[PA] (MATHS) 2. Pair of Linear Equations in Two Variables

TRACK-1. POLYCET-2025-FREE COACHING (2 hrs)/2 days.

09/04/25 & 10/04/25 (WED. & THU.) - Material (explanation only)

Ⓐ KEY Concepts (Main points. Examination point of view) :-

1) An equation of the form $ax+by+c=0$, Where a, b, c are real Nos. $(a\neq0, b\neq0)$ is called a Lr. Eqnn. in Two Variables x & y.

2) General form of a pair of Lr. equns is $a_1x+b_1y+c_1=0$ & $a_2x+b_2y+c_2=0$ Where $a_1^2+b_1^2\neq0$, $a_2^2+b_2^2\neq0$; $a_1, a_2, b_1, b_2, c_1, c_2$ are $\in R$

3) The graph of a pair of Lr. equns in two variables is in Straight Lines

4) (a) $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$ ⇒ The pair of Lr. equns. is Consistent (unique Soln) → Intersecting

(b) $\frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$ ⇒ The pair of Lr. Eqns. is Inconsistent (No Soln.) → Parallel

(c) $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$ ⇒ The pair of Lr. eqnns. is 'dependent' & Consistent (Infinitely Many solutions) → Coincide

5) (a) If the lines are intersect at a point, the pair of equns is Consistent

(b) If the lines are parallel, the pair of equns has no solution

(c) If the lines are coincide, then there are infinitely Many Solutions

6) $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$ is the condition for None of the above three

7) Each point on the graph of pair of two lines is a common solution of the lines in case of Infinitely Many Solutions.

8) Which of the following is a Lr. equn. in one Variable [D]

Ⓐ $2x+1=y-3$ Ⓑ $2x-1=x^2$ Ⓒ $x^2-x+1=0$ Ⓓ $3t-1=2t-5$

9) Which of the following is Not a Lr. equn. in two Variables [D]

Ⓐ $5+4x=y-3$ Ⓑ $x+2y=y-x$ Ⓒ $x+y=0$ Ⓓ $3-x=y^2+4$.

10) The pair of Lr. equns $x=y$ and $x+y=0$ has ______ [C]

Ⓐ No common soln Ⓑ Infinitely Many solutions Ⓒ Unique solution Ⓓ None

11) On Representing $x=a$ and $y=b$ Graphically we get ______ [D]

Ⓐ Parallel lines Ⓑ Coincident lines Ⓒ Intersecting lines at (b,a)

Ⓓ Intersecting lines at (a,b)

12) If $am\neq bl$, Then the system of equations $ax+by=c$, $lx+my=n$ has ______ Ⓐ only one Soln. Ⓑ No Soln. Ⓒ both 1 & 2 Ⓓ None. [A]

13) The graph of the equation $x-y=0$ is ______ [C]

Ⓐ Parallel to x-axis Ⓑ Parallel to y-axis

Ⓒ Passing through the origin Ⓓ None of these.

(Contd..)

(B) Practice Models:- (Based on theory points)

1) The value of 'x' satisfies the equation $2x-(4-x)=5-x$ is ______ [3]
(1) 4.5 (2) 3 (3) 2.25 (4) 0.5

2) For $x=2$ in $2x-8y=12$ the value of 'y' will be ___-1___

3) For $2x+3y=4$, 'y' can be written in terms of 'x' as $y=\frac{4-2x}{3}$

4) The pair of linear equations $x=2$ & $x=5$ has No common solution (Parallel)

5) Graphically $x-2=0$ represents a line parallel to y-axis at a distance 2 units from it.

6) For what value of 'P' for $2x+Py=-5$, $3x+3y=-6$ has Unique soln. is ___$\neq 2$___ $\left[\because \frac{a_1}{a_2}\neq\frac{b_1}{b_2} \Rightarrow \frac{2}{3}\neq\frac{P}{3}\right]$

7) The pair of linear equations $3x+5y=3$, $6x+ky=8$ do not have solutions if $k=$ ___10___ $\left[\because \frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2} \Rightarrow \text{parallel}\right]$

8) The point of intersection of the lines $x-2024=0$, $y+2025=0$ is ______
(2024, 2025)

9) The solution of the pair of equations $3x-y=5$ & $x+2y=4$ is
___$x=2, y=1$___ $\left[\because \begin{array}{l}3x-y=5\\ 3x+6y=12\end{array} \middle| \begin{array}{l}-7y=-7\\ \therefore y=-7/-7=1\end{array} \middle| \begin{array}{l}3x-1=5\\ 3x=5+1=6\end{array} \middle| \begin{array}{l}x=6/3\\ \therefore x=2\end{array}\right]$

10) The equations $3x-y+8=0$ & $6x-ky+16=0$, represent coincident lines then $k=$ ___2___ $\left[\because \frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2} \Rightarrow \frac{3}{6}=\frac{-1}{-k} \Rightarrow k=6/3=2\right]$

11) If $x=a, y=b$ is the solution of the equations $x-y=2$ & $x+y=4$, then the values of a and b respectively are ___3 and 1___
$\left[\because \frac{a_1}{a_2}\neq\frac{b_1}{b_2} \Rightarrow \frac{1}{1}\neq\frac{-1}{1} \Rightarrow 1\neq-1\right.$ So
$x-y=2$
$(+)\ x+y=4$
$2x=6$
| $x=6/2=3$; $3-y=2$; $-y=2-3=-1$; $\therefore y=1$

12) The value of 'k' for which the system of equations $kx-y=2$, $6x-2y=3$ has a unique solution, is ___ [D] (A) $k=3$ (B) $k=0$ (C) $k\neq0$ (D) $k\neq3$

13) Solve: $99x+101y=499$ and $101x+99y=501$ ______ [D]
(A) (0,7) (B) (1,−1) (C) (2,−1) (D) (1,2)

14) Among the following pair of linear equations are inconsistent? [D]
(A) $2x+3y=8$, $5x-4y=3$
(B) $6x+3y=9$, $x-8y=0$
(C) $3x-4y=6$, $6x-8y=12$ (coincide)
(D) $2x+5y=11$, $4x+10y=21$
$\left(\frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2}\right)$

15) If $2x+3y=0$, $4x+3y=0$ then $x+y$ equals to ___0___ $\left[\because \begin{array}{l}2x+3y=0\\ 4x+3y=0\\ \hline -2x=0\end{array}\right.$ $\therefore x=0/-2=0$, $\therefore y=0$ $\Big]$

16) The graph of the eqn. $x-y=0$ is passing through the origin

17) Point (4,3) lies on the line ______ [C]
(A) $3x+7y=27$ (B) $7x+2y=47$ (C) $3x+4y=24$ (D) $5x-4y=1$

✓ 18) The difference between 2 Nos. is 26 and one No. is 3 times the other; Find them ___A___ [ ] (A) 13, 39 (B) 13, 26 (C) 26, 39 (D) 21, 13

✓ 19) Five yrs ago, Nuri was thrice as old as Sonu. 10 yrs later, Nuri will be twice as old as Sonu. How old are Nuri & Sonu? ___45, 15___ yrs

✓ 20) $5x+7y=50$; $7x+5y=46$; $(x,y)=(3,5)$

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