# CAT 2025

## CORE & PRO

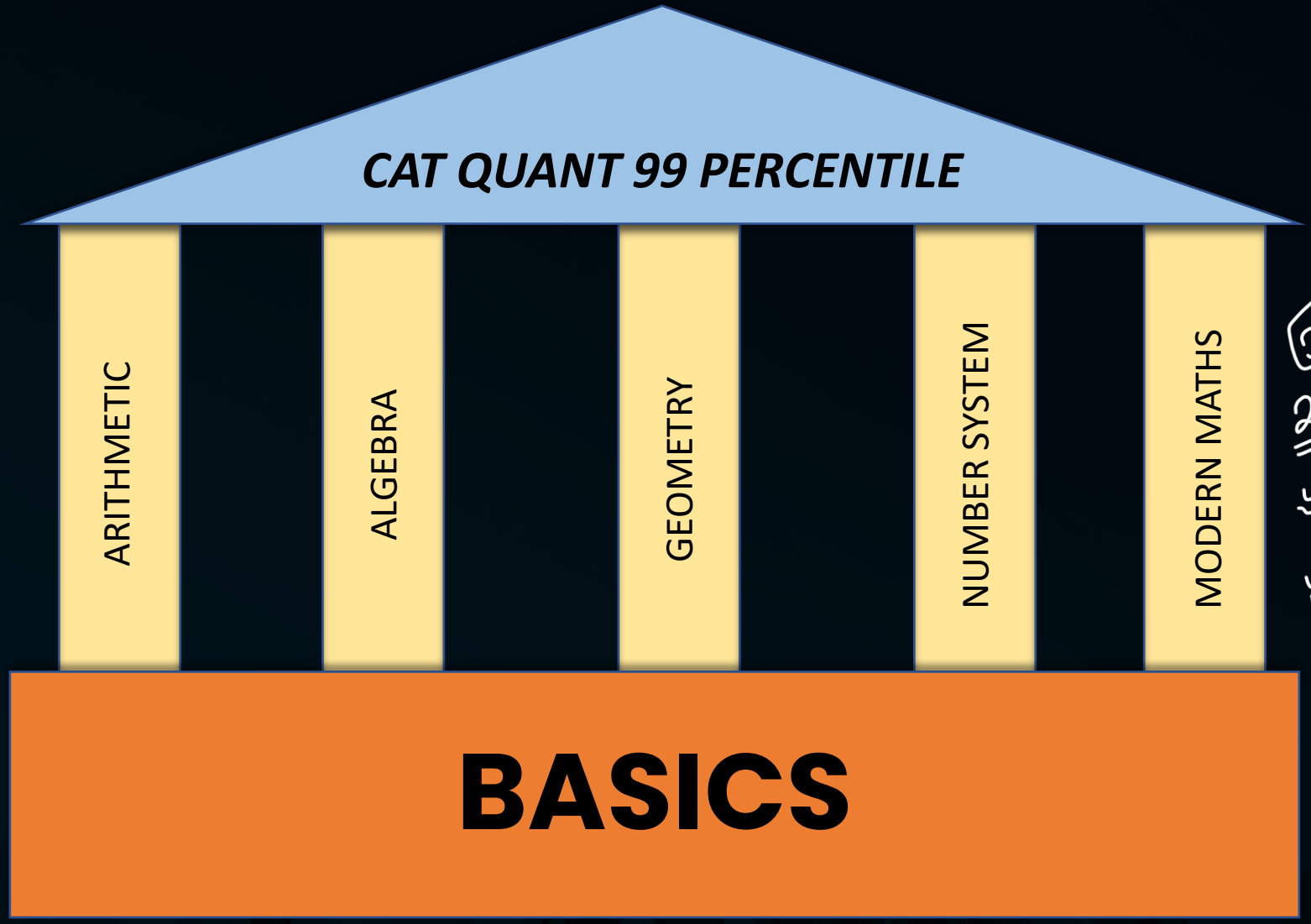
**Lecture- 02** | **QUANT BASICS**

### BASICS OF EQUATIONS

By- RAHUL BATHLA

# TOPICS to be covered

1. LINEAR EQUATION
2. QUADRATIC EQUATION - SPLITTING
3. WORD PROBLEMS – FORMING EQUATIONS


CAT QUANT 99 PERCENTILE
ARITHMETIC
ALGEBRA
GEOMETRY
NUMBER SYSTEM
MODERN MATHS
BASICS
YOUTUBE MBA WALLAH
30%
2x
found.
essentials
classes

# Topic: LINEAR EQUATION

LINEAR EQUATION

- $2x + 7y = 11$
- $4x - y = 7$

Substitution

$y \longrightarrow x$

$4x - y = 7$

$4x - 7 = y$

$4(2) - 7 = y$

$1 = y$

$x \longrightarrow y$

$2x + 7y = 11$

$2x + 7(4x - 7) = 11$

$2x + 28x - 49 = 11$

$30x = 60$

$x = 2$

$2 \times$ [ $2x + 7y = 11$ ]

$8x - y = 14$

$4x - y = 7$

Elimination

coefficient same for 'x' or 'y'

$\pm 4x - y = 7$

$\pm 4x + 14y = 22$

$-15y = -15$

$y = 1$

$4x - 1 = 7$

$4x = 8$

$x = 2$

LINEAR EQUATION

- $x + y = 8$
- $x - y = 4$

$2x = 12$

$\boxed{x = 6}$ ✓

$6 + y = 8$

$\boxed{y = 2}$ ✓

- $x + y = 8$
- $x - y = 4$

$\boxed{x = 4 + y}$

$\boxed{x = 4 + 2 = 6}$

$x + y = 8$

$4 + y + y = 8$

$2y = 4$

$\boxed{y = 2}$

$x + y = 8$

$x - y = 4$

$x = \frac{8+4}{2}$ $\quad$ $y = \frac{8-4}{2}$

$\boxed{x = 6}$ $\quad$ $\boxed{y = 2}$

| | |
|---|---|
| $x + y = 10$ | $x = 7$ |
| $x - y = 4$ | $y = 3$ |

LINEAR EQUATION

- $32x + 23y = 41$
- $23x + 32y = 14$

$55x + 55y = 55$

$\checkmark$ $x + y = 1$

$32x + 23y = 41$

$23x + 32y = 14$

$9x - 9y = 27$

$x - y = 3$

$x + y = 1$

$x - y = 3$

$x = 2$ $\quad$ $y = -1$

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

LINEAR EQUATION

- $28x + 72y = 12$
- $72x + 28y = 188$

$100x + 100y = 200$ (÷2)

$x + y = 2$

$-44x + 44y = -176$ (÷ −44)

$-x + y = -4$

$x - y = 4$

$x + y = 2$

$x - y = 4$

$x = 3$

$y = -1$

LINEAR EQUATION

- $\frac{4}{x+y} + \frac{6}{x-y} = 4$
- $\frac{8}{x+y} - \frac{2}{x-y} = 1$

$(4R + 6B = 4)2$

$8R - 2B = 1$

$8R + 12B = 8$

$-14B = -7$

$B = \frac{1}{2}$

$8R - 2\left(\frac{1}{2}\right) = 1$

$8R = 2$

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

$4R + 6B = 4$

$24R - 6B = 3$

$28R = 7$

$R = \frac{7}{28} = \frac{1}{4}$

$\frac{1}{4} = \frac{1}{x+y} = R$

$\frac{1}{2} = \frac{1}{x-y} = B$

$x + y = 4$

$x - y = 2$

$x = 3$ $y = 1$

LINEAR EQUATION

- $\frac{4}{x+y}+\frac{3}{x-y}=3$
- $\frac{6}{x+y}-\frac{15}{x-y}=-2$

HW

$(4R+3B=3)\times 5$

$6R-15B=-2$

$20R+15B=15$

# Topic: QUADRATIC EQUATION

# SPLTTING THE MIDDLE TERM

$-6 + -2 = -8$

$-6 \times -2 = 12$

$x^2 - 8x + 12 = 0$

$x^2 - 6x - 2x + 12 = 0$

$x(x-6) - 2(x-6) = 0$

$(x-6)(x-2) = 0$

either

$x - 6 = 0$

$x = 6$

or

$x - 2 = 0$

$x = 2$

SPLTTING THE MIDDLE TERM

$x^2 - 8x + 12 = 0$

$6 + 2 = 8$

$6 * 2 = 12$

$x = 6$

$x = 2$

$1x^2 - 11x + 18 = 0$

$9 + 2 = 11$

$9 * 2 = 18$

$x = 9$

$x = 2$

$7x^2 - 23x + 18 = 0$

$14 + 9 = +23$

$14 * 9 = 126$

$x = 14/7 = 2$ ✓

$x = 9/7$ ✓

$3x^2 - 29x + 18 = 0$

$27 + 2 = 29$

$27 * 2 = 54$

$x = 27/3 = 9$ ✓

$x = 2/3$ ✓

SPLTTING THE MIDDLE TERM

$x^2 - 5\sqrt{3}x + 18 = 0$

$2 + 3 = 5$

$2 * 3 = \frac{18}{3} = 6$

$x = 2\sqrt{3}$ ✓

$x = 3\sqrt{3}$ ✓

$x^2 + 6x - 27 = 0$

$-9 + 3 = -6$

$-9 \times 3 = -27$

$x = -9$ $x = 3$

$x^2 - 11\sqrt{5}x + 90 = 0$

$9 + 2 = 11$

$9 * 2 = \frac{90}{5} = 18$

$x = 9\sqrt{5}$ $x = 2\sqrt{5}$

$x^2 + 7x - 18 = 0$

$-9 + 2 = -7$ $x = -9$

$-9 \times 2 = -18$ $x = 2$

# Topic: WORD PROBLEMS – FORMING EQUATIONS

- $x$ is 2 more than y

  $x = 2 + y$

- $x$ is 2 times of y

  $x = 2(y)$

- $x$ is 3 less than 2 times of y.

  $x = 2y - 3$

- $x$ is less than 3 less than 2 times of y.

$x < 2y - 3$

$x < 2y - 3$ ✓

- $x$ is more than 3 less than 2 times of y.

$x > 2y - 3$

$2y - 3$

- 3 Years ago Father was 5 times his son's age.

$F = 5S$

3 YRS AGO

FATHER — F

SON — S

3 YR

- At present Father is 3 less than 4 times the son's age.

P.F = 4S.P − 3

$(F+3) = 4(S+3) - 3$

PRESENT

FATHER — $F+3$

SON — $S+3$

$5S+3 = 4S+12-3$

$S = 9-3$

$S = 6$

- $x$ is 20% more than y. (0.2)

$$x = \frac{100+20}{100} y$$

$$x = \frac{120}{100} y$$

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

$$x = (1+0.2) y$$

$$x = 1.2y$$

$x$ is 20% of $y$

$$x = \frac{20}{100} y$$

$$x = 0.2y$$

- $x$ is 5 more than 20% more than y. (1.2y)

$$x = 1.2y + 5$$

$x$ is 5 more than 20% of $y$ (0.2y)

$$x = 0.2y + 5$$

- $x$ is 20% less than y.

$$x = \left(\frac{100-20}{100}\right)y \qquad x = (1-0.2)y$$

$$x = \frac{80}{100}y \qquad x = 0.8y$$

- $x$ is 5 more than 20% less than y.

$0.8y$

$$x = 0.8y + 5$$

# SUMMARY

Linear eq.

Splitting

Eq. forming

Revise

BATCH → DPP

VIDEO


THANK
You
52%
64%
85%
26,465.54
28,161.92
26,465.54
198.45
37,492.43
201.55
1,097.95
0.00
26,717.43
7,534.44
12,512.54
28,875.56