

SSC FOUNDATION



सम्यान बैच

समय से तैयारी, समय से सफलता

MATHEMATICS

ALGEBRA (EQUATION)

सबसे सटीक, सबसे बेहतर



LIVE STREAM : 11:00 AM

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ALGEBRA (बीजगणित) (CLASS-05) [Algebraic Identity]

ALGEBRA

Factors Polynomial (बहुपद)

(चुंजक)

Expression (अभिव्यक्ति)

$$x^2 - 4x + 4 = x^2 - 2x - 2x + 4$$

$$= x(x-2) - 2(x-2)$$

$$(x-2)(x-2)$$

Roots =

$$x = 2$$

Equation (समीकरण)

$$x^2 - 4x + 4 = 0$$

$$(x-2)(x-2) = 0$$

Expression (संज्ञक) $\rightarrow$ Polynomial (बहुपद) $\rightarrow$ degree (घात)
 $\hookrightarrow$ max Power

$(x^{\textcircled{1}} - 2)$ ✓, $x^{\textcircled{2}} - 7x + 12$ ✓, $x^{\textcircled{3}} + x^2 + x + 2$ ✓

* Equation (समीकरण) *

An equation is a mathematical statement that uses an equal sign (=) to show that two expression have the same value.

समीकरण एक गणितीय कथन है जो बराबर चिह्न (=) का उपयोग करके यह दर्शाता है कि दो अभिव्यक्तियों का मान समान है।

Types of equation (समीकरण के प्रकार)

- ✓ (i) Linear equation (रैखिक समीकरण)
- ✓ (ii) quadratic equation (द्विघात समीकरण)
- ✗ (iii) Polynomial equation (बहुपद समीकरण)
- ✗ (iv) Trigonometric equations (त्रिकोणमितीय समीकरण)

(1) रेखीय समीकरण (Linear equation)-: *co-ordinate Geometry*

वह समीकरण जिसमें चर की धात सबसे अधिक 1 होता है

That equation where the variable(s) have the highest power of one.

$$ax + by + c = 0$$

Ex - $y = 2x + 3$, $x + 5 = 10$

समीकरण $\Rightarrow ax + by + c = 0$

$\Rightarrow y - 2x = 3$

constant (pointing to 3)
variable (pointing to y and x)
Operator (pointing to -)

(2) quadratic Equations-: (द्विघात समीकरण)-:

A quadratic equation is a polynomial equation with the highest power of the variable being two.

^{द्विघात} द्विघात समीकरण एक बहुपद समीकरण है जिसमें चर की उच्चतम घात दो होती है।

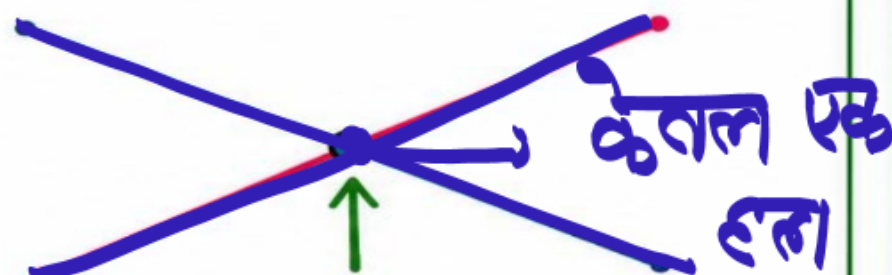
Ex: $x^2 - 9 = 0$, $2x^2 + 7x + 6 = 0$ etc.

Linear Equation - :

$$\begin{aligned} a_1x + b_1y + c_1 &= 0 \\ a_2x + b_2y + c_2 &= 0 \end{aligned}$$

~~How many solutions~~ ~~NO Solution~~

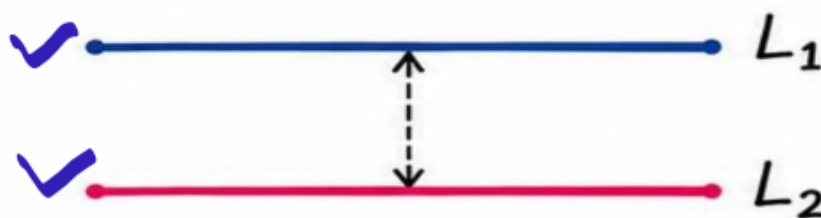
CASE-01



Two lines
[Non Parallel]
[Unique solution]

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

CASE-02



Two lines
[Parallel]
[No solution]

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

Parallel but different

CASE-03

$$\begin{aligned} 2x + 3y + 6 &= 0 \\ 4x + 6y + 12 &= 0 \end{aligned}$$

- ∞ intersection
- Infinite solution
(समापि रेखा) (Coincident)

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

Infinite solution

i If

$$\begin{aligned} 2K-2 &= 9 \\ 2K &= 11 \Rightarrow K = 5.5 \\ \frac{2}{3} &= \frac{3}{K-1} \end{aligned}$$

$$\begin{aligned} 2x + 3y + 9 &= 0 \\ 3x + (k-1)y + 12 &= 0 \end{aligned}$$

Find

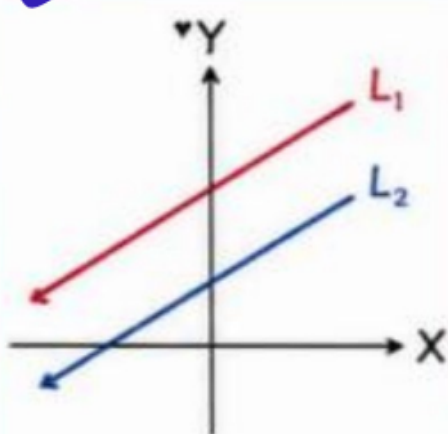


the value of K .

$$K \neq 5.5$$

Number of Solutions of a Pair of Linear Equations

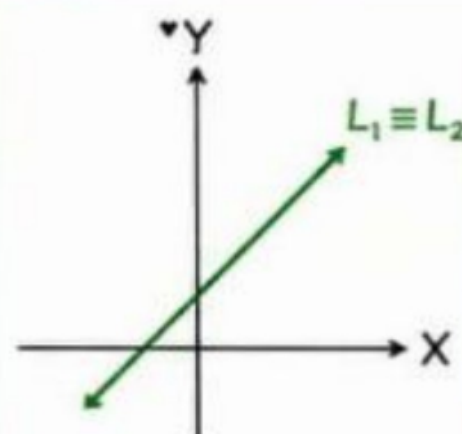
1 When **NO SOLUTION**



- Two distinct parallel lines.
 - They never intersect.
- [No solution]

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

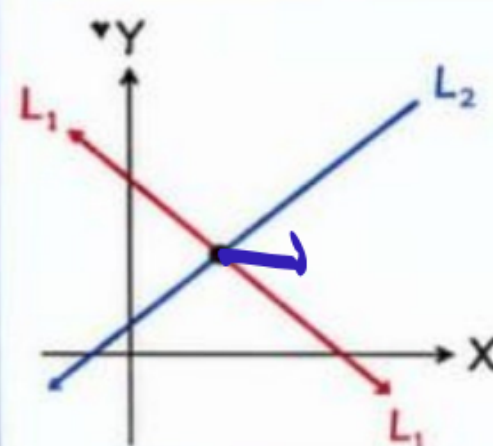
2 When **INFINITE SOLUTION**



- Coincident lines.
 - They intersect at infinitely many points.
- [Infinite solution]

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

3 When **UNIQUE SOLUTION**



- Intersecting lines.
 - They intersect at exactly one point.
- [Unique solution]

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



1. समीकरण $\frac{x+4}{4} + \frac{x-5}{3} = 11$ का मूल :-

Roots of $\frac{x+4}{4} + \frac{x-5}{3} = 11$

~~(a) 12~~
~~(b) 20~~
 (c) 2
 (d) 10

$\frac{16}{4} + \frac{7}{3}$
 $\frac{24}{4} + \frac{18}{3} = 11$

2. समीकरणों $4x - 6y = 18$ और $10x - 15y = 45$ के कितने हल हैं?

$$4x - 6y - 18 = 0$$

$$10x - 15y - 45 = 0$$

$$\frac{4}{10} \quad \frac{6}{15} \quad \frac{18}{45}$$

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

The Set of equations $4x - 6y = 18$ and $10x - 15y = 45$ has

(a) कोई हल नहीं (No solution)

(b) एक हल (unique solution)

(c) दो हल (Two solution)

(d) दो से ज्यादा हल (more than two solution)

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

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

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

3. रेखाएं जिनके समीकरण $2x - 5y + 7 = 0$ और $8x - 20y + 28 = 0$ हैं, एक दूसरे को कितनी बार प्रतिछेदित करती हैं?

The lines whose equations are $2x - 5y + 7 = 0$ and $8x - 20y + 28 = 0$ intersect each other how many times?

- (a) एक बार भी नहीं (Not even once)
- (b) एक बार (one)
- ☒ (c) अनगिनत बार (infinite)
- (d) बताया नहीं जा सकता (can't say)

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

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

$$\frac{1}{a} = \frac{2}{4}$$

$$a = 2$$

4. A का वह मान बताओं जिसके लिए रेखाएँ $x + 3y - 8 = 0$ और $ax + 12y + 5 = 0$ समानांतर हैं।

The value of a so that the lines $x + 3y - 8 = 0$ and $ax + 12y + 5 = 0$ are Parallel:

- (a) 0
- (b) 1
- ☒ (c) 4
- (d) -4

5. यदि समीकरणों $6x + 8y = 24$ और $9x + 12y = k$ का युग्म संगत है तो $k = ?$

If the set of equations $6x + 8y = 24$ and $9x + 12y = k$ is consistent then $k = ?$

- (a) $k = 12$ ✗
 (b) $k = 16$ ✗
 (c) $k = 24$ ✗
 (d) $k = 36$ ✓

$$\begin{cases} 6x + 8y - 24 = 0 \\ 9x + 12y - k = 0 \end{cases}$$

$$\frac{2}{3} = \frac{2}{3} = \frac{24}{k} = \underline{\underline{36}}$$

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

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

$$x + py - 18 = 0$$

$$4x + 12y - 30 = 0$$

$$\frac{1}{4} \neq \frac{p}{12}$$

$$p \neq 3$$

6. यदि समीकरणों $x + py = 18$ और $4x + 12y = 30$ का एक ही हल है तो निम्न में से क्या अवश्य सही है?

If the set of equations $x + 2y = 18$ and $4x + 12y = 30$ has unique solution, then which of the Following must be true?

- (a) $P = 3$
- ☒ (b) $P \neq 3$
- (c) $P = 48$
- (d) $P \neq 48$

7. $2x + 3y = 5$ और $4x + 6y = 12$ के कितने हल है -

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

The number of solutions $2x + 3y = 5$ and $4x + 6y = 12$

- ☒ (a) No solution (कोई हल नहीं)
- (b) one solution (एक हल)
- (c) infinite (अनगिनत)
- (d) can't say (बताया नहीं जा सकता)

8. यदि समीकरण $2x - ky + 7 = 0$ और $6x - 12y + 15 = 0$ का कोई हल नहीं है तो?

$2x - ky + 7 = 0$ and $6x - 12y + 15 = 0$
has no solution for

- (a) $k = -1$
(b) $k = -4$
(c) $k = 4$
(d) $k = 1$

H.O.

$$\begin{aligned} 2x + 3y - 18 &= 0 \\ 6x + 9y - k &= 0 \end{aligned}$$

It has solution

~~$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$~~

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

$$\frac{1}{3} = \frac{18}{k}$$

$$k = 54$$

9. If the set of equations $2x + 3y = 18$ and $6x + 9y = k$ has solution, then the value of 'k' must be:

यदि समीकरणों $2x + 3y = 18$ और $6x + 9y = k$ का समाधान है, तो होगा:

(a) 18

(b) 36

☒ (c) 54

(d) अपर्याप्त आँकड़े

10. For what value of K , the system of equation $Kx + 2y = 2$ and $3x + y = 1$ Will be coincident?

K के किस मान के लिए समीकरण $kx + 2y = 2$ और $3x + y = 1$ सम्पाती है?

- (a) 5
- (b) 6
- (c) 3
- (d) 2

H.O.T

$$xy + 1 = 2y$$

$$xy = (2y - 1)$$

$$2(2y - 1) - 3y = -2$$

$$4y - 2 - 3y = -2$$

$$y = 0$$

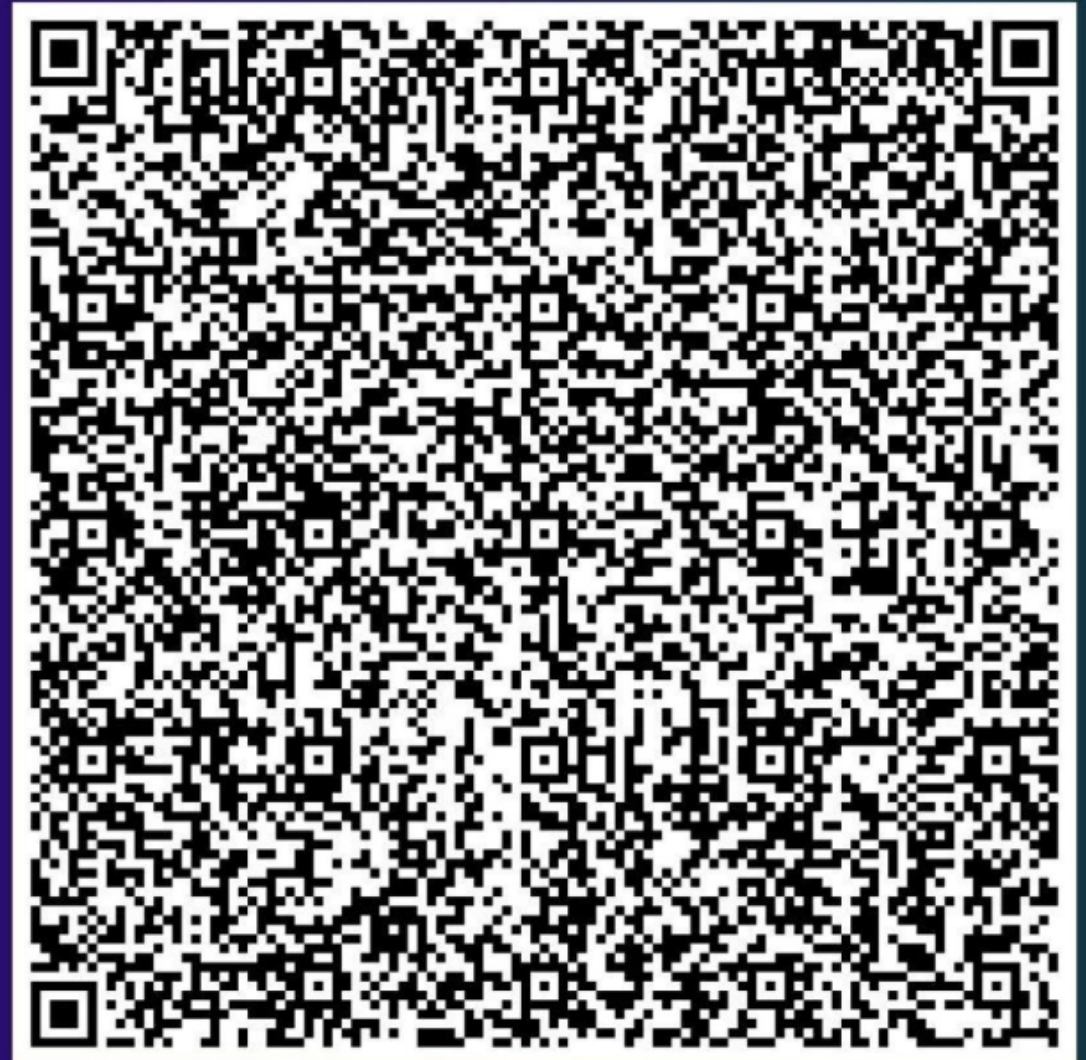
11. The number of solutions of the equations

$$x + \frac{1}{y} = 2 \text{ and } 2xy - 3y = -2 \text{ is:}$$

समीकरणों $x + \frac{1}{y} = 2$ और $2xy - 3y = -2$ के हलों की संख्या है:

- ✓ (a) 0
- (b) 1
- (c) 2
- (d) N.O.T

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