Introduction:

Power → -ve integer, irrational

- **Expression (व्यंजक):** not equated $3x + 2y - 5$, $3x^{-7} + \sqrt{x}\, y^2$
- **Equation (समीकरण):** equated with any value $3x + 2y - 5 = 17z$
- **Polynomial (बहुपद):** expression with finite terms and non-negative integral powers of variables → $3x$, $5x^2 y$, → $2x + 3y$, $5x^3 - 3xy^2$
  - **Monomial, binomial, trinomial (एकपद, द्विपद, त्रिपद)**
- **Variable (चर)** $a, b, c, x, y, z, s, t, p$
- **Constant (अचर)** $5, 7, -2, -3$, जिसके साथ variable ना हो
- **Terms (पद)**
- **Coefficient (गुणांक)** $5x^2 + 3xy - 4y$
- **Degree (घात)** Higher power
- **Linear (रैखिक) (1,2,3 variables)**
- **Quadratic (द्विघात) (1,2 variables)**
- **Cubic, Quartic, Quintic**

$3x^1 = 7 \qquad D = 1$

$4x^2 + 3x - 2 = 0 \qquad D = 2$

$3x^3 - 2x + 3 \qquad D = 3$

3

Linear eqn: Degree=1

$3x = 7$, $4y = 2$ $3x + 2y = 7$

D=1

LE, in 1 V

D = 1

Linear in 2 var.

$3x - 7y + 4z$

D=1   Lin in 3 Var

Quadratic (द्विघाती) $D = 2$

$$x^2 + 3x + 7 = 0$$
$$y^2 - 2x + 8 = 0$$

in 1 var

$$x^2 + 3xy + y^2 + 7y = 0$$
$$3x^2 - 4y + 5 = 0$$

in 2 var

$D = 1$

Lin Eqn in 1 variable:

$$3x = 6, \qquad 3x - 7 = 6 + x, \qquad \frac{x+1}{x} = 7$$

$$x = \frac{6}{3} = 2$$

coaching center

Linear eqn in 2 Variables

$3 \times (\ 2x + 3y = 6 \ )$

$2 \times (3x + 2y = 13 \ )$

$$5y = -8$$

$$\boxed{y = -\frac{8}{5}}$$

$6x + 9y = 18$

$- \ 6x \pm 4y = 26$

1. The root of the equation $\frac{x+4}{4} + \frac{x-5}{3} = 11$ **is:**

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

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

$$\frac{3x+12+4x-20}{12} = 11$$

$$\Rightarrow \quad 7x-8 = 132$$

$$\Rightarrow \quad x = \frac{140}{7} = 20$$

2. If $2x - y = 5$ and $3x + 2y = -3$ then $3x + y =$

अगर $2x - y = 5$ और $3x + 2y = -3$ है तो $3x + y =$

a) −2   b) −1   c) 0   d) 1

$3 - 3 = 0$

$2 \times ① + ②$

$7x = 7$

$x = 1$

$3 + 2y = -3$

$y = \frac{-6}{2} = -3$

3. If $x + y = 7$ and $3x + y = 13$, then what is $4x^2 + y^2 + 4xy$ equal to?

यदि $x + y = 7$ और $3x + y = 13$ है, तो $4x^2 + y^2 + 4xy$ किसके बराबर है ?

a) 75   b) 85   c) 91   d) 100

$$2x = 6 \quad 3$$

$$y = 4$$

$$\begin{array}{r} 36 \\ 16 \\ 48 \\ \hline 100 \end{array}$$

4. If $3x + 4y - 11 = 18$ and $8x - 6y + 12 = 6$, then what is the value of $5x - 3y - 9$?

यदि $3x + 4y - 11 = 18$ तथा $8x - 6y + 12 = 6$ है, तो $5x - 3y - 9$ का मान क्या है?

$15 - 15 - 9$

a) 18   b) -9   c) -27   d) -18

$3x \begin{pmatrix} 3x + 4y = 29 \\ 9 \qquad 20 \end{pmatrix} - ①$

$2x \begin{pmatrix} 8x - 6y = -6 \\ -② \end{pmatrix}$

$25x = 87 - 12$

$= 75 \quad 3$

$y = 5$

5. Find a and b if $\frac{5}{2a+b} + \frac{3}{a-b} = 4$ and $\frac{10}{2a+b} + \frac{1}{a-b} = 3$

अगर $\frac{5}{2a+b} + \frac{3}{a-b} = 4$ और $\frac{10}{2a+b} + \frac{1}{a-b} = 3$ है तो a और b ज्ञात करें|

a) a = 1, b = 1
b) a = 2, b = 2
c) a = 1, b = 2
d) a = 2, b = 1

$$\frac{1}{2a+b} = x$$

$$\frac{1}{a-b} = y$$

$$\overset{1}{5x} + \overset{3}{3y} = 4$$

$$3x \left(10x + y = 3 \right.$$

$$2a+b = 5$$

$$a - b = 1$$

$$25x = 5$$

$$x = \frac{1}{5}$$

$$y = 1$$

$$3a = 2$$

$$b = 1$$

12

6. If $\frac{3}{x+y} + \frac{2}{x-y} = 2$ and $\frac{9}{x+y} - \frac{4}{x-y} = 1$, then what is the value of $\frac{x}{y}$?

यदि $\frac{3}{x+y} + \frac{2}{x-y} = 2$ और $\frac{9}{x+y} - \frac{4}{x-y} = 1$ है, तो $\frac{x}{y}$ का मान क्या होगा ?

a) $\frac{3}{2}$ b) 5   c) $\frac{2}{3}$ d) $\frac{1}{5}$

$2 \times (\overset{1}{\overbrace{3a}} + \overset{1}{\overbrace{2b}} = 2)$

$9a - 4b = 1$

$15a = 5$

$a = \frac{1}{3}, \ b = \frac{1}{2}$

$x + y = 3$

$x - y = 2$

$\frac{5}{2}$ $\frac{1}{2}$

$\frac{x}{y} = \frac{5 \times 2}{2 \times 1} = 5$

$\frac{1}{x+y} = a$

$\frac{1}{x-y} = b$

7. If $\frac{2}{x} + \frac{3}{y} = \frac{9}{xy}$ and $\frac{4}{x} + \frac{9}{y} = \frac{21}{xy}$ where $x \neq 0$ and $y \neq 0$, then $x + y = ?$

यदि $\frac{2}{x} + \frac{3}{y} = \frac{9}{xy}$ और $\frac{4}{x} + \frac{9}{y} = \frac{21}{xy}$ हैं, जहाँ $x \neq 0$ और $y \neq 0$, तो $x + y$ का मान ज्ञात करो |

a) -1　　　　b) 4　　　　c) 0　　　　d) 1

$2x \left(2y + 3x = 9 \right)$
$6 \quad 3$

$4y + 9x = 21$

$3x = 3 \quad 1$

$y = 3$

8. What are the values of x and y, respectively, from the following equations?

$2 \times ($ $6x + 7y = 5xy$

$3 \times ($ $10y - 4x = 4xy$

निम्नलिखित समीकरणों से क्रमशः x और y के मान ज्ञात करें?

$6x + 7y = 5xy$

$10y - 4x = 4xy$

a) 3 and 4   b) 4 and 5

c) 2 and 4   d) 2 and 5

$2 \; 14y = 22xy$

$2 = x$

$12 + 7y = 10y$

$4 + 2 = 3y$

9. If $65x - 33y = 97$ and $33x - 65y = 1$, then what is xy equal to?

यदि $65x - 33y = 97$ और $33x - 65y = 1$ है, तो xy किसके बराबर है ?

a) 2   b) 3 — ①   c) -2   — ② d) -3

① + ②'

$$98x - 98y = 98 \rightarrow x - y = 1$$

2

1

① - ②'

$$32x + 32y = 96 \rightarrow x + y = 3$$

$$7x - 11y = 25 \quad —①$$

$$11x - 7y = 29 \quad —②$$
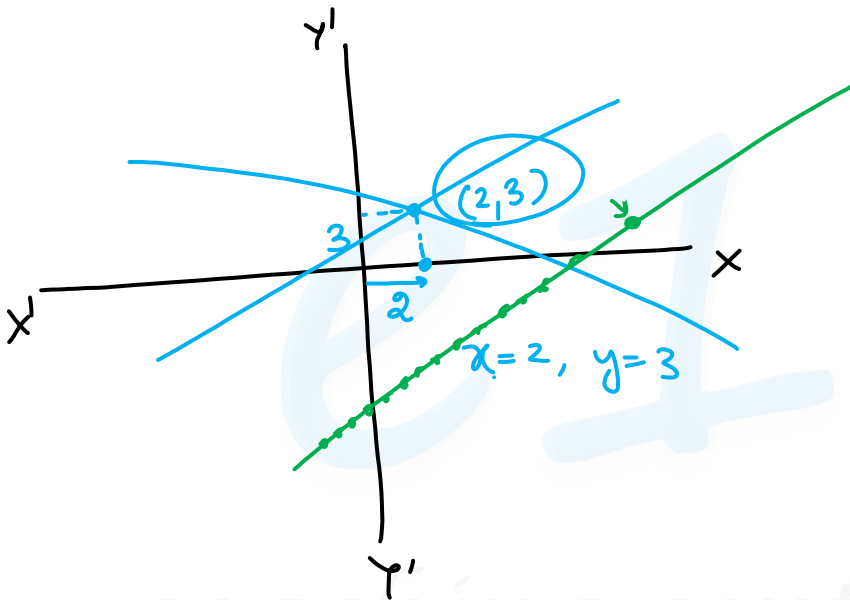
$①+②$

$$18x - 18y = 54 \implies x - y = 3$$

$②-①$

$$4x + 4y = 4 \implies x + y = 1$$

10. The **point of intersection** of the graphs of the equations $147x - 231y = 525$ and $77x - 49y = 203$, lies on the graph of the equation:

समीकरण $147x - 231y = 525$ और $77x - 49y = 203$ के ग्राफ का प्रतिछेदन बिंदु, निम्न में से किस समीकरण के ग्राफ पर स्थित है?

a) $9x - 5y = 23$ b) $4x + 5y = 13$
c) $5x - 4y = 6$ d) $5x - 9y = 17$

17

(2, 3)

$x = 2, \ y = 3$

11. Find x, y, z if $2x + 3y + 5z = 15$, $x + y + z = 5$ and $3x - y + z = 5$

अगर $2x + 3y + 5z = 15$, $x + y + z = 5$ और $3x - y + z = 5$ है तो x,y और z ज्ञात करें।

① 2   2   1

②   ③

a) 1, 2, 3   b) 2, 2, 1   c) 1, 2, 2   d) 1, 1, 2

② + ③ → $\overbrace{(4x}^{8} + \overbrace{2z}^{2} = 10) \times 4$

$3 \times ③ + ①$ → $11x + 8z = 30$

$8x = 16$ 2

$z = 1$

12. If $2x + 3y - 5z = 18$, $3x + 2y + z = 29$ and $x + y + 3z = 17$, then what is the value of $xy + yz + zx$?

यदि $2x + 3y - 5z = 18$, $3x + 2y + z = 29$ तथा $x + y + 3z = 17$ है, तो $xy + yz + zx$ का क्या मान है?

$5 + 6 + 6$

a) 32   b) 52   c) 64   d) 46

$3 \times ③ - ② \rightarrow y + 8z = 22$

$① - 2 \times ③ \rightarrow y - 11z = -16$

$30 + 10 + 12$

$19z = 38 \Rightarrow 2$

$y = 6$

$x = 5$

$\begin{array}{r} 18 \\ -34 \\ \hline 16 \end{array}$

13. If $5a - b + 3c = 2,\ 3a + 2b - 4c = -22$ and $a + 5b + 2c = 6$, then what is the value of $4a - 2b + 7c$?

(HW)

यदि $5a - b + 3c = 2,\ 3a + 2b - 4c = -22$ तथा $a + 5b + 2c = 6$ है, तो $4a - 2b + 7c$ का मान क्या है?

— ①   — ②   — ③

$-8 - 0 + 28$
$= 20$

a) 36   b) 20   c) -28   d) 28

$2 \times ① + ② \rightarrow\ 13a + 2c = -18$ ④

$5 \times ① + ③ \rightarrow\ 26a + 17c = 16$ —⑤

$⑤ - 2 \times ④ \rightarrow\ 13c = 16 + 36 = 52\ 4$

$c = 4$ ④→ $13a + 8 = -18$

$a = \dfrac{-26}{13} = -2$

→ putting in ①

$-10 - b + 12 = 2$

$\Rightarrow\ 0 = b$

22

14. If $a + b + c = \frac{7}{12}$, $3a - 4b + 5c = \frac{3}{4}$ and $7a - 11b - 13c = -\frac{7}{12}$, then what is the value of $a + c$?

यदि $a + b + c = \frac{7}{12}$, $3a - 4b + 5c = \frac{3}{4}$ तथा $7a - 11b - 13c = -\frac{7}{12}$ है, तो $a + c$ का मान क्या है?

a) $\frac{1}{2}$ b) $\frac{5}{12}$ c) $\frac{3}{4}$ d) $\frac{1}{4}$

① ② ③

$3 \times ① - ② \rightarrow$ $7b - 2c = \frac{7}{4} - \frac{3}{4} = \frac{4}{4} = 1$

$7 \times ① - ③ \rightarrow$ $18b + 20c = \frac{49}{12} + \frac{7}{12} = \frac{56}{12} \quad \frac{14}{3}$

$\overset{2}{88}b = 10 + \frac{14}{3} = \frac{44}{3}$

$b = \frac{1}{6}$

$a + c = \frac{7}{12} - \frac{1}{6} \times \frac{2}{2}$

$= \frac{5}{12}$