



ANNA ADMINISTRATIVE STAFF COLLEGE

Presents

TNPSC GROUP-4

Subject

APTITUDE & MENTAL ABILITY

Topic

STRATEGY & SIMPLIFICATION -1

10. **திறனறிவும் மனக்கணக்கு நுண்ணறிவும் (APTITUDE & MENTAL ABILITY)**

- i. சுருக்குதல் - விழுக்காடு - மீப்பெரு பொதுக் காரணி - மீச்சிறு பொது மடங்கு
- ii. விகிதம் மற்றும் விகிதாசாரம்.
- iii. தனி வட்டி - கூட்டு வட்டி - பரப்பு - கொள்ளளவு - காலம் மற்றும் வேலை.
- iv. தருக்கக் காரணவியல் - புதிர்கள் - பகடை - காட்சிக் காரணவியல் - எண் எழுத்துக் காரணவியல் - எண் வரிசை.

10. **APTITUDE & MENTAL ABILITY TESTS**

- i. Simplification - Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM).
- ii. Ratio and Proportion.
- iii. Simple Interest - Compound Interest - Area - Volume - Time and Work.
- iv. Logical Reasoning - Puzzles - Dice - Visual Reasoning - Alpha Numeric Reasoning - Number Series.

| S. No | Topic | Weightage (Last 5 years) | Weightage (2019) | Weightage (2021) | Weightage (2022) |
|-------|---|--------------------------|---------------------------------|------------------|------------------|
| 1 | Simplification (சுருக்குதல்) | 1-2 | 4 | 1 | |
| 2 | Percentage (விழுக்காடு) | 1-2 | 1 | 4 | 2 |
| 3 | LCM & HCF (மீ.பெ.வ & மீ.சி.ம) | 1-2 | 2 | 3 | 3 |
| 4 | Ratio & Proportion (விகிதம் மற்றும் விகிதாச்சாரம்) | 2-3 | 3 | 1 | 2 |
| 5 | Simple & Compound Interest (தனி வட்டி - கூட்டு வட்டி) | 2-3 | SI-2 | SI - 3 | CI-1 SI -3 |
| 6 | Area Volume (பரப்பு - கொள்ளளவு) | 2-3 | 3 | | 2 |
| 7 | Time & work (காலம் மற்றும் வேலை) | 2-4 | 2 | 4 | 3 |
| 8 | Logical Reasoning (தருக்கக் காரணவியல்) | 1 | | 2 | 2 |
| 9 | Puzzles - Dice (புதிர்கள் - பகடை) | 1 | | 1 | 1 |
| 10 | Visual & Alpha Numeric Reasoning (காட்சி மற்றும் எண்ணுமுத்து காரணவியல்) | 1 | 1 | 1 | 2 |
| 11 | Number Series (A.P, G.P) (எண் வரிசை) A.P, G.P | 1-2 | 4 | 4 | 3 |
| 12 | Probability & statistics (நிகழ்தகவு மற்றும் புள்ளியியல்) | 2-3 | Statistics -2 Probability -1 | 1 | 1 |

WHERE TO STUDY ? (6 – 10th School Books)

| Book | Topic Name | Page No |
|-------------------------------------|-----------------------------------|-----------|
| Simplification (சுருக்குதல்) | | |
| 6 th Term I | BODMAS (Basics) | 21 to 38 |
| 6 th Term III | Fractions | 1 to 22 |
| 7 th Term I | Algebra (Basic Equations) | 52 to 72 |
| 7 th Term II | Metric Tables (எண்ணியல்) | 6 to 9 |
| 7 th Term II | Fraction & Decimals | 9 to 17 |
| 7 th Term II | Algebra (அடுக்குகள்) | 45 to 68 |
| 7 th Term III | Decimals(+,-x,/) | 1 to 25 |
| 7 th Term III | Algebra (Equations) | 48 to 70 |
| 8 th Term I | விகிதமுறு எண்கள் (Simplification) | 1 to 35 |
| 8 th Term I | Algebra | 69 to 100 |
| 8 th Term II | Algebra (Equations) | 33 to 42 |

WHERE TO STUDY ? (6 – 10th School Books)

| Book | Topic Name | Page No |
|-------------------------------------|--|-----------|
| Simplification (சுருக்குதல்) | | |
| 8 th Term III | எண்கள் (Squares, cubes, square & cube root) | 1 to 29 |
| 9 th Term I | மெய் எண்கள் | 41 to 69 |
| 9 th Term I | Algebra (Basic Equations) | 70 to 102 |
| 9 th Term II | மெய் எண்கள் | 23 to 45 |
| 9 th Term II | Algebra | 46 to 75 |
| 9 th Term III | Algebra (Equation) | 25 to 34 |
| 9 th Term III | AP, GP (Sequence, Series) | 88 |
| 9 th Term III | Algebra (Formula) | 90 to 127 |
| Percentage (விழுக்காடு) | | |
| 7 th Term III | Percentage | 26 to 39 |
| 8 th Term II | Percentage (வாழ்வியல் கணிதம்) | 3 to 8 |

WHERE TO STUDY ? (6 – 10th School Books)

| Book | Topic Name | Page No |
|---|-----------------------------|----------|
| LCM & HCF (மீ.பெ.வ & மீ.சி.ம) | | |
| 6 th Term II | Numbers (LCM & HCF) | 3 to 26 |
| 9 th Term II | Algebra | 46 to 75 |
| 10 th book | HCF & LCM | 94 to 99 |
| Ratio & proportion (விகிதம் மற்றும் விகிதாச்சாரம்) | | |
| 6 th Term I | Ratio & proportion | 56 to 77 |
| 7 th Term I | நேர் மற்றும் எதிர் விகிதம் | 73 to 85 |
| SI & CI (தனி வட்டி - கூட்டு வட்டி) | | |
| 7 th Term III | Simple Interest | 39 to 46 |
| 8 th Term I | SI - CI | 18 to 29 |
| Profit & Loss (லாபம் நட்டம்) | | |
| 6 th Term III | Profit & Loss | 54 to 64 |
| Discount (தள்ளுபடி) | | |
| 8 th Term II | Profit, Loss, GST, Discount | 8 to 17 |

WHERE TO STUDY ? (6 – 10th School Books)

| Book | Topic Name | Page No |
|--|---------------------------------------|------------|
| Time & Work (காலம் மற்றும் வேலை) | | |
| 7 th Term I | நேர் மற்றும் எதிர் விகிதம் | 80 to 82 |
| 8 th Term III | நேர் மற்றும் எதிர்மாறல் (Time & Work) | 32 to 48 |
| Area & Volume (பரப்பளவு மற்றும் கொள்ளளவு) | | |
| 6 th Term III | Area & Perimeter (Square & rectangle) | 43 to 60 |
| 7 th Term I | Quadrilateral, rhombus, trapezoid | 34 to 50 |
| 7 th Term II | Circle & Rectangular path | 22 to 44 |
| 8 th Term I | Combined figure | 36 to 78 |
| 9 th Term III | Triangle, cube, cuboid | 91 to 115 |
| 10 th book | Cylinder, sphere, cone | 279 to 310 |

WHERE TO STUDY ? (6 – 10th School Books)

| | | |
|---|--|--|
| <p>Logical Reasoning - Puzzles- Dice - Visual Reasoning - Alpha numeric Reasoning – Number Series.</p> <p>தருக்கக் காரணவியல் - புதிர்கள் - பகடை - காட்சிக் காரணவியல் - எண் எழுத்துக் காரணவியல் - எண் வரிசை</p> | <p>Std 6 – Numbers (Term 1) Std 6 – Numbers (Term 2) Std 6 – Fractions (Term 2) Std 7 – Number System Std 8 – Numbers Std 9 – Real Numbers Std 10 – Number and Sequences</p> | <p>Std 6 - எண்கள் (Term 1) Std 6 - எண்கள் (Term 2) Std 6 - பின்னங்கள் (Term 2) Std 7 - எண்ணியல் Std 8 - எண்கள் Std 9 - மெய்யெண்கள் Std 10 - எண்களும் தொடர்வரிசைகளும்</p> |
|---|--|--|

CLASS SCHEDULE

| CLASS NO | DATE | TOPICS & SUB TOPICS |
|----------|----------------|---|
| 1 | 14 – 11 – 2023 | Simplification Part 1 – VBODMAS, SQUARE & CUBE ROOT, POWER & INDICES, |
| 2 | 15 – 11 – 2023 | Simplification Part 2 – FRACTION, ALGEBRA, WORD PROBLEM |
| 3 | 20 – 11 – 2023 | Percentage Part 1 |
| 4 | 21 – 11 – 2023 | Percentage Part 2 - Profit & Loss, Discount, GST |
| 5 | 27 – 11 – 2023 | Least Common Multiple (LCM) |
| 6 | 28 – 11 – 2023 | Highest Common Factor (HCF) |
| 7 | 04 – 12 – 2023 | Ratio & Proportion Part 1 |
| 8 | 05 – 12 – 2023 | Ratio & Proportion Part 2 – Ages, Mixture & Allegation |
| 9 | 11 – 12 – 2023 | Simple Interest |
| 10 | 12 – 12 – 2023 | Compound Interest Part 1 |
| 11 | 18 – 12 – 2023 | Compound Interest Part 2 |
| 12 | 19 – 12 – 2023 | Area Part 1 – Square, Rectangle, Circle |
| 13 | 25 – 12 – 2023 | Area Part 2 – Triangle, Quadrilateral, Trapezium, rhombus |
| 14 | 26 – 12 – 2023 | Volume Part 1 – Cube, Cuboid, Cylinder |

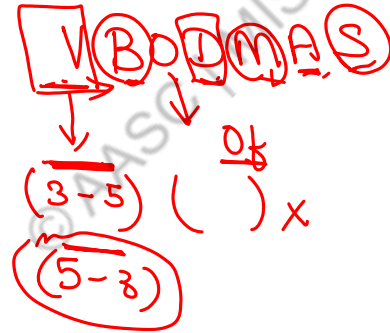
CLASS SCHEDULE

| CLASS NO | DATE | TOPICS & SUB TOPICS |
|----------|----------------|--|
| 15 | 01 – 01 – 2024 | Volume Part 2 – Cone, Sphere, Hemisphere |
| 16 | 02 – 01 – 2024 | Time & Work |
| 17 | 08 – 01 – 2024 | Time & Distance |
| 18 | 09 – 01 – 2024 | Number system (A.P) |
| 19 | 15 – 01 – 2024 | Number system (G.P) |
| 20 | 16 – 01 – 2024 | Logical Reasoning |
| 21 | 22 – 01 – 2024 | Puzzles & Dice |
| 22 | 23 – 01 – 2024 | Alphanumeric Series |
| 23 | 29 – 01 – 2024 | Visual Reasoning |
| 24 | 30 – 01 – 2024 | Probability |
| 25 | 31 – 01 – 2024 | Miscellaneous – Statistics |
| | 17 – 02 – 2024 | Maths Revision 1 |
| | 18 – 02 – 2024 | Maths Revision 2 |

SIMPLIFICATION (சுருக்குக)

| BIDMAS இன் விரிவாக்கம் | | |
|------------------------|-----------------------------|------------------------------|
| B | <u>அடைப்புக்குறி</u> | () |
| I | <u>அடுக்குகள்</u> $(a^m)^n$ | இது பற்றிப் பிறகு கற்பீர்கள் |
| D | <u>வகுத்தல்</u> | ÷ அல்லது / |
| M | <u>பெருக்கல்</u> | × |
| A | <u>கூட்டல்</u> | + |
| S | <u>கழித்தல்</u> | - |

| Expansion of BIDMAS | |
|---------------------|-----------------------------------|
| B | Bracket () |
| I | Indices (you will learn it later) |
| D | Division ÷ or / |
| M | Multiplication × |
| A | Addition + |
| S | Subtraction - |



SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

1. Simplify/சுருக்குக $24 + 2 \times 8 \div 2 - 1$

- a) ~~31...~~
- b) 33
- c) 19
- d) 20

$$\begin{array}{l} \xrightarrow{4} \\ \overline{24 + 8 - 1} \\ \curvearrowleft \overline{24 + 2 \times 4 - 1} \end{array}$$

SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

2. Simplify/சுருக்குக $20 + [2 \times 8 + \{6 \times 3 - 10 \div 5\}]$

- a) 32
- b) 33
- ~~c) 52...~~
- d) 20

$$\underline{[2 \times 8 + 16]}$$

$$16 + 16$$

$$20 + 32$$

$$52.$$

SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

3. Simplify/சுருக்குக $100 + 8 \div 2 + \{(3 \times 2) - 6 \div 2\}$

- a) 54
- ~~b) 107...~~
- c) 28
- d) 105

$$\begin{aligned} & 100 + \boxed{8 \div 2} + 3 \\ & \underline{100 + 4 + 3} \end{aligned}$$

VBODMAS

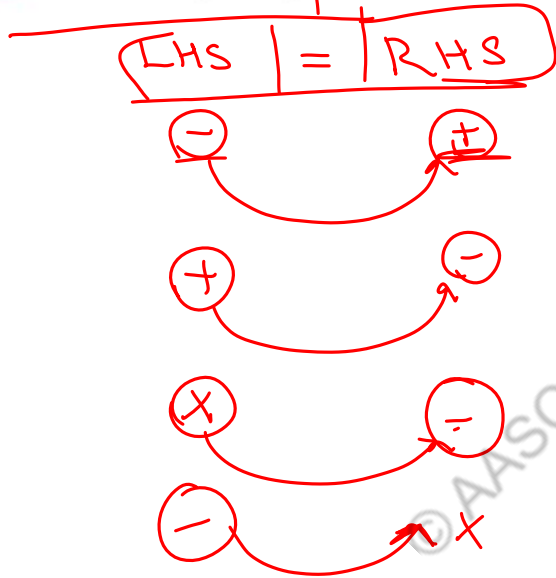
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SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

BIDMAS ஐப் பயன்படுத்திச், சரியான குறியீட்டைக் கட்டத்தில் நிரப்புக..

$$2 \square 6 - 12 \div (4 + 2) = 10$$



Use BIDMAS and put the correct operator in the box.

$$2 \square 6 - 12 \div (4 + 2) = 10$$

(a) +

(b) -

~~(c) x~~

(d) ÷

$$2 \square 6 - 12 \div (4 + 2) = 10$$

$$2 \square 6 - 12 \div 6 = 10$$

$$2 \square 6 \div 2 = 10 + 2$$

$$2 \times 6 = 12$$

SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

5. Simplify/சுருக்குக $\frac{3}{7} + \frac{2}{3}$

- a) 6/21
- ~~b) 23/21...~~
- c) 5/10
- d) 1/2

Handwritten solution for $\frac{3}{7} + \frac{2}{3}$:

Method 1: $\frac{(3 \times 2) + (1 \times 1)}{4 \times 1 \times 2} = \frac{6 + 1}{8} = \frac{7}{8}$

Method 2: $\frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$

Method 3: $\frac{3}{4} + \frac{1}{2} = \frac{3}{4} + \frac{2}{4} = \frac{5}{4}$

Method 4: $\frac{(3 \times 3) + (2 \times 7)}{7 \times 3} = \frac{9 + 14}{21} = \frac{23}{21}$

Method 5: $\frac{3}{1 \times 4} + \frac{1}{2 \times 4} = \frac{3}{4} + \frac{1}{8} = \frac{6}{8} + \frac{1}{8} = \frac{7}{8}$

SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

6. Simplify/சுருக்குக $3\frac{2}{4} + 7\frac{2}{5}$

- a) $11\frac{9}{10}$
- b) $12\frac{3}{4}$
- c) $10\frac{9}{10}$
- d) $10\frac{3}{4}$

$$3\frac{2}{4} + 7\frac{2}{5} \Rightarrow 8 + 1 = 9$$

$$3\frac{2}{4} = \frac{(3 \times 4) + 2}{4}$$

$$\frac{1}{2} \times \frac{37}{5}$$

$$\frac{35 + 74}{10} \Rightarrow \frac{109}{10}$$

$$3\frac{2}{4} \Rightarrow \frac{14}{2} = \frac{37}{5}$$

$$10\frac{9}{10}$$

$$\begin{array}{r} 109 \\ \underline{10} \\ 109 \\ \underline{100} \\ 9 \end{array}$$

SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

7. Simplify/சுருக்குக $5\frac{1}{2} - 3\frac{1}{4}$

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

$\Rightarrow (5-3) - \left(\frac{1}{2} - \frac{1}{4}\right)$

$\frac{1 \times 2}{2} - \frac{1 \times 1}{2} = \frac{2-1}{2} = \frac{1}{2}$

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

$\frac{1 \times 2 - (1 \times 1)}{2 \times 2} \Rightarrow \frac{1}{4}$

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SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

8. Simplify/சுருக்குக $4\frac{1}{2} \div 3\frac{1}{2}$

- a) $\frac{7}{9}$
- b) $2\frac{1}{7}$
- c) $1\frac{1}{7}$
- ~~d) $\frac{9}{7}$...~~

$$4\frac{1}{2} \div 3\frac{1}{2}$$
$$\frac{9}{2} \div \frac{7}{2}$$
$$\frac{9}{2} \times \frac{2}{7}$$

$$\frac{9}{\cancel{2}} \Rightarrow 1\frac{2}{9}$$

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SIMPLIFICATION (சுருக்குக)

TYPE 1: VBODMAS

$$\frac{1}{2} \times \frac{1}{4} \ominus \frac{1}{4}$$
$$\left(\frac{1 - \frac{1}{2}}{2} \right) \times \left(\frac{1}{2} - \frac{1}{4} \right) \div \left(\frac{3}{4} - \frac{1}{2} \right) =$$

(A) ~~$\frac{1}{2}$~~ (B) $\frac{3}{4}$ (C) $\frac{1}{4}$ (D) $\frac{-1}{2}$

$$\frac{1}{2} \times \frac{1}{4} \times \frac{1}{1}$$

$\left(\frac{1}{2} \right)$

HOMWORK – TYPE I (VBODMAS)

1. $9\frac{1}{4} - 3\frac{5}{6} = ?$

a) $6\frac{5}{12}$ **b) $5\frac{5}{12}$ ** c) $6\frac{8}{12}$ d) $6\frac{7}{12}$

2. $\frac{1}{7} + \frac{3}{9}$

a) $\frac{53}{21}$ b) $\frac{13}{21}$ **c) $\frac{10}{21}$** d) $\frac{5}{7}$

3. $(3\frac{1}{3}) + (4\frac{1}{6}) = ?$

a) $7\frac{3}{7}$ **b) $7\frac{1}{2}$** c) $6\frac{1}{2}$ d) $7\frac{5}{7}$

4. $(1\frac{3}{5}) + (5\frac{4}{7}) = ?$

a) $7\frac{8}{35}$ b) $7\frac{5}{18}$ c) $6\frac{8}{35}$ d) $7\frac{1}{7}$

5. $2\frac{1}{3} - 1\frac{3}{5} = ?$

a) $\frac{2}{3}$ b) $\frac{8}{5}$ c) $\frac{8}{15}$ **d) $\frac{11}{15}$**

6. $(7\frac{2}{7}) - 3\frac{4}{21}$

a) $4\frac{2}{21}$ b) $5\frac{4}{21}$ c) $5\frac{2}{3}$ d) $4\frac{2}{7}$

7. $(\frac{4}{3} - (-\frac{3}{2})) + (-\frac{5}{3} \div \frac{30}{12}) + (-\frac{12}{9} \times \frac{-27}{16}) = ?$

a) $\frac{74}{12}$ b) 1 **c) $6\frac{1}{12}$** d) $6\frac{1}{6}$

SIMPLIFICATION (சுருக்காக)

TYPE 2: SQUARE ROOT (வர்க்க மூலம்)

- ~~$1^2 = 1$~~
- ~~$2^2 = 4$~~
- $3^2 = 9$
- ~~$4^2 = 16$~~
- $5^2 = 25$
- ~~$6^2 = 36$~~
- $7^2 = 49$
- ~~$8^2 = 64$~~
- ~~$9^2 = 81$~~
- $10^2 = 100$

8^2

$$\begin{array}{r} 18^2 \\ \downarrow \downarrow \\ 0164 \\ 16 + \\ \hline 324 \end{array}$$

~~$\sqrt{256} =$~~ 14, 16

$\Rightarrow 27^2$

$$\begin{array}{r} 27^2 \\ \downarrow \downarrow \\ 0481 \\ 36 + \\ \hline 0841 \\ 29^2 = 841 \end{array}$$

~~$\sqrt{324} =$~~ 12, 18

$\sqrt{324} \Rightarrow 18$

~~$\sqrt{7921} =$~~ 81, 89

90^2
8100

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SIMPLIFICATION (சுருக்குக)

TYPE 2: CUBE ROOT (கன மூலம்)

- $1^3 = 1$
- $2^3 = 8$
- $3^3 = 27$
- $4^3 = 64$
- $5^3 = 125$
- $6^3 = 216$
- $7^3 = 343$
- $8^3 = 512$
- $9^3 = 729$
- $10^3 = 1000$

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29

$12^3 \Rightarrow 8$ $13^3 \Rightarrow 7$
 $18^3 \Rightarrow 12$ $17^3 \Rightarrow 10$

$$\sqrt[3]{4096} = \underline{16}$$

$$\sqrt[3]{13824} = \underline{24}$$

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

10. Evaluate/மதிப்பு காண்க $\frac{\sqrt[3]{9261}}{\sqrt{8000}}$

- a) $\frac{21}{20} \dots$
- b) $\frac{21}{17}$
- c) $\frac{21}{37}$
- d) $\frac{20}{21}$

$$2^3 \\ \overline{) 8}$$

$$2^3 = 100 \\ 2^3 = 27$$

$$\frac{21}{20}$$

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

11. $\sqrt{48}$ is approximately equal to ___

$\sqrt{48}$ இன் தோராய மதிப்பு காண்க

- a) 5
- b) 6
- c) 7...
- d) 8

$$\sqrt{48}$$

$$\Rightarrow \cancel{24} \times 2$$

$$\Rightarrow \underline{16} \times 3$$

$$\Rightarrow \sqrt{16 \times 3}$$

$$\Rightarrow \underline{4\sqrt{3}}$$

$$= \underline{4 \times 1.732}$$

$$6^2 = 36$$
$$7^2 = \underline{49}$$

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

$$12. \sqrt{128} - \sqrt{98} + \sqrt{18} = 8\sqrt{2} - 7\sqrt{2} + 3\sqrt{2}$$

- a) $\sqrt{2}$
- b) $\sqrt{8}$
- c) $\sqrt{48}$
- d) $\sqrt{32}$...

$$\begin{array}{r} 2 \overline{) 128} \\ \underline{4} \\ 2 \overline{) 64} \\ \underline{4} \\ 2 \overline{) 32} \\ \underline{4} \\ 4 \overline{) 16} \\ \underline{4} \\ 4 \overline{) 8} \\ \underline{4} \\ 4 \overline{) 4} \\ \underline{4} \\ 0 \end{array}$$

$$\sqrt{2 \times 2 \times 2 \times 4 \times 4}$$

$$4 \times 2 \times \sqrt{2}$$

$$\begin{array}{r} 2 \overline{) 98} \\ \underline{14} \\ 7 \overline{) 49} \\ \underline{49} \\ 0 \end{array} \quad \begin{array}{r} 2 \overline{) 18} \\ \underline{6} \\ 3 \overline{) 9} \\ \underline{9} \\ 0 \end{array}$$

$$\begin{aligned} 4 &= \sqrt{4} \times \sqrt{4} \\ 2 &= \sqrt{2} \times \sqrt{2} \end{aligned}$$

$$= \sqrt{2} (8 - 7 + 3)$$

$$= 4\sqrt{2}$$

$$\sqrt{2 \times 7 \times 7}$$

$$7\sqrt{2}$$

$$\Rightarrow \sqrt{16 \times 2} = \sqrt{32}$$

$$\Rightarrow 4\sqrt{2}$$

$$\sqrt{2 \times 3 \times 2}$$

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

13. $\sqrt{22 + \sqrt{7 + \sqrt{4}}} =$

- ~~a) $\sqrt{25}$...~~
- b) $\sqrt{33}$
- c) $\sqrt{31}$
- d) $\sqrt{29}$

5

$$\sqrt{22 + \sqrt{7 + \sqrt{4}}}$$

← ← ←

$$\sqrt{9}$$
$$\sqrt{22 + 3}$$

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

14. Find the value of

$$\sqrt{58 + \sqrt{31 + \sqrt{21 + \sqrt{11 + \sqrt{25}}}}}$$

- a) 7
- ~~b) 8...~~
- c) 9
- d) 6

Handwritten work in red ink showing the simplification process:

- $\sqrt{64}$ (circled)
- 8 (circled)
- $\sqrt{49}$ (boxed)
- 7 (circled)
- 58 (written next to the boxed 49)
- 64 (circled)

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SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

15. Find the value of

$$\sqrt{609 + \sqrt{248 + \sqrt{60 + \sqrt{7 + \sqrt{81}}}}}$$

- a) 20
- b) 25...**
- c) 16
- d) 9

$$\sqrt{609 + 16}$$

$$\sqrt{625}$$

$$\Rightarrow \underline{25}$$

SIMPLIFICATION (சுருக்காக)

TYPE 2: SQUARE & CUBE ROOT

16. Find the value of $\sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}$

- a) 3
- ~~b) 4...~~
- c) 2
- d) 6

Handwritten solution for the first method:

$$x = 4$$

$(x-4)(x+3) = 0$

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

Factorization: 1×12 , 2×6 (crossed out), 3×4 (circled)

Final result: $x = 4$ (circled)

Handwritten solution for the second method:

$$\sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}} = x$$

$$\left(\sqrt{12 + x}\right)^2 = (x)^2$$

$$\left((12+x)^{1/2}\right)^2 \Rightarrow 12+x = x^2$$

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

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

17. Find the value of $\sqrt{6 - \sqrt{6 - \sqrt{6 - \sqrt{\dots}}}}$

- a) 3
- b) 4
- ~~c) 2...~~
- d) 6

$$6 \begin{cases} 3 \\ 2 \end{cases}$$

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SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

18. Simplify $\sqrt{12} \times \sqrt{3}$

- a) 3
- b) 4
- c) 2
- ~~d) 6...~~

$$\begin{aligned} & \sqrt{12} \times \sqrt{3} \\ & \sqrt{4 \times 3} \times \sqrt{3} \Rightarrow \\ & 2 \times \sqrt{3} \times \sqrt{3} \\ & 2 \times 3 \Rightarrow 6 \end{aligned}$$

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

19. Simplify/சுருக்குக $\sqrt{\frac{98}{162}}$

- a) 8/9
- b) 5/9
- ~~c) 7/9...~~
- d) 6/5

$$\begin{array}{r} 2 \overline{) 98} \\ \underline{74} \\ 24 \end{array} \quad \begin{array}{r} 2 \overline{) 162} \\ \underline{98} \\ 64 \end{array}$$

$$\sqrt{\frac{2 \times 7 \times 7}{2 \times 9 \times 9}} \Rightarrow \frac{7}{9}$$

HOMWORK – TYPE 2

1. Simplify/சுருக்குக $\sqrt{2\frac{7}{9}}$

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

2. $\sqrt{63} - \sqrt{175} + \sqrt{28}$

a) $5\sqrt{7}$ b) $7\sqrt{5}$ **c) 0** d) 1

3. $\sqrt{27} + \sqrt{12} =$

a) $\sqrt{39}$ b) $5\sqrt{6}$ **c) $5\sqrt{3}$** d) $3\sqrt{5}$

4. $4\sqrt{7} \times 2\sqrt{3} =$

a) $6\sqrt{10}$ **b) $8\sqrt{21}$** c) $8\sqrt{10}$ d) $6\sqrt{21}$

5. If $\sqrt{80} = k\sqrt{5}$, then k =

$\sqrt{80} = k\sqrt{5}$, எனில் k=?

a) 2 **b) 4** c) 8 d) 16

6. Find the value of $\sqrt{214 + \sqrt{112 + \sqrt{74 + \sqrt{49}}}}$

a) 15 b) 18 c) 25 d) 17

7. Find the value of $\sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{\dots}}}}$

a) 15 b) 4 c) 5 **d) 6**

SIMPLIFICATION (சுருக்குக)

TYPE 3: POWER & INDICES (அடுக்குமுறை)

20. Simplify/சுருக்குக $(-2)^{-3} \times (-2)^{-2}$

~~a) $-\frac{1}{32}$~~

b) $\frac{1}{32}$

c) 32

d) -32

$$(-2)^{-3} \times (-2)^{-2} \Rightarrow (-2)^{-3-2}$$

$$a^m \times a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$a^{-m} = \frac{1}{a^m}$$

$$\Rightarrow (-2)^{-5}$$

$$\Rightarrow \frac{1}{(-2)^5} = -\frac{1}{32}$$

$$\underbrace{2 \times 2 \times 2 \times 2 \times 2}$$

SIMPLIFICATION (சுருக்குக)

TYPE 3: POWER & INDICES (அடுக்குமுறை)

21. Simplify/சுருக்குக $\frac{5^2 \times 5^8}{25^2}$

- a) 5^{10}
- b) 5^8
- ~~c) 5^6 ...~~
- d) 25^6

$$\frac{5^2 \times 5^8}{25^2} \Rightarrow \frac{5^{10}}{5^4}$$
$$5^{10-4}$$

(4) $(a^m)^n \Rightarrow a^{mn}$

SIMPLIFICATION (சுருக்குக)

TYPE 3: POWER & INDICES (அடுக்குமுறை)

22. Simplify/சுருக்குக

$$\frac{2^8 \times 3^5 \times 5^4}{3^3 \times 5^7 \times 2^4}$$

$$\Rightarrow 2^{8-4} \times 3^{5-3} \times 5^{4-7}$$

$$\textcircled{5^{-2}}$$

a) $2^4 \times 3^2 \times 5$

b) $\frac{2^4 \times 3^2}{5^2}$

c) $\frac{2^4 \times 3^2}{5}$

d) $2^4 \times 3^2 \times 5^{-3} \dots$

$$\frac{2^8 \times 2^4}{2^4}$$

$$\Rightarrow \frac{2^4 \times 3^2}{5^3}$$

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SIMPLIFICATION (சுருக்குக)

TYPE 3: POWER & INDICES (அடுக்குமுறை)

23. $2^{40} + 2^{40}$ is approximately equal to ___

$2^{40} + 2^{40}$ இன் தோராய மதிப்பு காண்க

- a) 4^{40}
- ~~b) 2^{80}~~
- ~~c) 2^{41} ...~~
- d) 7^2

$$\begin{aligned} & 2^{40} + 2^{40} \\ & \Rightarrow 2^{40+40} \\ & \Rightarrow 2^{80} \end{aligned}$$

$$2^0 = 1$$

$$2^{40} + 2^{40}$$

$$2^{40} (1 + 1)$$

$$\begin{aligned} & 2^{40} \times (2) \Rightarrow 2^{40+1} \\ & \Rightarrow 2^{41} \end{aligned}$$

SIMPLIFICATION (சுருக்குக)

TYPE 3: POWER & INDICES (அடுக்குமுறை)

24. Find 'x' so that $(-7)^{x+2} \times (-7)^5 = (-7)^{10}$

$(-7)^{x+2} \times (-7)^5 = (-7)^{10}$ எனில், 'x' இன் மதிப்பு காண்க

- a) 3...
- b) 4
- c) 5
- d) 2

$$a^m \times a^n \Rightarrow a^{m+n}$$

$$(-7)^{x+2+5} = (-7)^{10}$$

$$\underline{x+2+5} = 10$$

SIMPLIFICATION (சுருக்குக)

TYPE 3: POWER & INDICES (அடுக்குமுறை)

If $\left(\frac{p}{q}\right)^{1-3x} = \left(\frac{q}{p}\right)^{\frac{1}{2}}$, then x is

(a) 4^{-1}

(b) 3^{-1}

(c) 2^{-1}

(d) 1^{-1}

$\left(\frac{p}{q}\right)^{1-3x} = \left(\frac{q}{p}\right)^{\frac{1}{2}}$ எனில் x ஆனது.

(அ) 4^{-1}

(ஆ) 3^{-1}

(இ) 2^{-1}

(ஈ) 1^{-1}

$\left(\frac{p}{q}\right)^{1-3x} = \left(\frac{q}{p}\right)^{\frac{1}{2}}$
 $\Rightarrow \left(\frac{p}{q}\right)^{1-3x} = \left(\frac{q}{p}\right)^{-\frac{1}{2}}$
 $\Rightarrow 1-3x = -\frac{1}{2}$
 $\Rightarrow 1 + \frac{1}{2} = 3x$
 $\Rightarrow \frac{3}{2} = 3x$
 $\Rightarrow x = \frac{1}{2}$

SIMPLIFICATION (சுருக்குக)

TYPE 2: SQUARE & CUBE ROOT

26. If $\sqrt{9^x} = \sqrt[3]{9^2}$, then 'x' value is

If $\sqrt{9^x} = \sqrt[3]{9^2}$, எனில், $x =$ _____

- a) 2/3
- ~~b) 4/3...~~
- c) 1/3
- d) 5/3

$$(a^m)^n = a^{mn}$$

$$(9^x)^{1/2} = (9^2)^{1/3}$$

$$9^{x/2} = 9^{2/3}$$

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

$$x = \frac{2}{3} \times 2 = \frac{4}{3}$$

SIMPLIFICATION (சுருக்குக)

TYPE 3: POWER & INDICES (அடுக்குமுறை)

27. Simplify/சுருக்குக $\frac{2^{-1} \times 3^{-1}}{6^{-2}}$

- a) 6.
- b) $\frac{1}{6}$
- c) 3
- d) $\frac{-1}{3}$

COMMENT BELOW

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SUMMARY (சுருக்கம்)

$$(a^m)^n = a^{mn}$$

$$a^0 = 1$$

① V B O D M A S

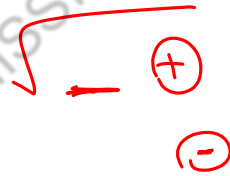
③

$$a^m \times a^n = a^{m+n}$$

$$a^m / a^n = a^{m-n}$$

$$a^{-m} = \frac{1}{a^m}$$

②



$$\frac{12}{+0} \left\{ \begin{array}{l} \ominus \text{ Planor} \\ \oplus \end{array} \right.$$