if $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$.

5. (d) Not available

6. (c) Not available

7. (a) Not available

8. (b) Not available

9. (d) Not available

10. (d) Not available

11. (d) Given: $4p-6q+18=0$ and $2p-3q+9=0$

$\Rightarrow \quad \frac{a_1}{a_2}=2;\ \frac{b_1}{b_2}=2$ and $\frac{c_1}{c_2}=2$

$\therefore \quad \frac{a_1}{a_2}=\frac{b_1}{b_2}$

Thus, the given system of equations has infinitely many solutions.

To find if the system of simultaneous equations is consistent check if it.

satisfies the condition $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}=\frac{c_1}{c_2}$

12. (b) Given, system of equations are $a+3b=6$ and $2a-3b=12$.

$\Rightarrow \quad \frac{a_1}{a_2}=\frac{1}{2};\ \frac{b_1}{b_2}=-1;$

$\therefore \quad \frac{a_1}{a_2}\neq\frac{b_1}{b_2}$

Hence the system is consistent.

13. (c) $2x-y=2$ ..... (1)

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

From (1), $x=\frac{2+y}{2}$

$\therefore 4\left(\frac{2+y}{2}\right)-y=4 \quad \Rightarrow y=0$

$\therefore \quad x=\frac{2+0}{2}=1$

$x=1$ and y = 0 is the unique solution of the given system of simultaneous equations.

14. (a) Not available

15. (a) Not available

16. (a) Not available

17. (d) Not available

18. (c) Not available

19. (b) Not available

20. (d) Not available

21. (b) Not available

22. (a) Not available

23. (d) Not available

24. (a) Not available

25. (b) Not available

26. (c) Not available

27. (a) Not available

28. (a) Not available

29. (a) Given linear equations are

$x+2y=5$ and $3x+12y=10$

Here, $a_1=1, b_1=2, c_1=-5$

and $a_2=3, b_2=12, c_2=-10$

$\Rightarrow \quad \frac{a_1}{a_2}=\frac{1}{3}, \frac{b_1}{b_2}=\frac{1}{6}, \frac{c_1}{c_2}=\frac{1}{2}$

$\therefore \quad \frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Hence, the given system of linear equations has a unique solution.

30. (a) Let the age of father be 'x' years.

Let the age of son be 'y' years.

Given, $x+y=65$ ..... (1)

and $2(x-y)=50$

$x-y=25$ .....(2)

Adding eq. (1) and eq. (2), we get

$\Rightarrow \quad x=45$

Hence, the age of father = 45 years.

31. (b) Not available

32. (a) Not available

33. (b) Not available

34. (d) Not available

35. (d) Not available

36. (b) Not available

37. (d) Not available

38. (d) Not available

39. (b) Not available

40. (b) Given $\frac{3x-y+1}{3}=\frac{2x+y+2}{5}$

$=\frac{3x+2y+1}{6}$

Equate any two equations:

$\Rightarrow \quad \frac{3x-y+1}{3}=\frac{2x+y+2}{5}$

$\Rightarrow \quad 9x-8y-1=0$ .....(1)

And $\frac{2x+y+2}{5}=\frac{3x+2y+1}{6}$

$\Rightarrow \quad 3x+4y-7=0$ .....(2)

Solving eq (1) and (2), we get

y = 1 and $x=1$.

The solution of equations is

$x=1, y=1$.

41. (b) Not available

42. (c) Not available

43. (a) Not available

44. (d) Not available

45. (b) Not available

46. (a) Not available

47. (c) The given equations can be written as

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

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

Adding (i) and (ii), we get

$24x=144 \quad \Rightarrow \quad x=6$

Substituting x = 6 in (i). we get

$y=8$.

48. (a) Given equations are $3x-4y=5$

and $12x-16y=20$

Here $a_1=3, b_1=4, c_1=-5$

and $a_2=12, b_2=-16, c_2=-20$

$\Rightarrow \quad \frac{a_1}{a_2}=\frac{1}{4};\ \frac{b_1}{b_2}=\frac{1}{4};\ \frac{c_1}{c_2}=\frac{1}{4}$

$\therefore \quad \frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$

Hence, the given equations have infinitely many solutions i.e., more than two solutions.

49. (a) Given equations become

$$x+\frac{1}{y}=2 \qquad \text{.....(i)}$$

and $2xy-3y=-2$

$$\Rightarrow \quad 2x+\frac{2}{y}=3 \qquad \text{……(2)}$$

Let $\frac{1}{y}=z$. then the equations are

$x+z=2$ and $2x+2z=3$.

Here, $a_1=1, b_1=1, c_1=-2$ and

$a_2=2, b_2=2, c_2=-3$

$$\Rightarrow \quad \frac{a_1}{a_2}=\frac{1}{2};\frac{b_1}{b_2}=\frac{1}{2};\frac{c_1}{c_2}=\frac{2}{3}$$

$$\therefore \quad \frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{1}{2};\frac{c_1}{c_2}=\frac{2}{3}$$

Hence, the equations do not have any solution.

50. (a) Given equations are

$$2x+y=5$$

and $x+2y=4$

Here $a_1=2, b_1=1, c_1=-5$

and $a_2=1, b_2=2, c_2=-4$

$$\Rightarrow \quad \frac{a_1}{a_2}\neq\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$$

Hence, the given equations have a unique solution and are consistent.

51. (d) Not available

52. (b) Not available

53. (c) Not available

54. (c) Not available

55. (a) Not available

56. (c) Let the no. of girls be 'x' and the no. of boys be 'y'.

Given, $0.50x+0.25y=49$

and $x+y=150$ .... (1)

$$\Rightarrow \quad \frac{x}{2}+\frac{x}{y}=49 \qquad \text{…. (2)}$$

From (1) & (2) $x=46,\ y=104$

Hence, number of boys (y) = 104.

57. (d) Let the length of the rectangle be 'x' units, and the breadth be 'y' units. Then in the first case,

$$(x+2)\times(y+2)=xy+76 \qquad \text{i.e.,}$$

$$2x+2y+4=76 \qquad \text{....(1)}$$

i.e., $x+y=4$ ..... (1)

In the second case,

$$(x+3)\times(y-3)=xy-21$$

i.e., $x-y=4$

.....(2)

Adding eq. (1) and eq. (2), we get

$2x=40 \Rightarrow x=20$ units

$x-y=4 \Rightarrow y=20-4=16$ units

Hence, the length of rectangle is 20 units and the breadth is 16 units.

$\therefore$ Their sum $=20+16$

$= 36$ units

58. (c) Four numbers are in proportion if

First $\times$ Fourth = Second $\times$ Third

Let 'x' be added to each of the given numbers to make the numbers proportionate.

Then,

$(5+x)(27+x)=(9+x)(17+x)$

$\Rightarrow \quad x=3$

59. (c) Not available

60. (d) Not available

61. (b) Not available

62. (a) Not available

63. (c) Not available