

Number Based Reasoning

Basic & Concept

8 Section

(संख्याओं पर आधारित
रीजनिंग)



Topics based on Number based Reasoning✓

- Number Analogy✓ सादृश्यता
- Number Classification✓ वर्गीकरण
- Number series✓ श्रृंखला
- Missing Number✓ लुप्त संख्या पद
- Numerical operations✓ गणितीय संक्रियाएँ
- Alphanumeric Number Reasoning✓

Reasoning Set (Analogy)

(12, 14, 56)

1. (24, 16, 214)
2. (16, 18, 96)
3. (14, 20, 145)
4. (10, 16, 82)



Most Important

Reasoning Analogy Question

Q1. 12 : 36 :: 14 : ? Q2. 11 : 22 :: 13 : ?

- (A) 40 (B) 50
(C) 60 (D) 70

- (A) 64 (B) 52
(C) 38 (D) 42

Q3. 4 : 12 :: 5 : ? Q4. 23 : 25 :: 36 : ?

- (A) 21 (B) 20
(C) 23 (D) 24

- (A) 79 (B) 80
(C) 81 (D) 82

Number Analogy Reasoning

Q1. 4 : 12 :: 5 : ?

- (A) 25 (B) 20
(C) 22 (D) 30

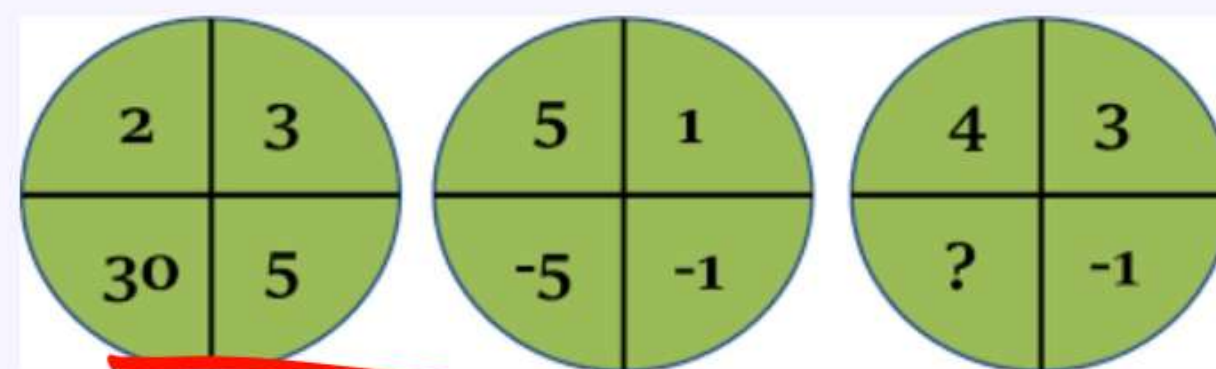
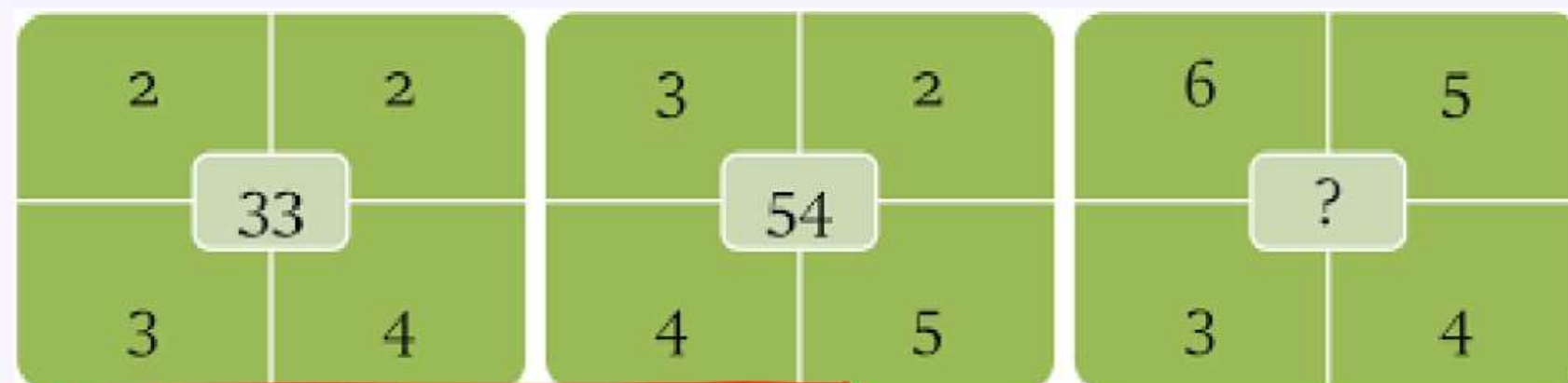
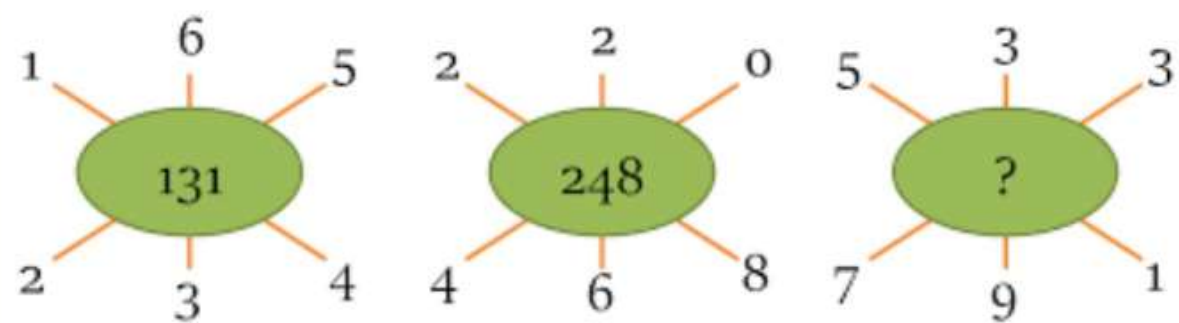
Q3. 6 : 18 :: 18 : ?

- (A) 19 (B) 32
(C) 16 (D) 24

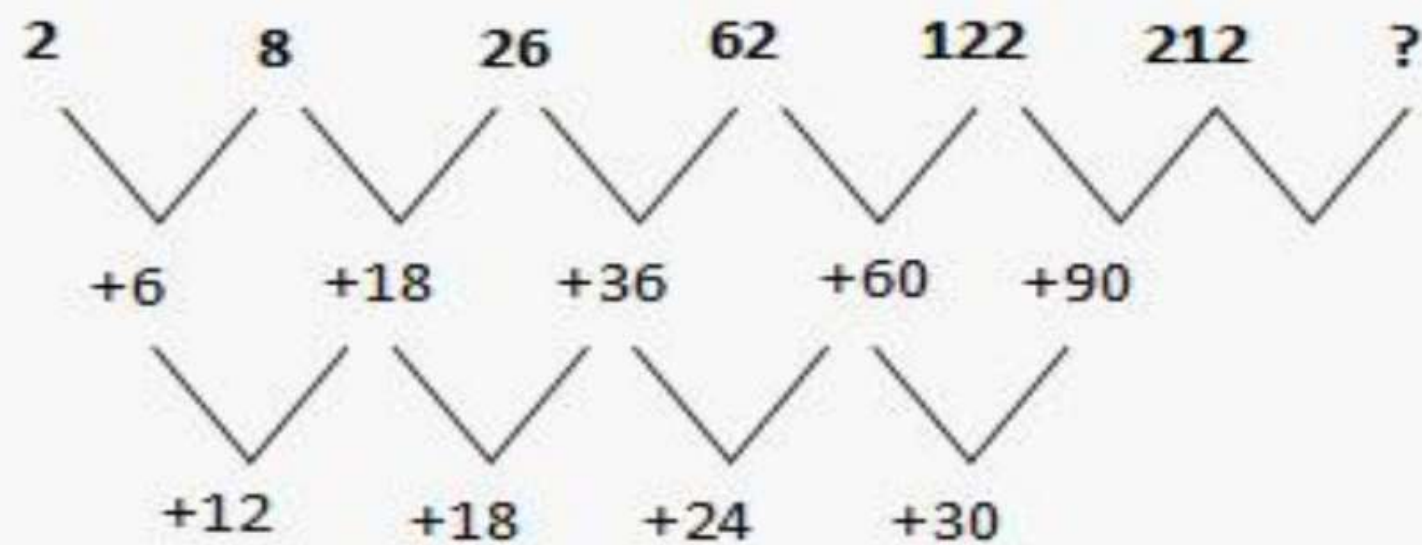
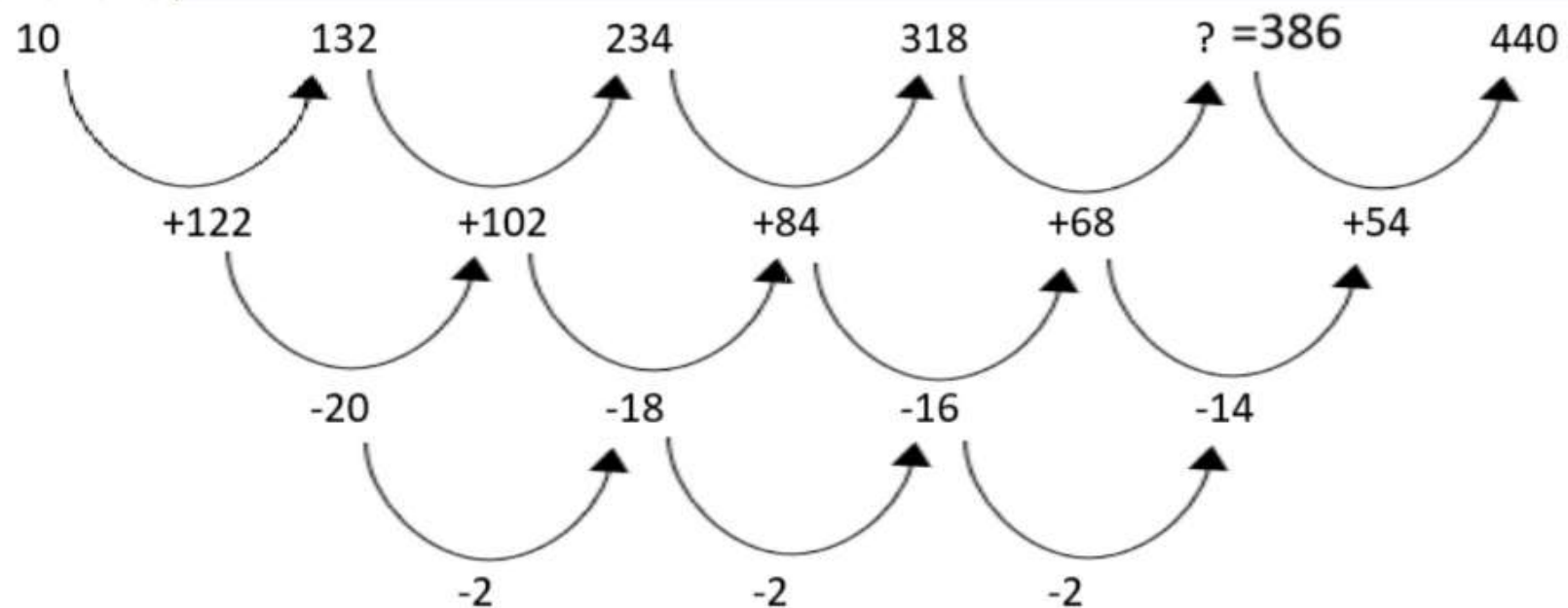
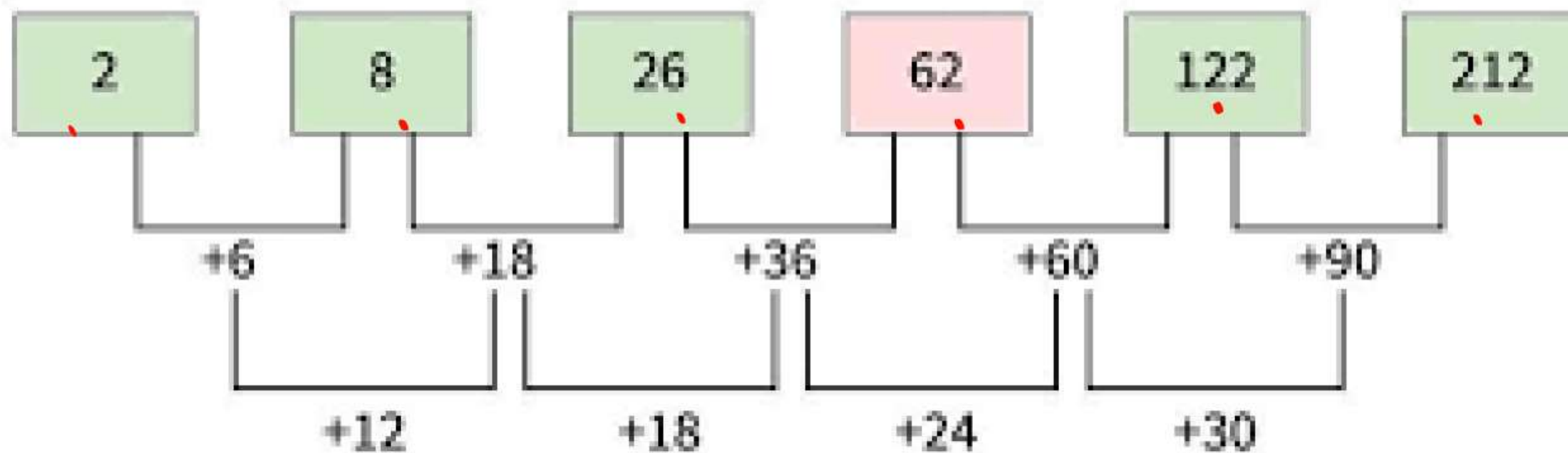
Q4. 33 : 121 :: 27 : 81 :: 45 : ? Q5. 19 : 324 :: 25 : 576 :: 9 : ?

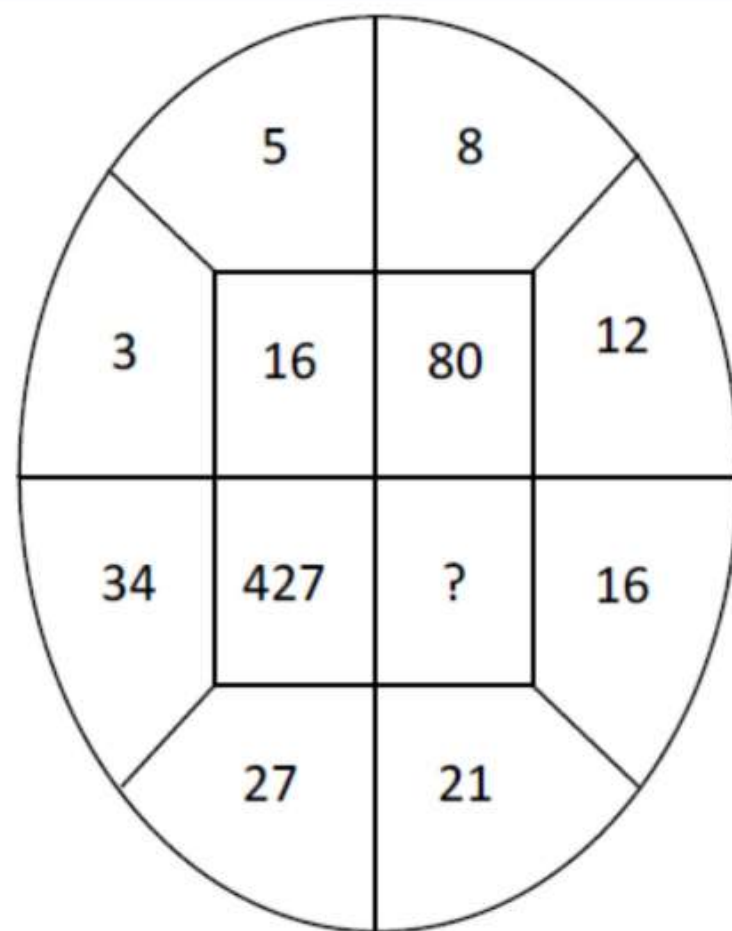
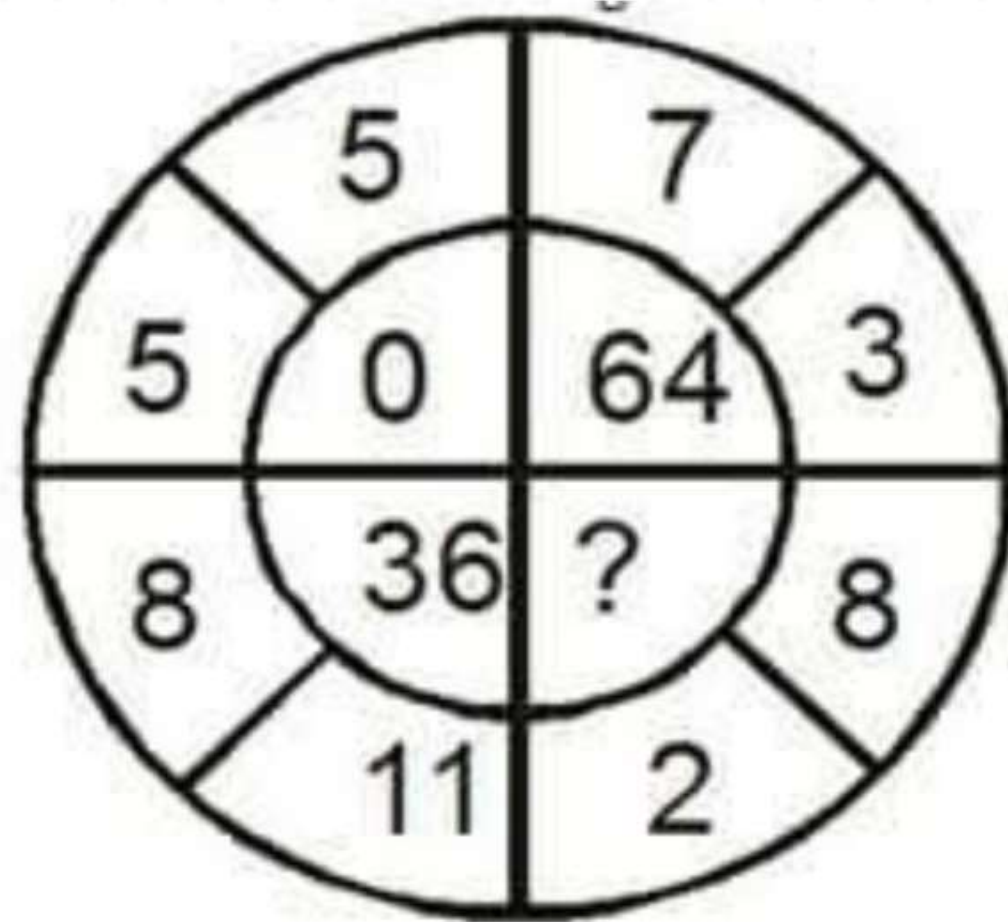
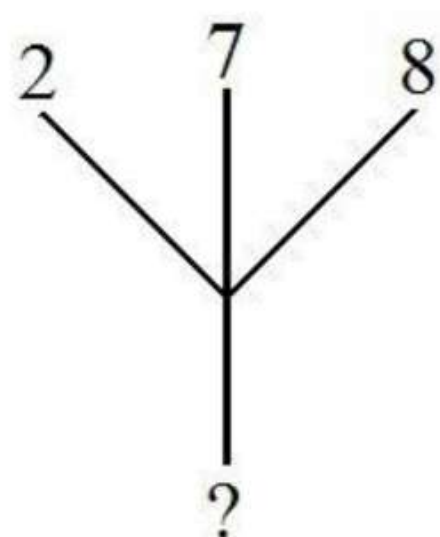
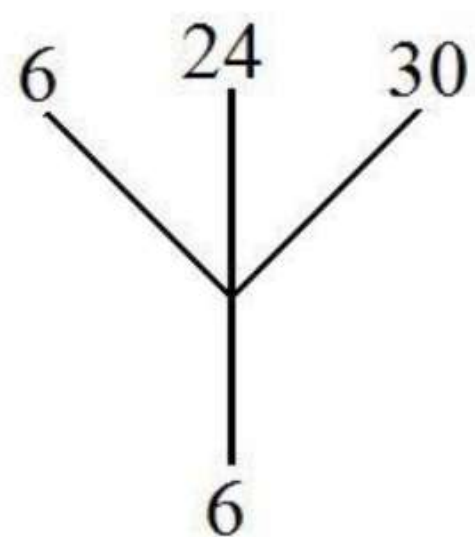
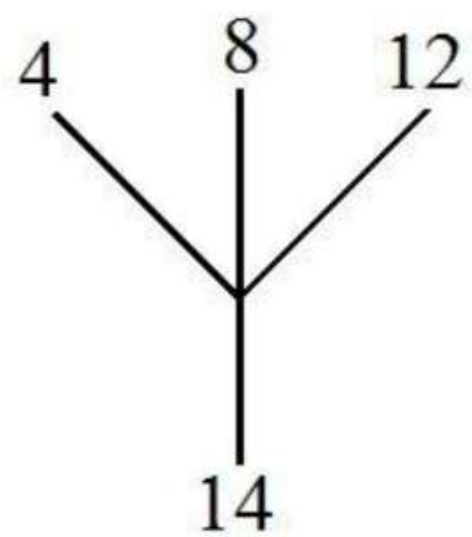
- (A) 275 (B) 225
(C) 305 (D) 256

- (A) 16 (B) 64
(C) 88 (D) 72



MISSING TERM SERIES:





2	7	6
9	5	1
4	3	8

→ 15

→ 15

→ 15

15 ↙ ↓ ↓ ↓ ↘ 15

Mathematical Operations

B = Bracket ()

O = Of

D = Division [÷]

M = Multiplication [x]

A = Addition [+]

S = Subtraction [-]

$$6 \times 4 + 9 \div 15$$

+ means ÷

÷ → ×

× → -

- → +

(1) $18 \div 6 = 3 \times 2 = 20$
 (2) $18 \div 6 = 3 \times 5 = 18$
 (3) $18 \div 6 = 3 \times 7 = 21$
 (4) $18 \div 6 = 3 \times 5 = 22$

B

O

D

M

A

S

Brackets
(...)

Orders
powers,
roots

Division
÷

Multiplication
×

Addition
+

Subtraction
—

Mathematical Operations

$$54 \times 27 \times 9 \times 18 \times 36 \times 72$$

1. +, ÷, ×, -, =

2. -, +, ×, ÷, =

3. +, -, ×, ÷, =

4. -, ×, +, ÷, =



Do First

Do Last

Letter	Rule	VBODMAS
V	Vinculum	— or bar
B	Brackets	() { } []
O	Of	×
D	Division	÷
M	Multiplication	×
A	Addition	+
S	Subtraction	-

Topics based on Number based Reasoning

- Number Analogy
- Number Classification
- Number series
- Missing Number
- Numerical operations
- Alphanumeric Number Reasoning

SSC

15-25%

Railway

20-35%

Bank

13-24%

UPSC CSAT
UGC NET

Basic Number ** knowledge

This information is useful for covering the
topics

ऊपर दिए गए विषयों के लिए आवश्यक है

Number Classification (संख्या वर्गीकरण)

Real (वास्तविक)

(5, -9, $\sqrt{17}$) 3.6416

✓
complex (सम्मिश्र)
(a + ib)

Eg : 5 + ui

(काल्पनिक)

$i = \sqrt{-1}$ (आयोटा)

Eg : 3i, 5i, $\sqrt{-6}$

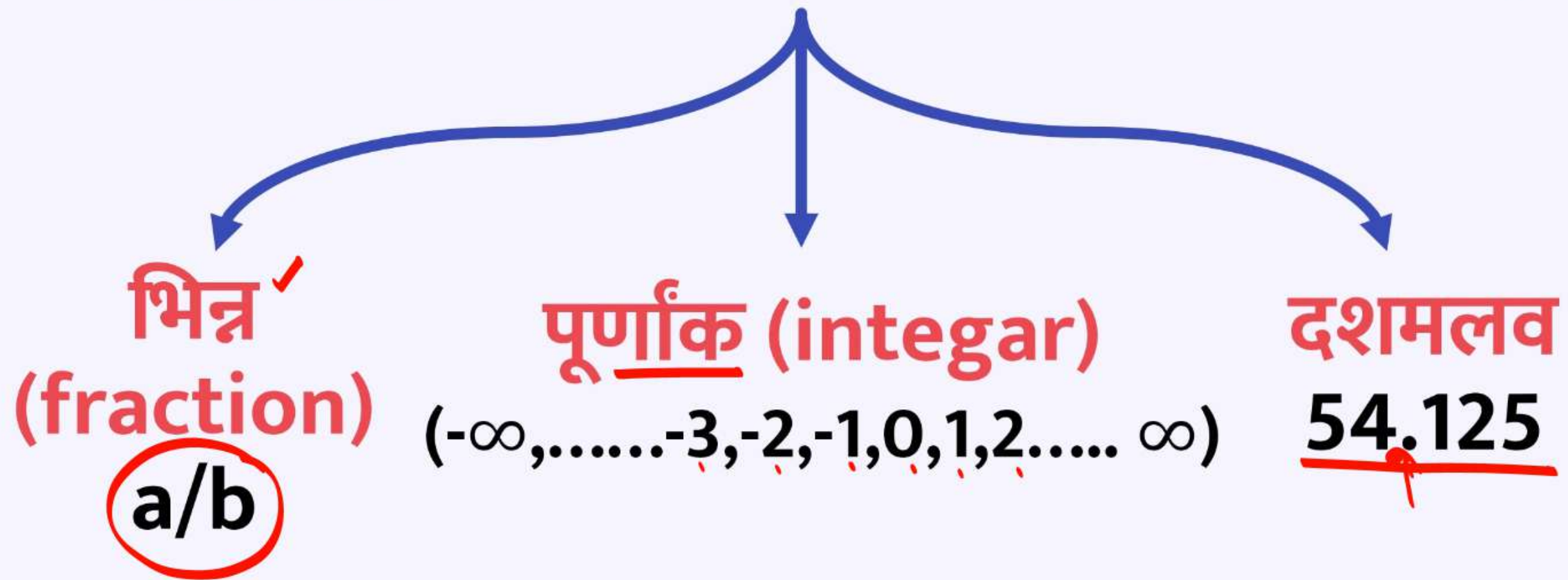
↔ परिमेय (Rational Number) : p/q

Eg : $\frac{a}{b}$, $\frac{3}{7}$, $\frac{9}{11}$, $\frac{11}{3}$, $\frac{22}{7}$

↔ अपरिमेय (Irrational Number)

Eg : $\sqrt{3}$, $\sqrt{7}$, π , e

परिमेय (Rational Number)



(a) भिन्न (fraction) : (a/b)

↔ पूर्ण भिन्न (Proper Fraction)

Eg : $\frac{3}{5}$ (a < b)
अंश 3, हर 5

↔ अपूर्ण भिन्न (Improper Fraction)

Eg : $\frac{7}{5}, \frac{5}{3}$ (a > b)

↔ मिश्र भिन्न (Mixed Fraction)

Eg : $1\frac{2}{5}, 1\frac{2}{3}, 7\frac{2}{3}$

(b) पूर्णांक (Integer) : $(-\infty, \dots, -3, -2, -1, 0, 1, 2, \dots, \infty)$

↔ Negative Integer

Eg : $(-\infty, \dots, -3, -2, -1)$

↔ Non-negative Integer

Eg : $(0, 1, 2, 3, 4, \dots, \infty)$

positive integer

$(1, 2, 3, \dots, \infty)$

Whole Number

(पूर्ण संख्याएं)

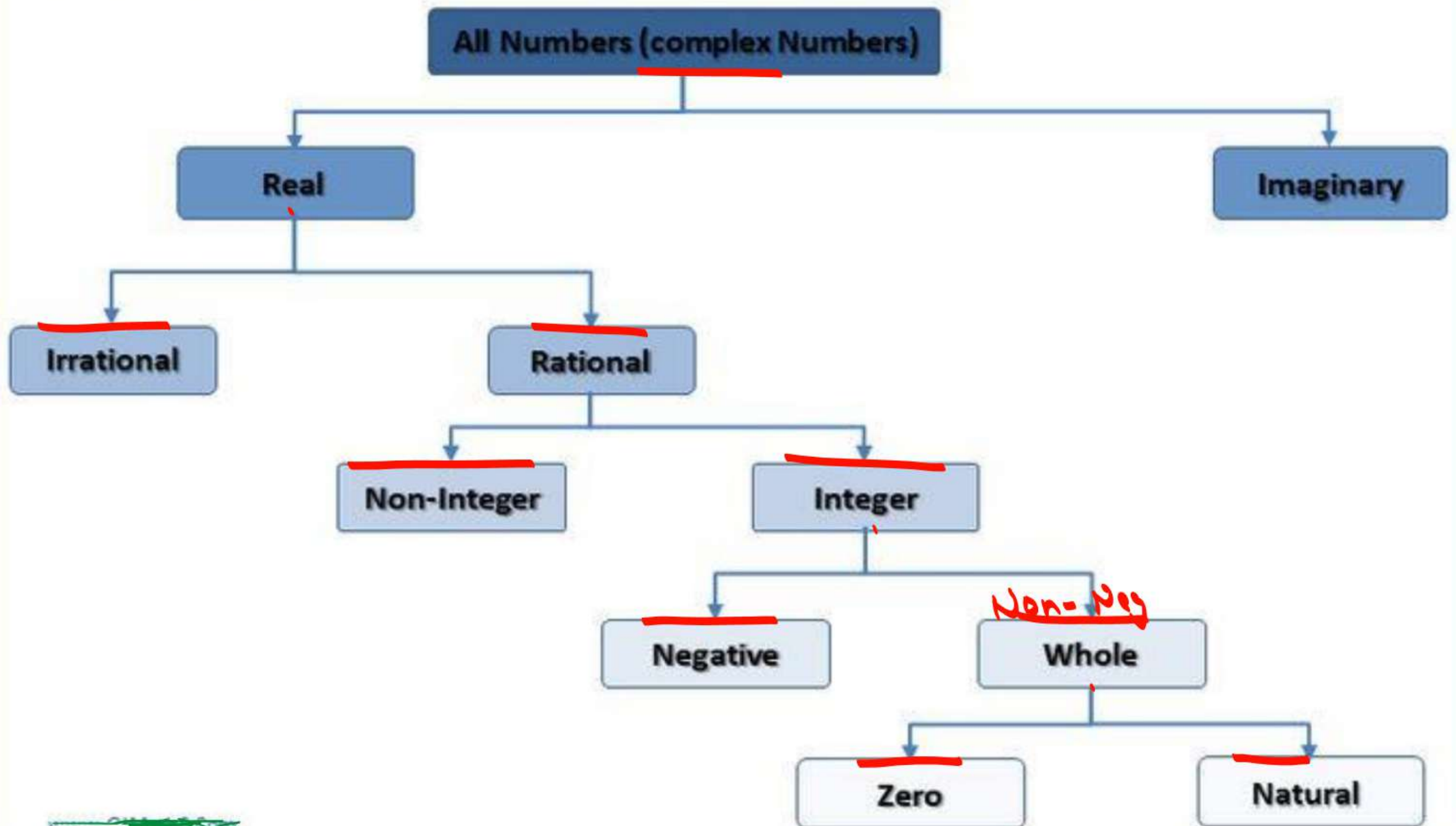
$(0, 1, 2, 3, \dots, \infty)$

Natural Number

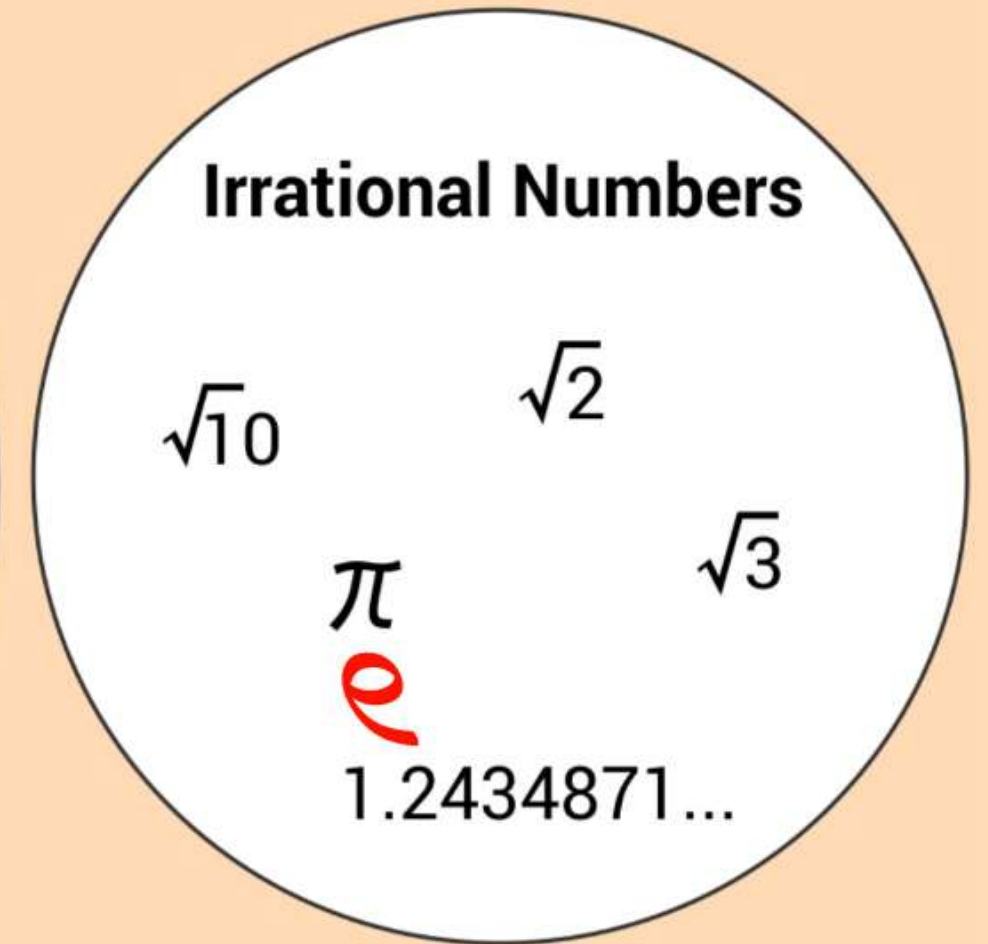
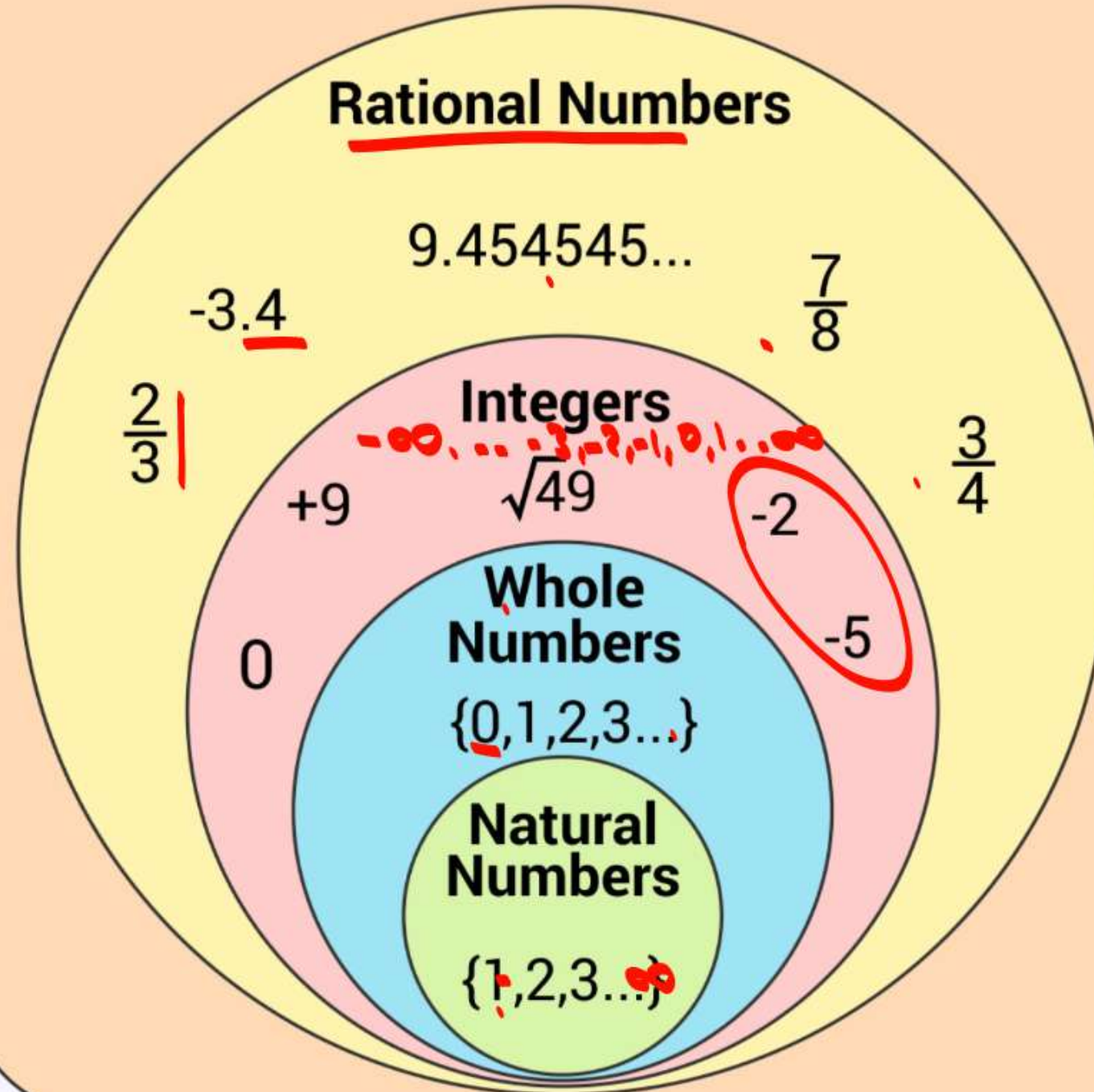
(प्राकृत संख्याएं)

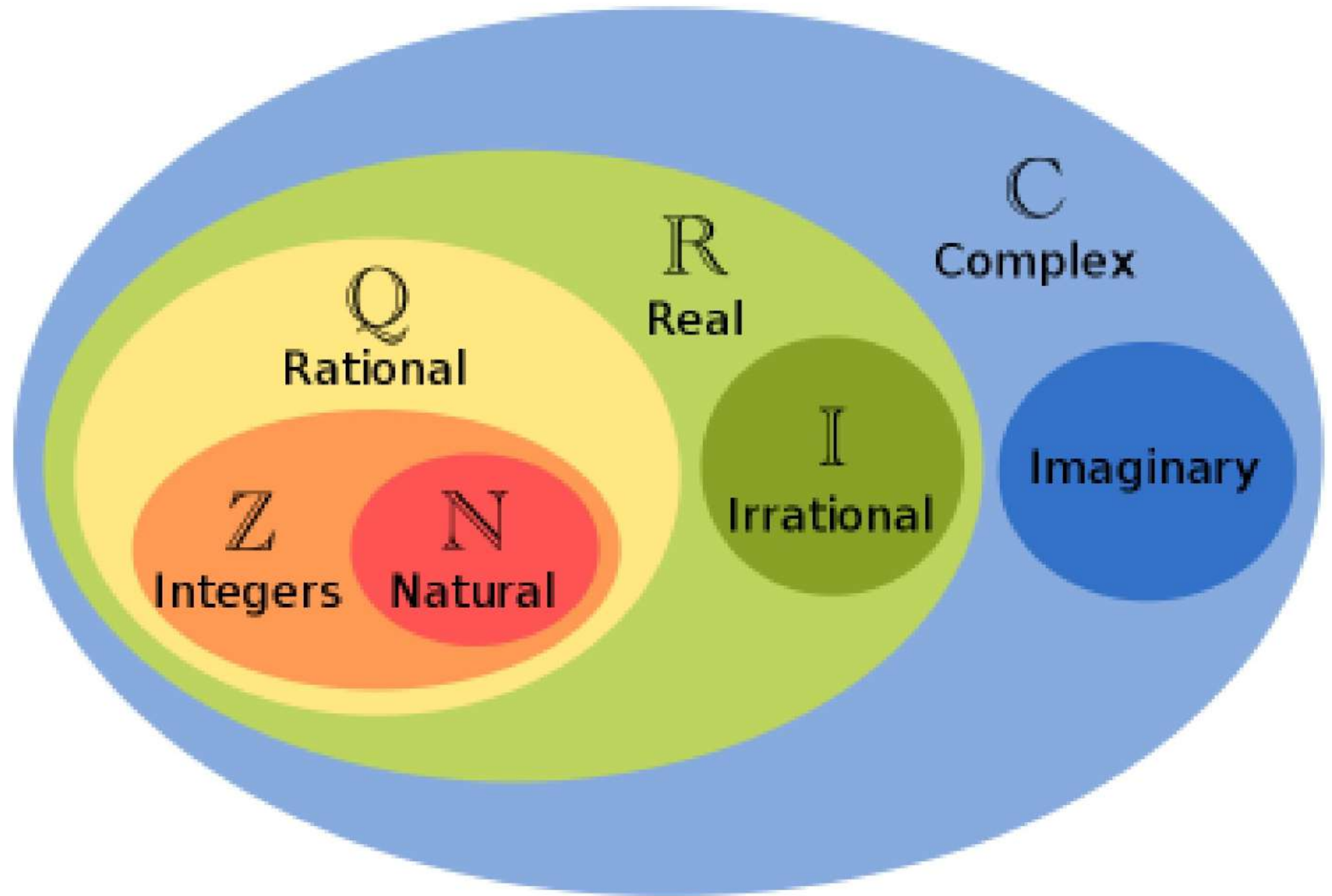
$(1, 2, 3, 4, 5, 6, 7, 8, \dots, \infty)$

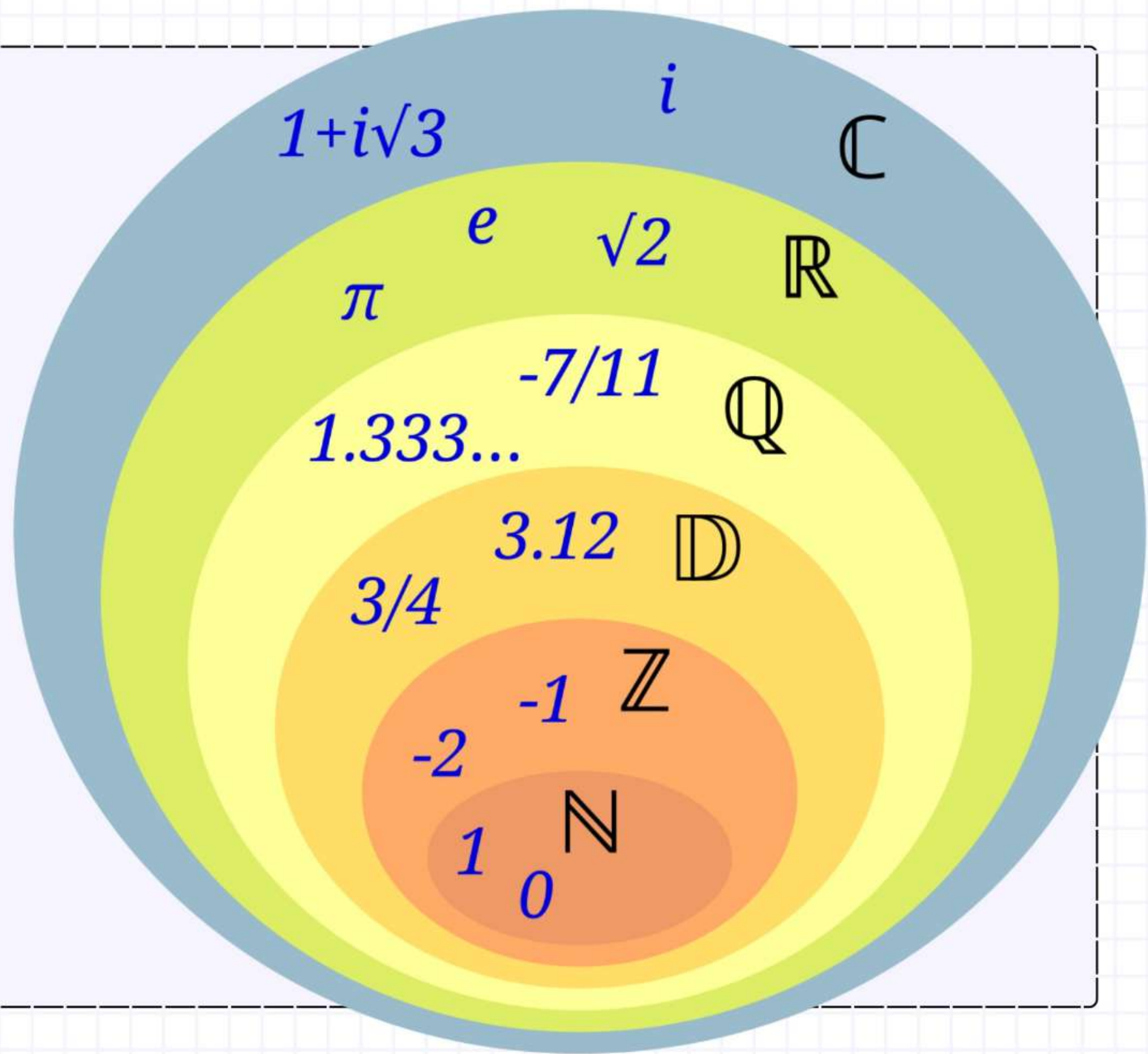
Number Classification



Real Numbers







Number Classification

All Numbers (Complex Numbers)

Irrational

A real number that can not be written as a fraction

$$\pi$$

$$\pi$$

$$\pi$$

Real

Rational

Non-Integer

A decimal or a fraction

$$0.125$$

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

$$0.125$$

$$-0.125$$

$$0.125$$

$$-0.125$$

$$0.125$$

$$-0.125$$

Integer

Negative

A whole number that is negative

$$\dots, -4, -3, -2, -1$$

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

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

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

Whole

Zero

The number zero

$$0$$

Natural

All positive number

$$1, 2, 3, 4$$

$$0, 1, 2, 3, 4$$

All positive and negative number

$$\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots$$

$$\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots$$

$$\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots$$

$$\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots$$

Imaginary

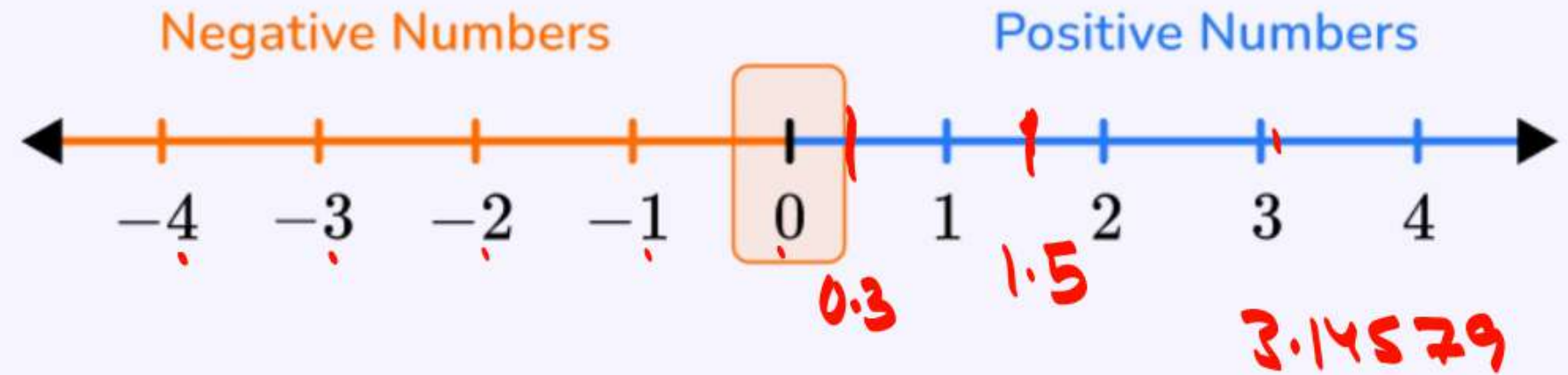
Imaginary number

$$\sqrt{-1}=i$$

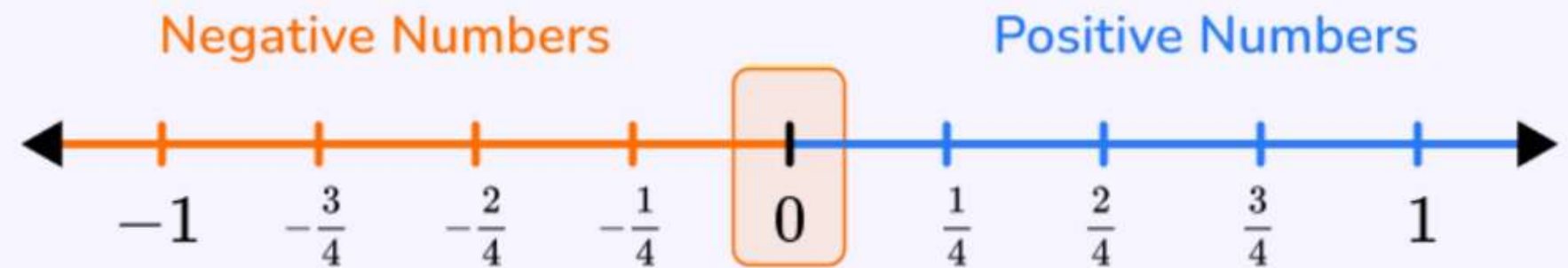
$$\sqrt{-1}=i$$

Number line

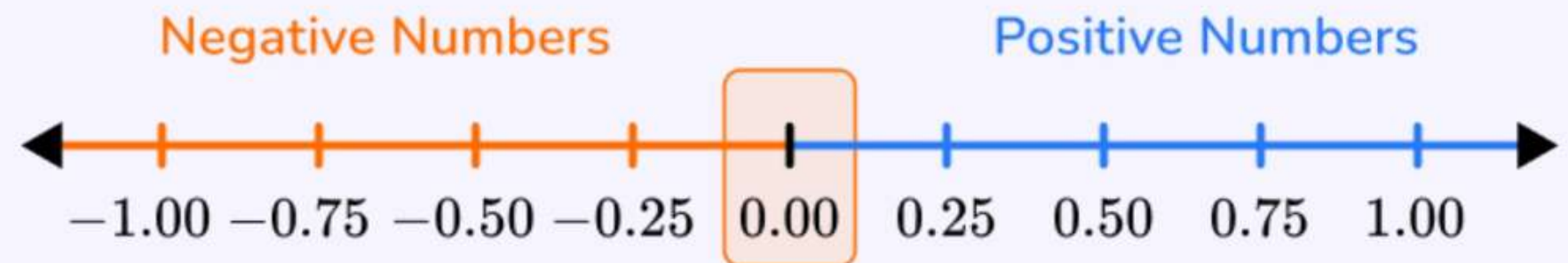
Integers

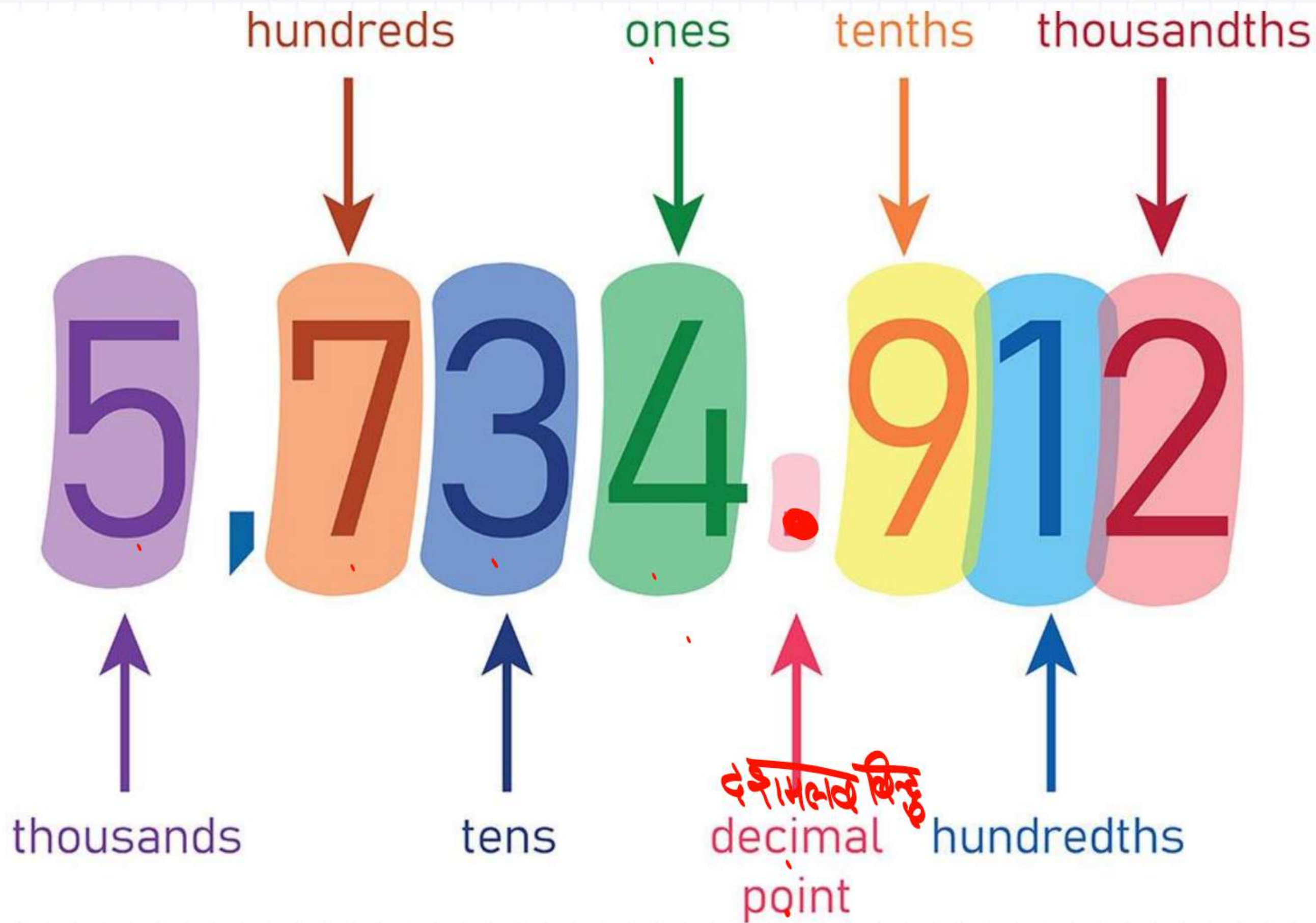
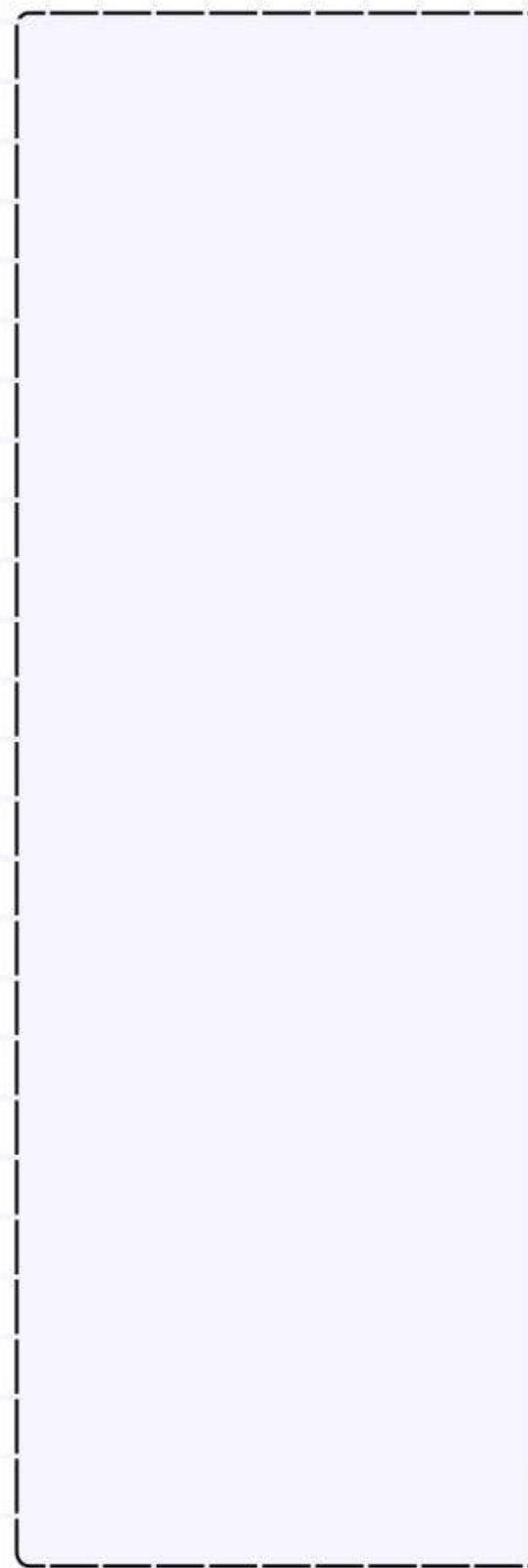


Rational Numbers (Fractions)



Rational Numbers (Decimals)





[illegible]

Even number

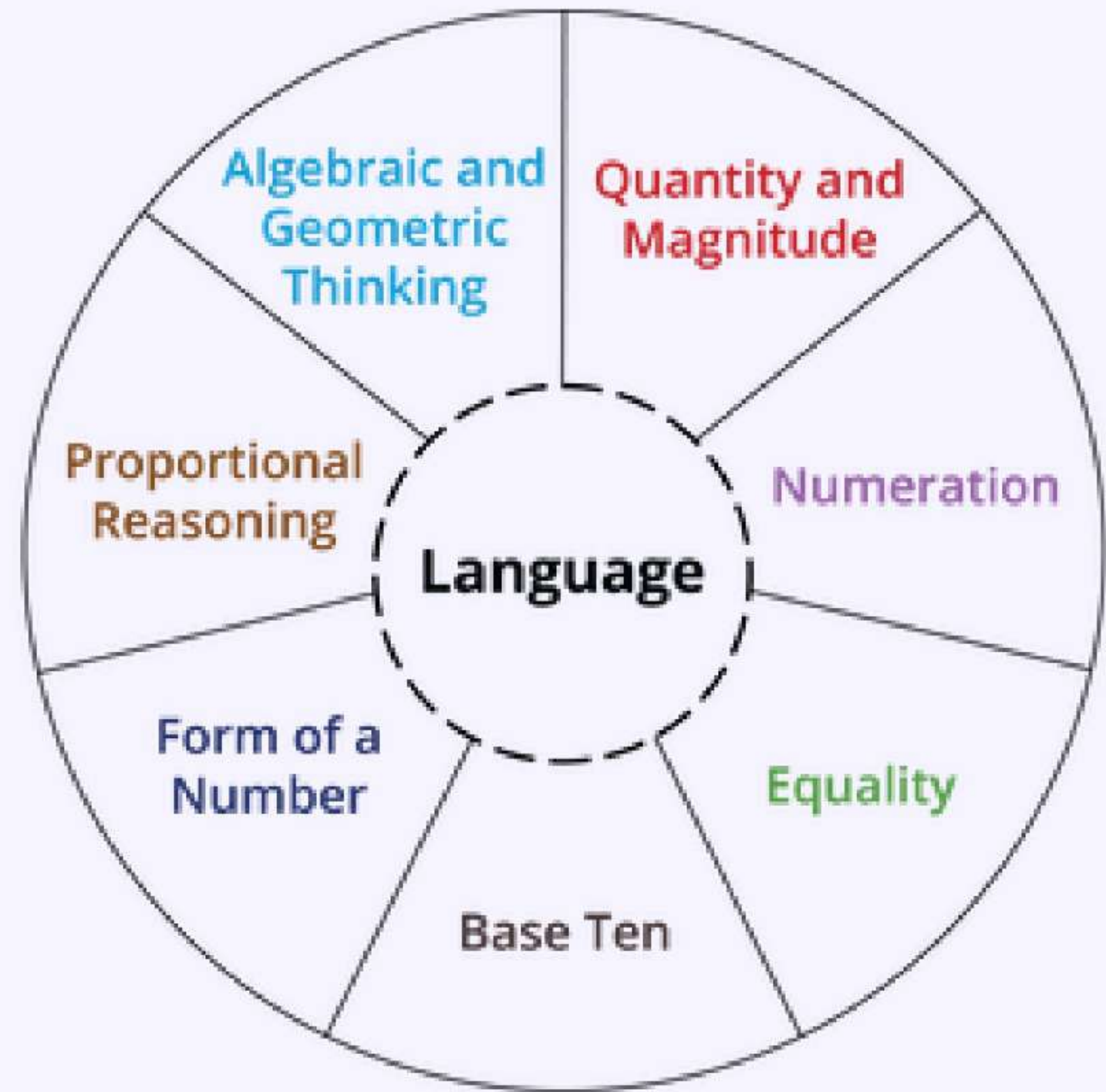
सम संख्याये ✓

0, 2, 4, 6, 8,

Odd number

विषम संख्याये ✓

1, 3, 5, 7, 9,



Components of Number Sense

Prime Number / અભાજ્ય સંખ્યાएं

Range	Number of Prime Numbers	List of Prime Numbers
<u>25</u> <u>1 to 100</u>	25 prime numbers	2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97
<u>101-200</u>	(21) અભાજ્ય prime numbers	101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199
201-300	16 prime numbers	211, 223, 227, 229, 233, 239, 241, 251, 257, 263, 269, 271, 277, 281, 283, 293
301-400	16 prime numbers	307, 311, 313, 317, 331, 337, 347, 349, 353, 359, 367, 373, 379, 383, 389, 397
401-500	17 prime numbers	401, 409, 419, 421, 431, 433, 439, 443, 449, 457, 461, 463, 467, 479, 487, 491, 499
501-600	14 prime numbers	503, 509, 521, 523, 541, 547, 557, 563, 569, 571, 577, 587, 593, 599
601-700	16 prime numbers	601, 607, 613, 617, 619, 631, 641, 643, 647, 653, 659, 661, 673, 677, 683, 691
701-800	14 prime numbers	701, 709, 719, 727, 733, 739, 743, 751, 757, 761, 769, 773, 787, 797
801-900	15 prime numbers	809, 811, 821, 823, 827, 829, 839, 853, 857, 859, 863, 877, 881, 883, 887
901-1000	14 prime numbers	907, 911, 919, 929, 937, 941, 947, 953, 967, 971, 977, 983, 991, 997

✓
173

✓
181

✗
169
132

prime
97
✓

✗
93
3×31

✗
87
3×29

Number Vision

1

Square (1-50)

1 to 60

Square	Value	Square	Value	Square	Value	Square	Value	Square	Value
1^2	1	11^2	121	21^2	441	31^2	961	41^2	1681
2^2	4	12^2	144	22^2	484	32^2	1024	42^2	1764
3^2	9	13^2	169	23^2	529	33^2	1089	43^2	1849
4^2	16	14^2	196	24^2	576	34^2	1156	44^2	1936
5^2	25	15^2	225	25^2	625	35^2	1225	45^2	2025
6^2	36	16^2	256	26^2	676	36^2	1296	46^2	2116
7^2	49	17^2	289	27^2	729	37^2	1369	47^2	2209
8^2	64	18^2	324	28^2	784	38^2	1444	48^2	2304
9^2	81	19^2	361	29^2	841	39^2	1521	49^2	2401
10^2	100	20^2	400	30^2	900	40^2	1600	50^2	2500

Square (51-100)

Square	Value	Square	Value	Square	Value	Square	Value	Square	Value
51^2	2601	61^2	3721	71^2	5041	81^2	6561	91^2	8281
52^2	2704	62^2	3844	72^2	5184	82^2	6724	92^2	8464
53^2	2809	63^2	3969	73^2	5329	83^2	6889	93^2	8649
54^2	2916	64^2	4096	74^2	5476	84^2	7056	94^2	8836
55^2	3025	65^2	4225	75^2	5625	85^2	7225	95^2	9025
56^2	3136	66^2	4356	76^2	5776	86^2	7396	96^2	9216
57^2	3249	67^2	4489	77^2	5929	87^2	7569	97^2	9409
58^2	3364	68^2	4624	78^2	6084	88^2	7744	98^2	9604
59^2	3481	69^2	4761	79^2	6241	89^2	7921	99^2	9801
60^2	3600	70^2	4900	80^2	6400	90^2	8100	100^2	10000

Techniques

100 के पास की संख्याएँ

$$\begin{array}{r|l}
 107^2 & 100 + \textcircled{7} \\
 \downarrow & \\
 \begin{array}{r} 107 \\ +7 \end{array} & 7^2 \\
 \hline
 114 & \boxed{49} \checkmark
 \end{array}$$

$$\begin{array}{r|l}
 102^2 & \\
 \begin{array}{r} 102 \\ +2 \end{array} & 2^2 \\
 \hline
 104 & \boxed{04} \\
 10404 \checkmark &
 \end{array}$$

$$\begin{array}{r|l}
 111^2 & \\
 \begin{array}{r} 111 \\ +11 \end{array} & 11^2 \\
 \hline
 122 & \boxed{121} \\
 +1 & \\
 \hline
 123 & \boxed{21} \checkmark
 \end{array}$$

1000 के पास Square

1003^2

$$(1000+3) \times 3$$

1003	3^2
+3	9
1006	009

1007^2

1007	7^2			
+7	49			
1014	<table border="1"><tr><td>0</td><td>4</td><td>9</td></tr></table>	0	4	9
0	4	9		

Cube (1-30)

Cube	Cube Value	Cube	Cube Value	Cube	Cube Value
1³	1	11³	1331	21³	9261
2³	8	12³	1728	22³	10648
3³	27	13³	2197	23³	12167
4³	64	14³	2744	24³	13824
5³	125	15³	3375	25³	15625
6³	216	16³	4096	26³	17576
7³	343	17³	4913	27³	19683
8³	512	18³	5832	28³	21952
9³	729	19³	6859	29³	24389
10³	1000	20³	8000	30³	27000

100 के पास के घन

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

आधार = 100

$x=5$

$100+5$

105^3

1	3x	3x ²	x ³	
1	3x5	3x5 ²	5 ³	
1	15	75	125	
		76	25	

→ 1157625 ✓

$x=9$

109^3

1	3x9	3x9 ²	9 ³	
1	27	243	729	
	29	50	29	

→ 1295029

$$10 \mid^3 \quad \textcircled{x=1}$$

1	3×1	3×1^2	1^3	
1	$\bigcirc 3$	$\bigcirc 3$	$\bigcirc 1$	✓

$$103 \mid^3 \quad \textcircled{x=3}$$

1	3×3	3×3^2	3^3
1	$\underline{09}$	$\underline{27}$	$\underline{27}$

$$119 \mid^3$$

1	3×19	3×19^2	19^3				
1		3×361					
	57	1083	6859				
	$\underline{68}$	$\underline{1051}$					
<table border="0" style="width: 100%;"> <tr> <td>1</td> <td>68</td> <td>51</td> <td>59</td> </tr> </table>				1	68	51	59
1	68	51	59				

1000 के पास के घन

1003^3

1	$3 \times$	$3 \times^2$	$\times^3$
	3×3	3×3^2	3^3
1	9	27	27
1	009	027	<u>027</u> ✓

$999^3 (1000-1)^3$