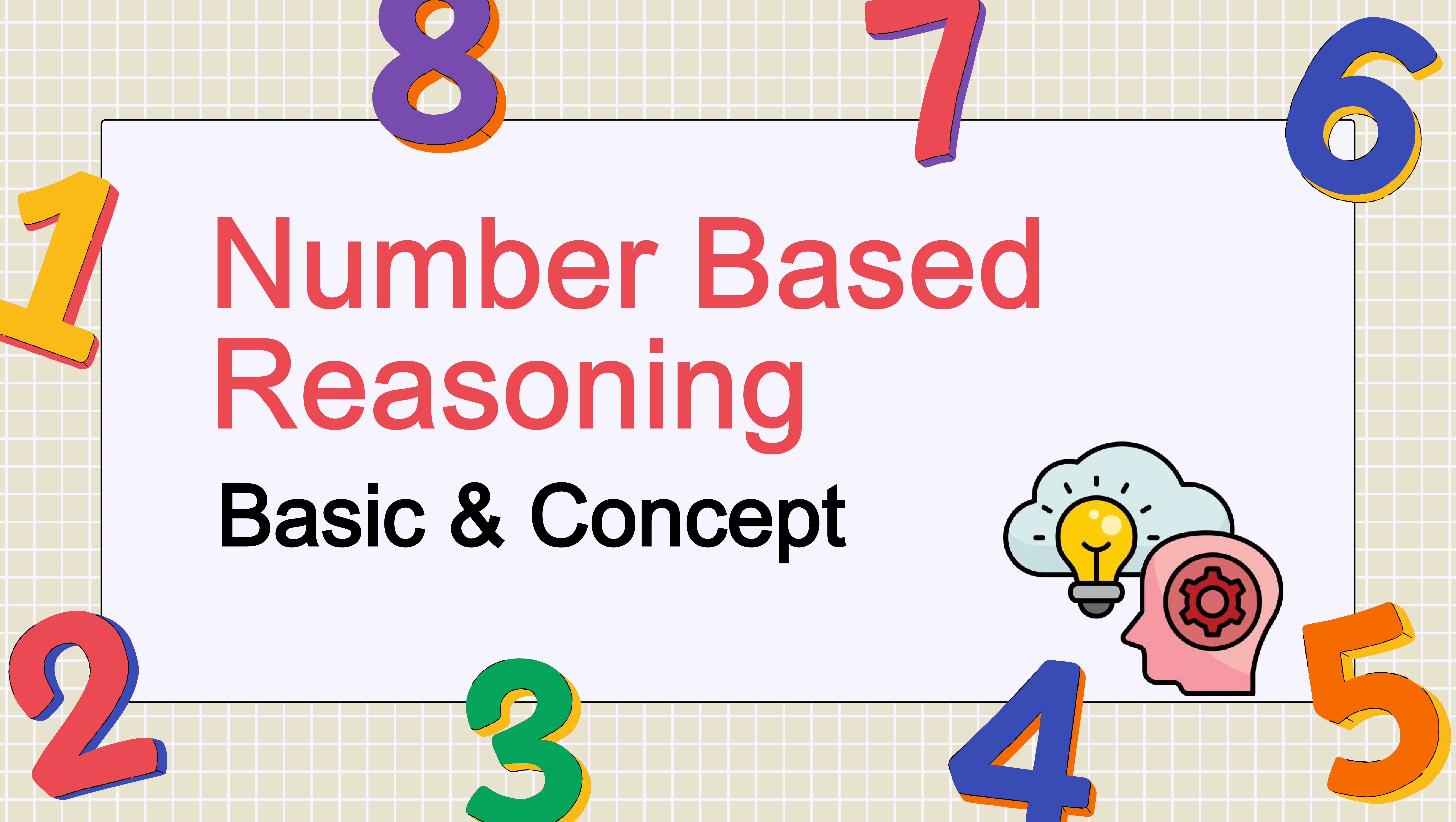




Number Based Reasoning

Basic & Concept

1

4

9

16

Topics based on Number based Reasoning

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

2

3

4

6

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

(A) 64 (B) 52

(C) 60 (D) 70

(C) 38 (D) 42

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

(A) 21 (B) 20

(A) 79 (B) 80

(C) 23 (D) 24

(C) 81 (D) 82

Number Analogy Reasoning

Q1. $4 : 12 :: 5 : ?$

Q3. $6 : 18 :: 18 : ?$

(A) 25

(B) 20

(A) 19

(B) 32

(C) 22

(D) 30

(C) 16

(D) 24

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

(A) 275

(B) 225

(A) 16

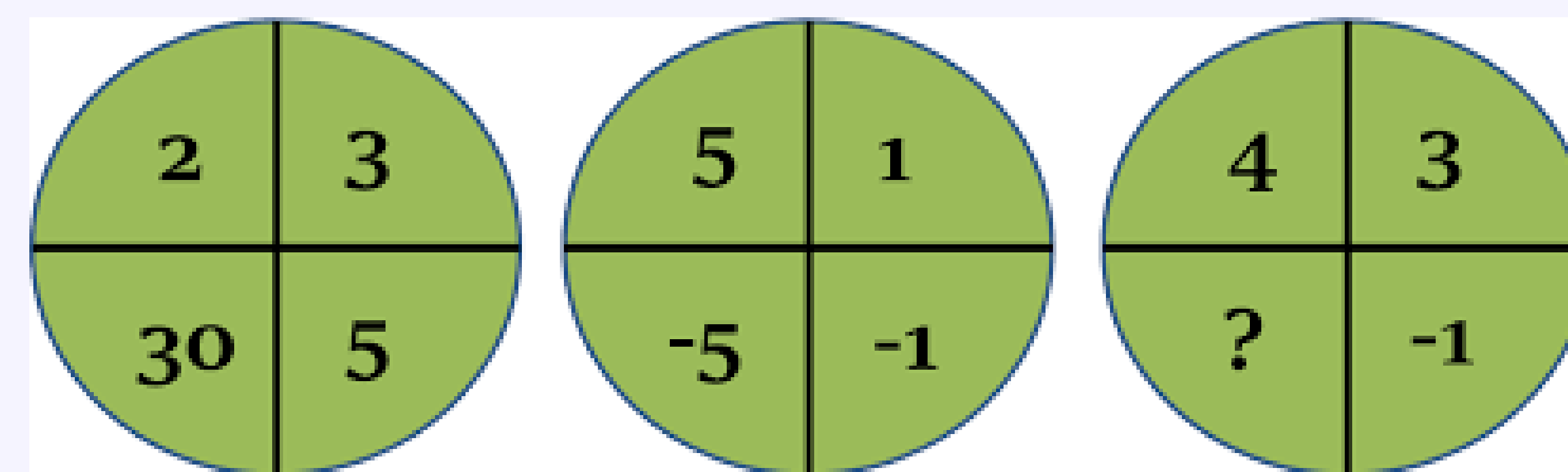
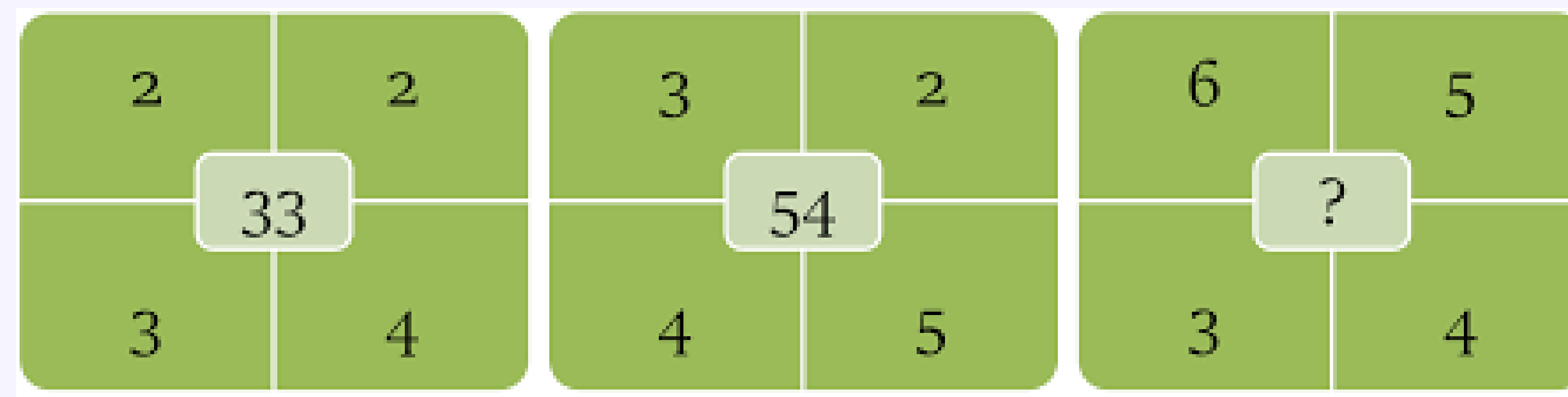
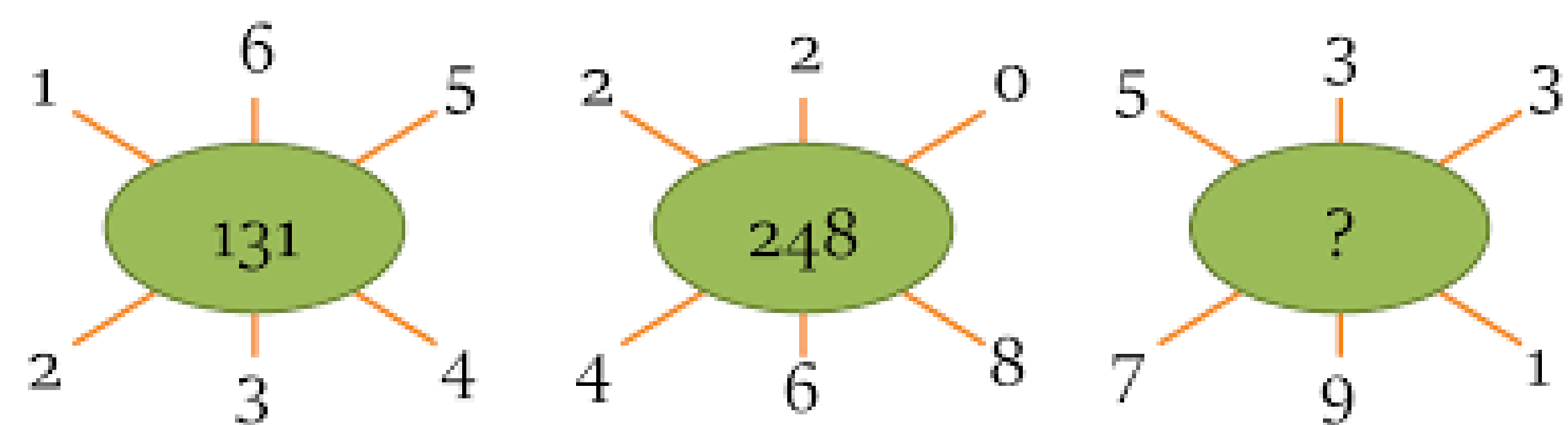
(B) 64

(C) 305

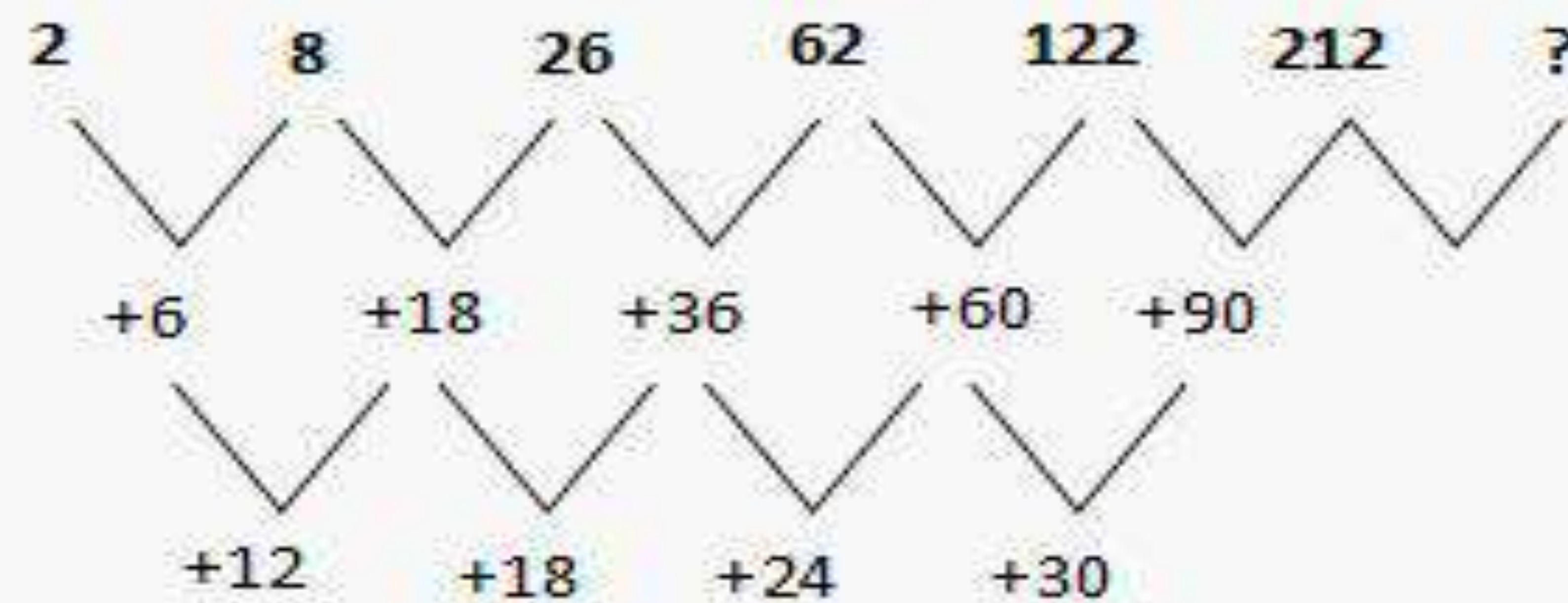
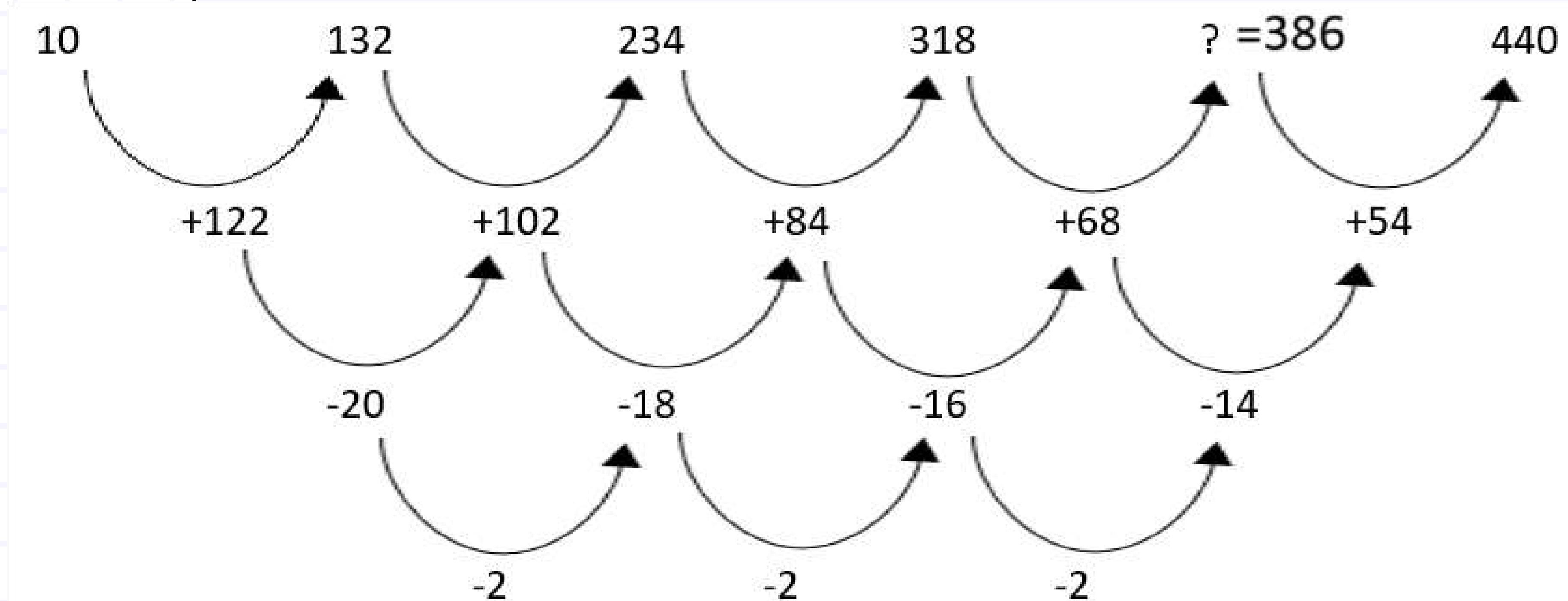
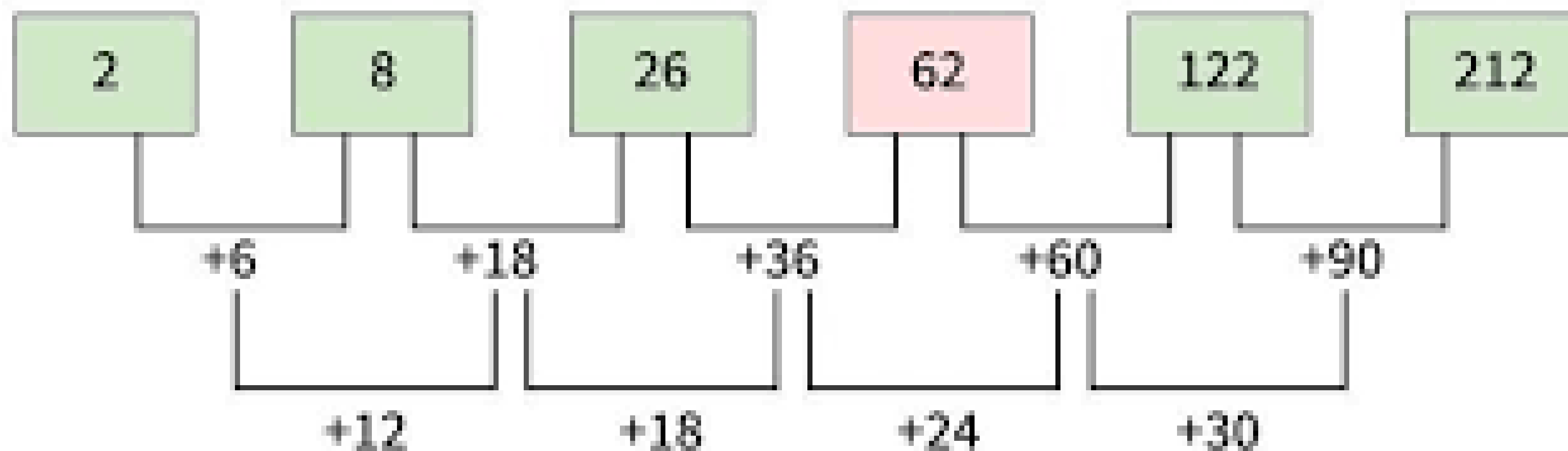
(D) 256

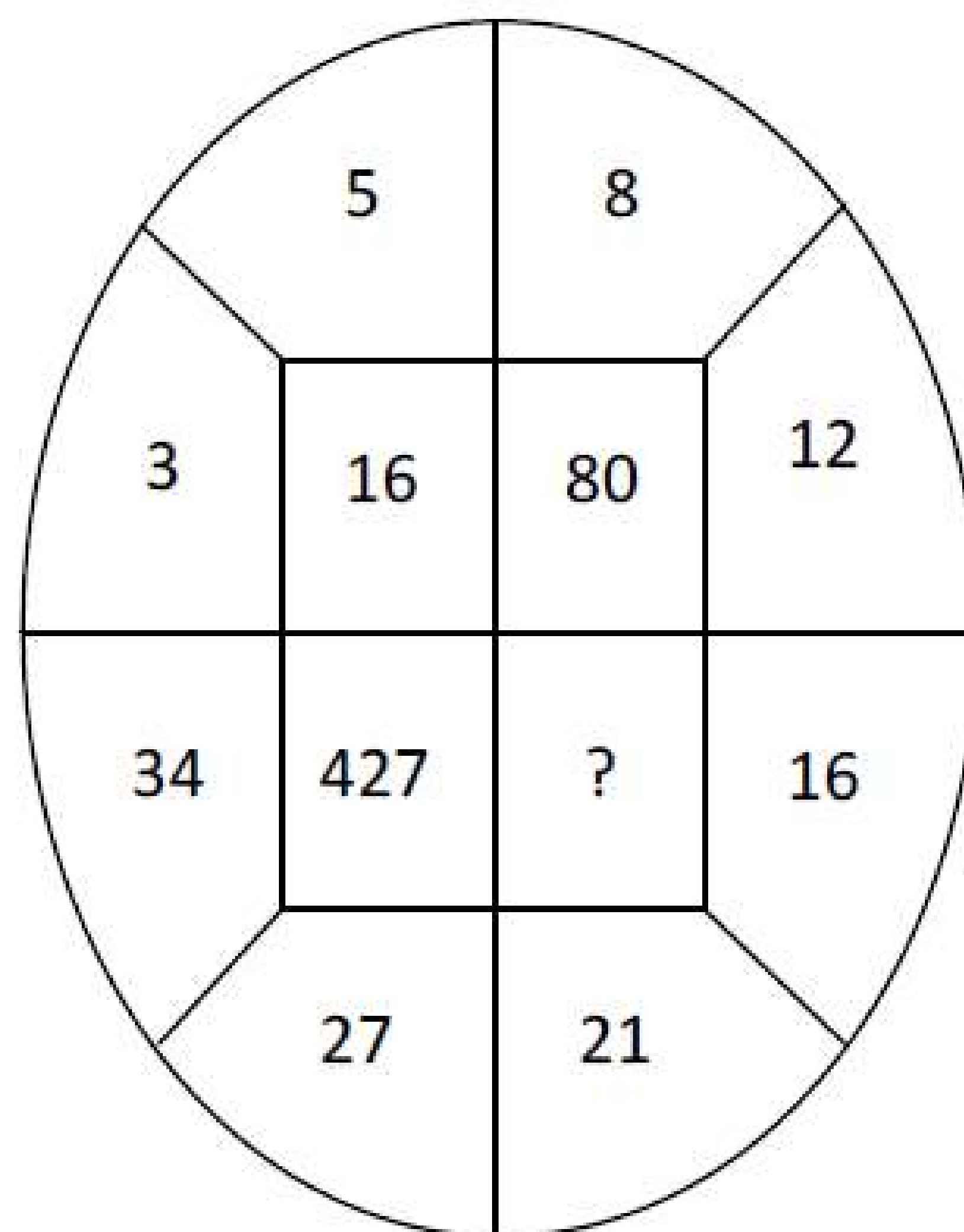
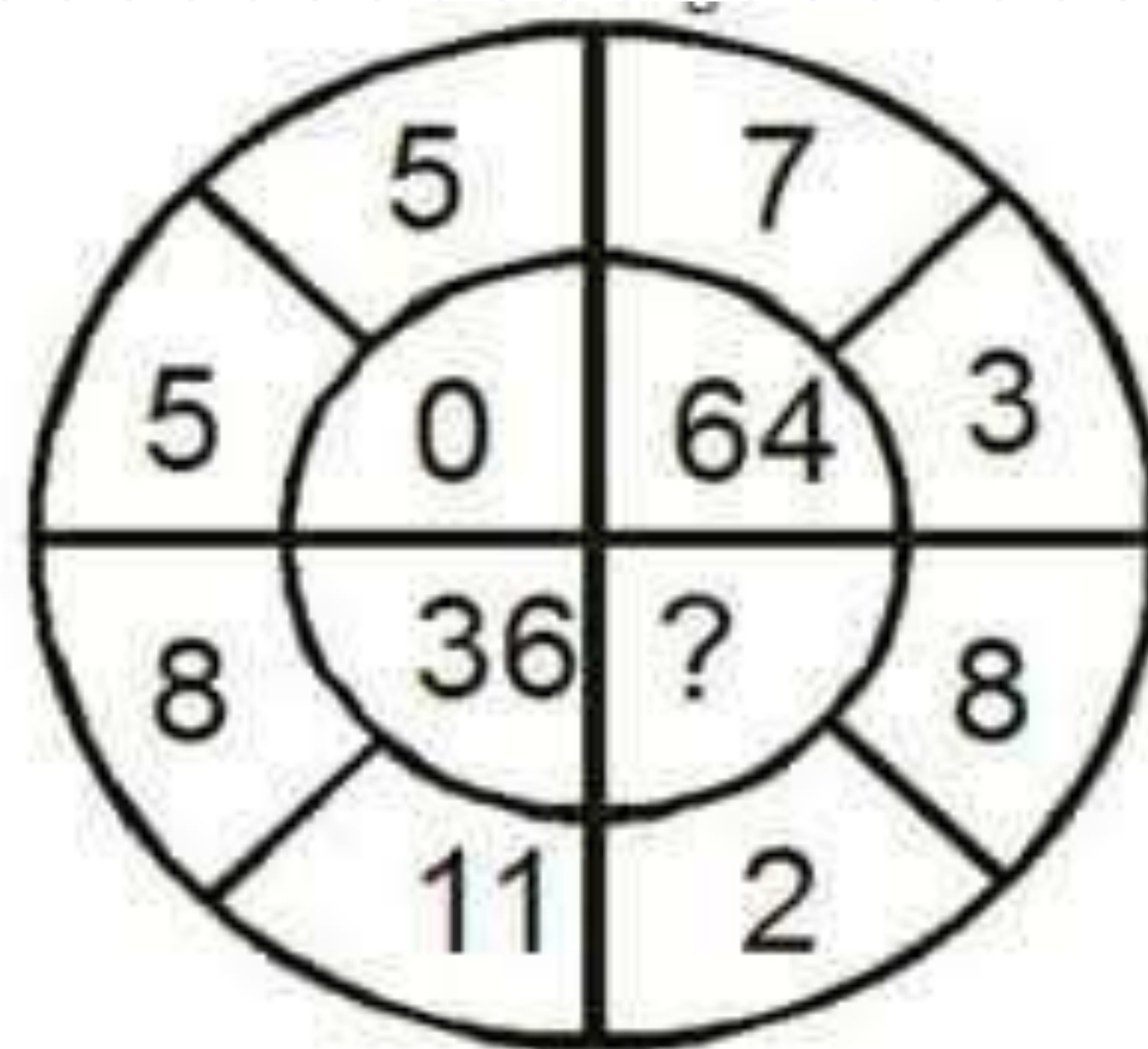
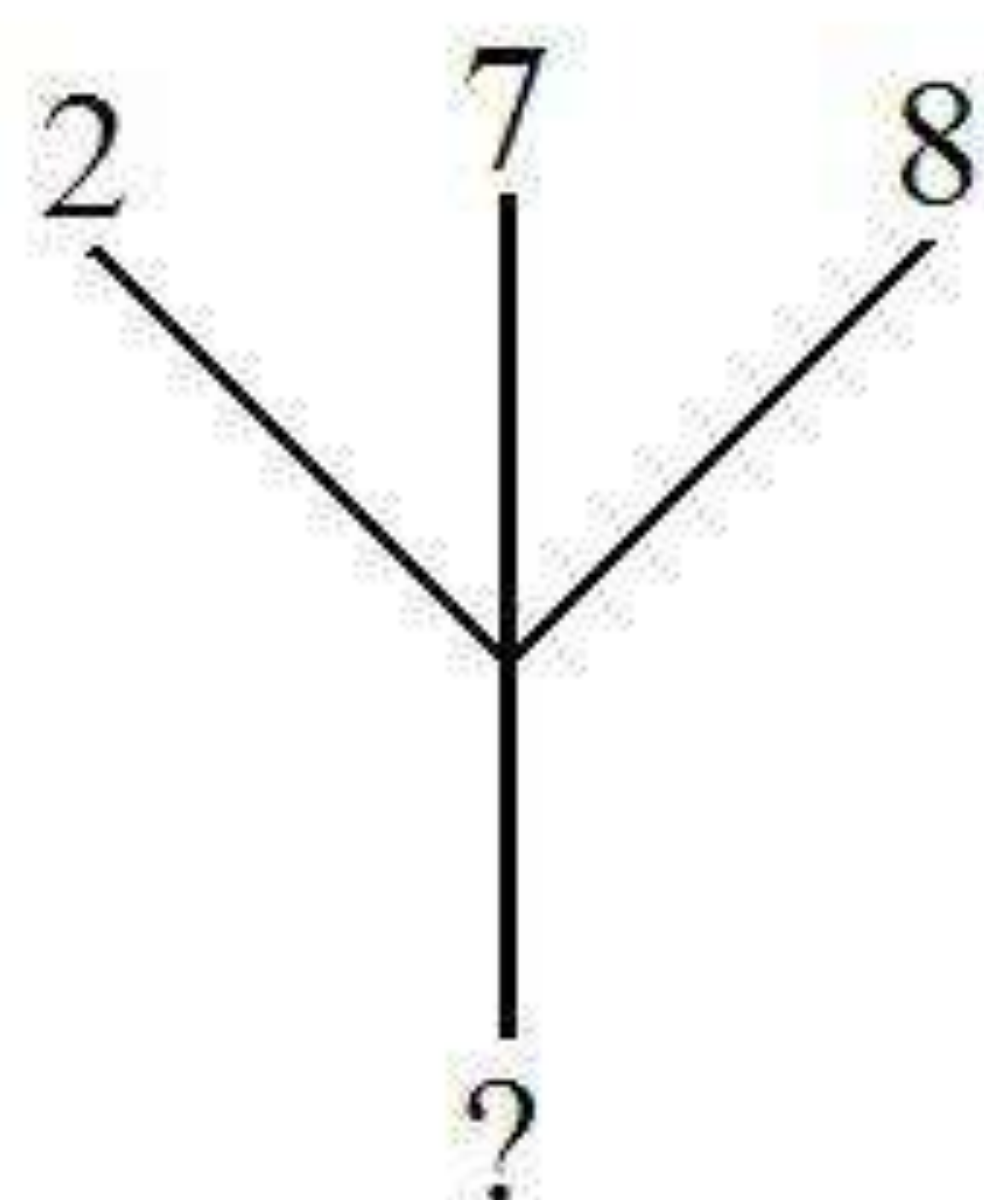
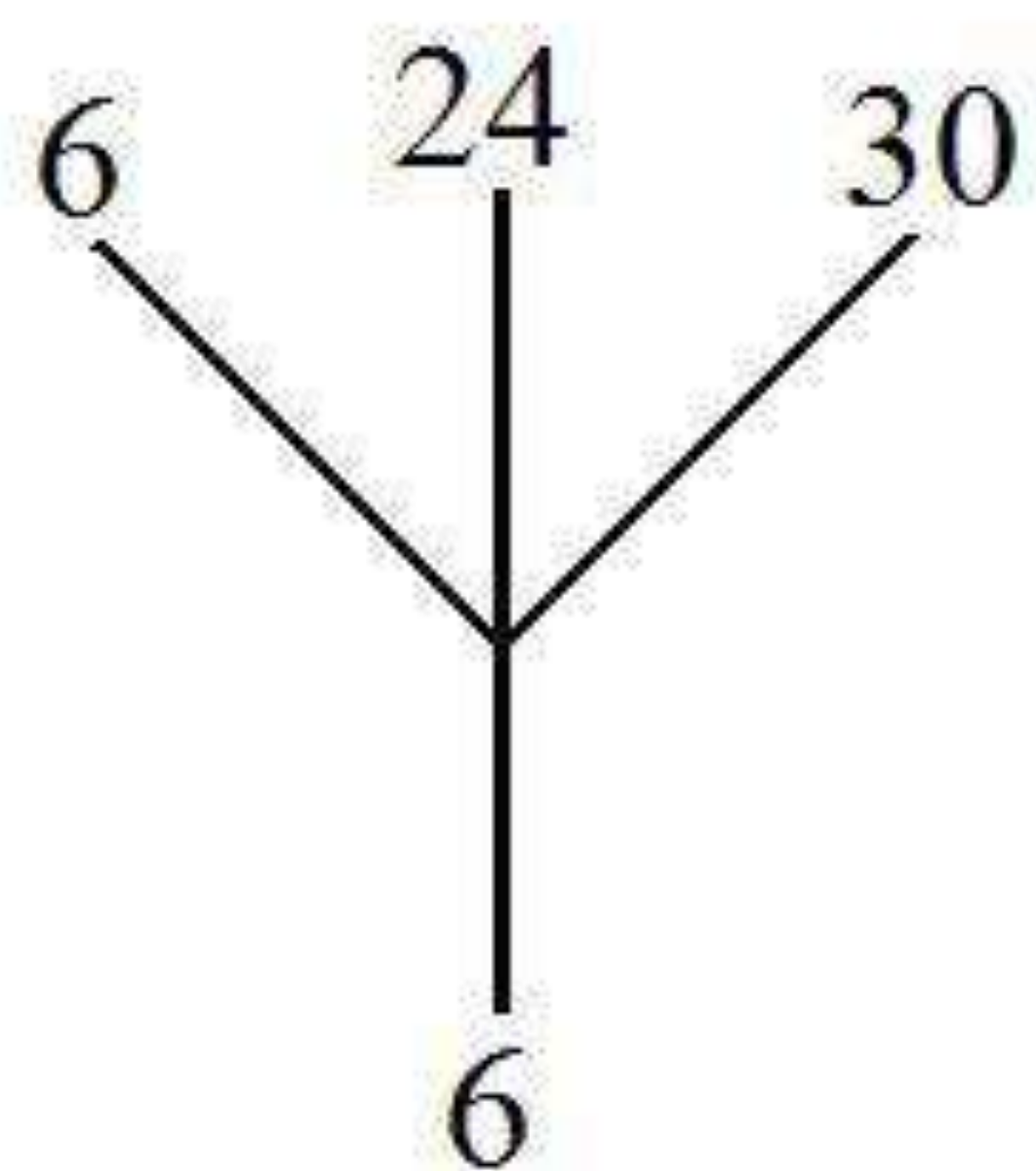
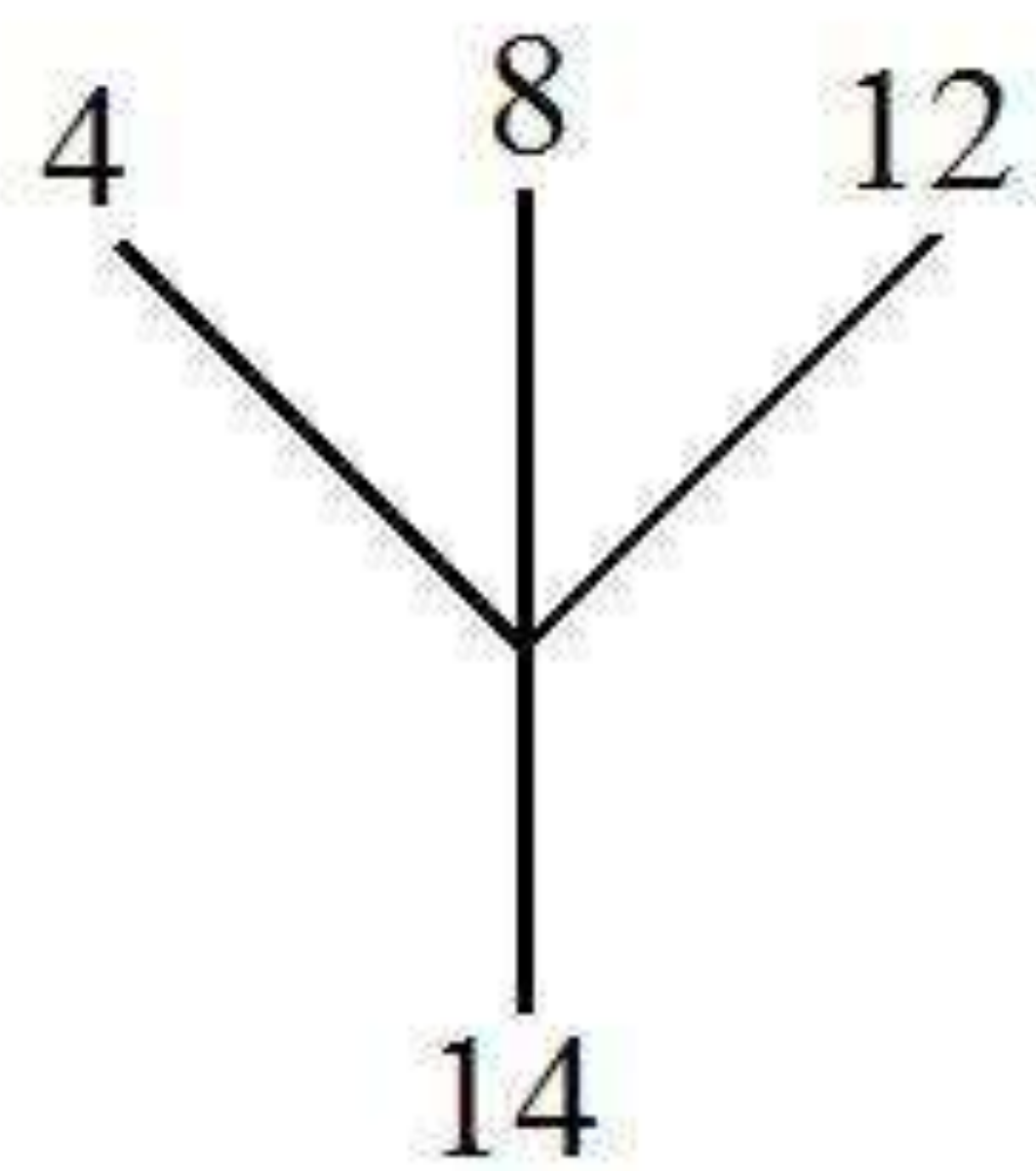
(C) 88

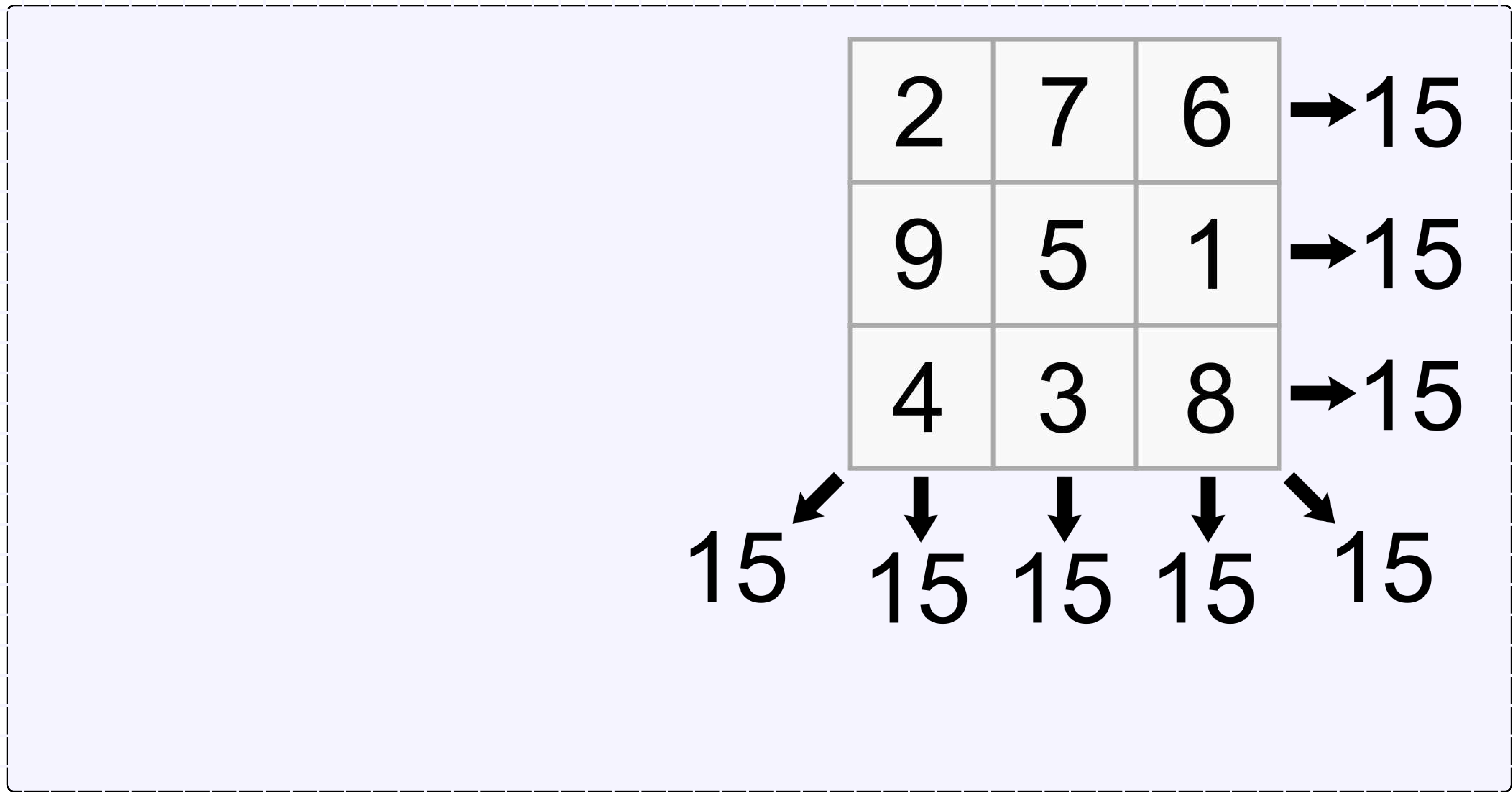
(D) 72



MISSING TERM SERIES:







Mathematical Operations

B = Bracket ()

O = Of

D = Division [÷]

M = Multiplication [x]

A = Addition [+]

S = Subtraction [-]

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

+ means ÷

÷ → ×

× → -

- → +

$$(1) 18 \div 6 \div 7 \div 5 \times 2 = 20$$

$$(2) 18 \div 6 \div 7 \times 5 \div 2 = 18$$

$$(3) 18 \times 6 \div 7 \div 5 \div 2 = 16$$

$$(4) 18 \div 6 \times 7 \div 5 \div 2 = 22$$

B

O

D

M

A

S

Brackets
(...)

Orders
powers,
roots

Division
÷

Multiplication
×

Addition
+

Subtraction
—

Mathematical Operations

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

$$1. +, \div, \times, -, =$$

$$2. -, +, \times, \div, =$$

$$3. +, -, \times, \div, =$$

$$4. -, \times, +, \div, =$$



Do First

Do Last

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

1

4

9

16

Topics based on Number based Reasoning

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

2

3

4

6

Basic Number knowledge

This information is useful for covering the
topics

ऊपर दिए गए विषयों के लिए आवश्यक है

Number Classification (संख्या वर्गीकरण)

1
Real (वास्तविक)

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

complex (सम्मिश्र)
(a + ib)

Eg : 5 + ui

(काल्पनिक)

$i = \sqrt{-1}$ (आयोग)

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

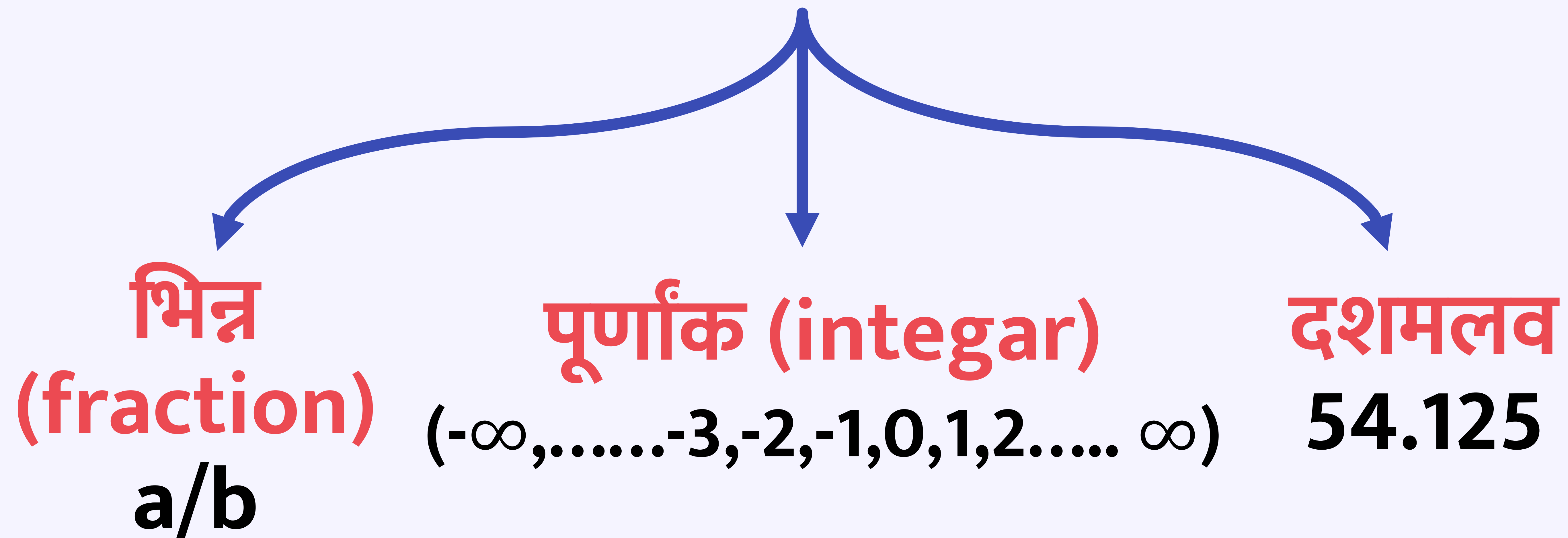
↔ **परिमेय (Rational Number) : p/q**

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 : $\frac{3}{5}$ ($a < b$)

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

Whole Number

(पूर्ण संख्याएं)

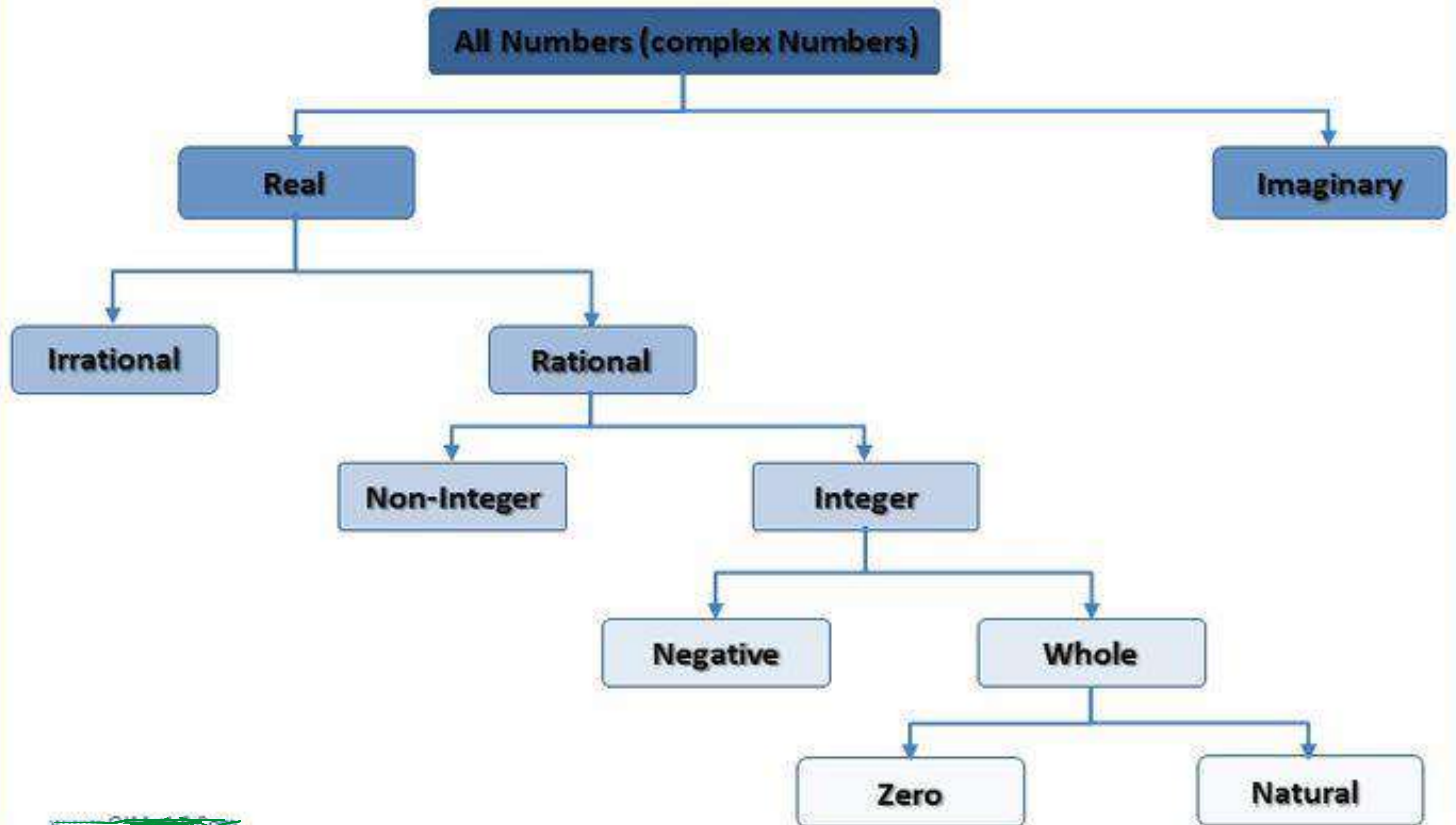
$(0, 1, 2, 3, \dots, \infty)$

Natural Number

(प्राकृत संख्याएं)

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

Number Classification



Real Numbers

Rational Numbers

9.454545...

$\frac{7}{8}$

-3.4

$\frac{2}{3}$

Integers

$\sqrt{49}$

-2

+9

$\frac{3}{4}$

-5

Whole Numbers

{0,1,2,3...}

0

Natural Numbers

{1,2,3...}

Irrational Numbers

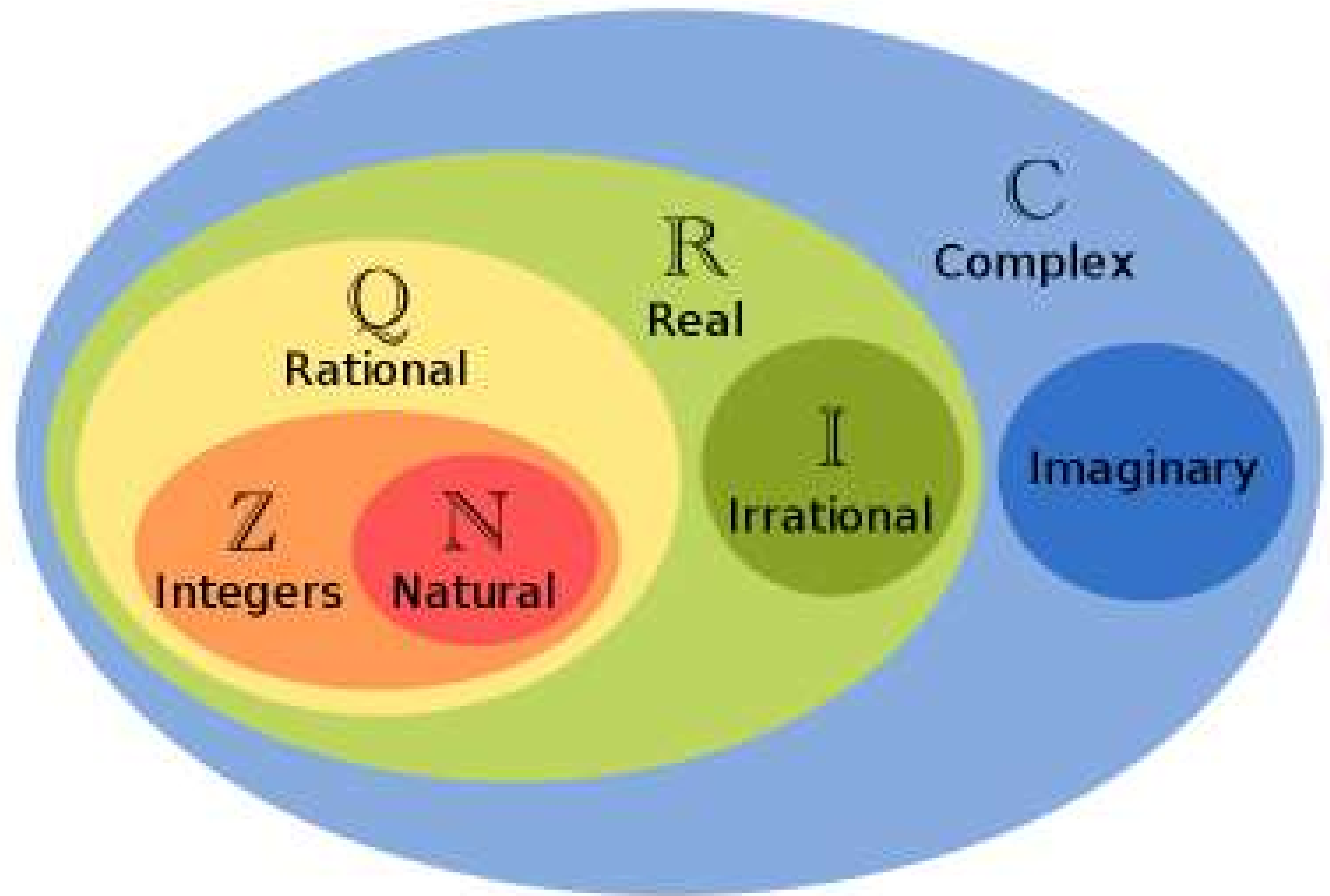
$\sqrt{10}$

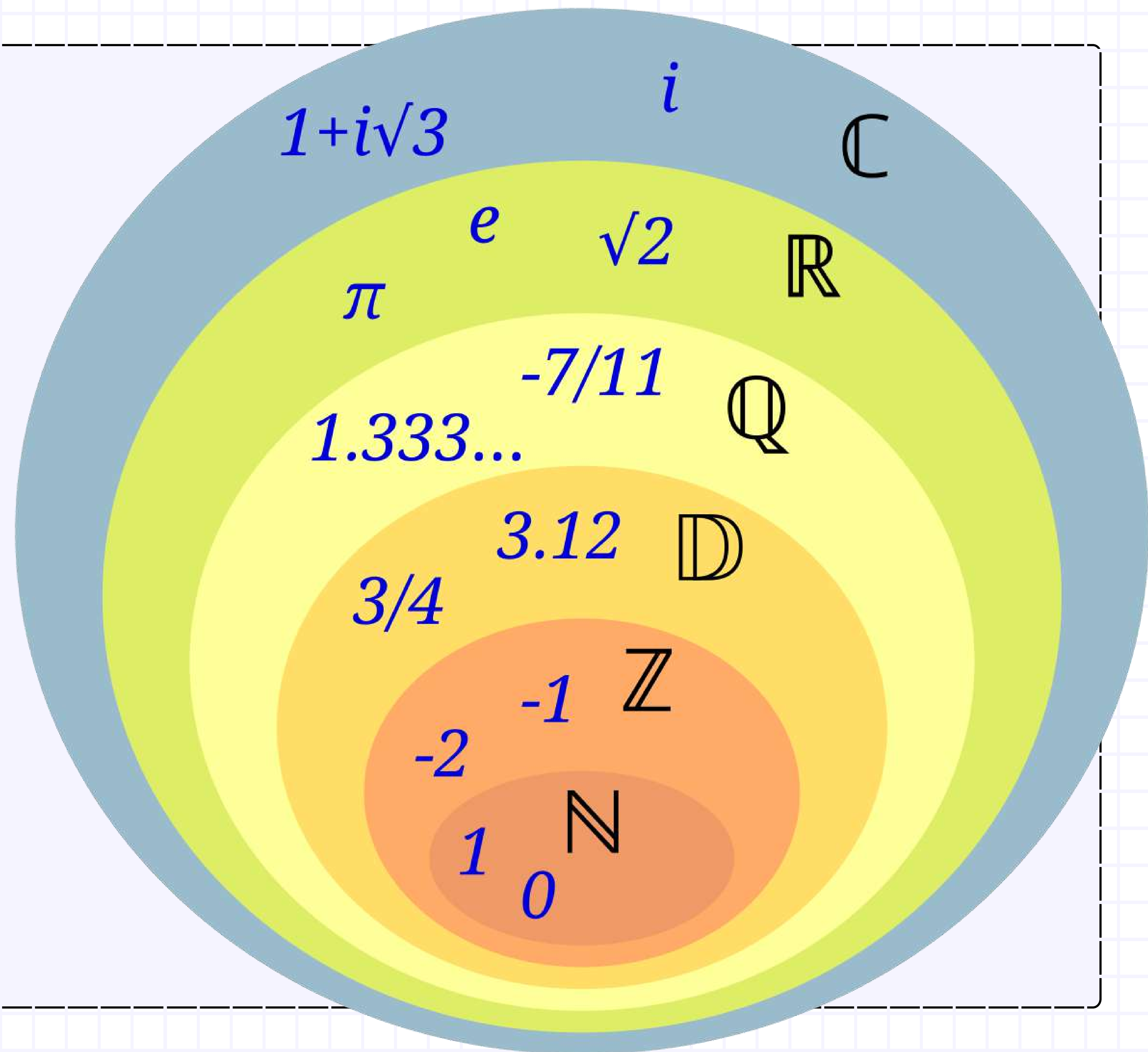
$\sqrt{2}$

π

$\sqrt{3}$

1.2434871...





Number Classification

All Numbers (Complex Numbers)

Real

Imaginary

Imaginary number

Irrational

A real number that can not be written as a fraction

π

Non-Integer

A decimal or a fraction

0.125

$\frac{2}{5}$

Rational

Integer

Negative

A whole number that is negative

..., -4, -3, -2, -1

Whole

Zero

The number zero

0

Natural

All positive number

1, 2, 3, 4

0, 1, 2, 3, 4

All positive and negative number

..., -4, -3, -2, -1, 0, 1, 2, 3, 4, ...

0.125

-0.125

$\frac{2}{5}$

$-\frac{2}{5}$

..., -4, -3, -2, -1, 0, 1, 2, 3, 4, ...

π

0.125

-0.125

$\frac{2}{5}$

$-\frac{2}{5}$

..., -4, -3, -2, -1, 0, 1, 2, 3, 4, ...

π

0.125

-0.125

$\frac{2}{5}$

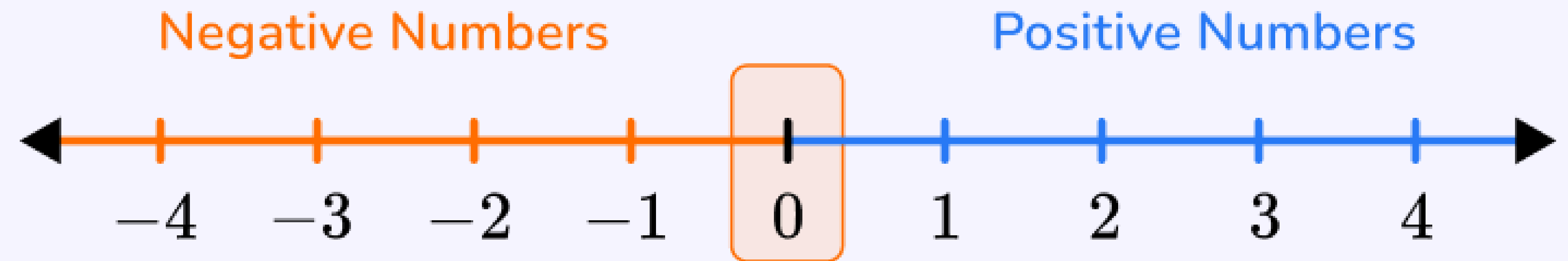
$-\frac{2}{5}$

..., -4, -3, -2, -1, 0, 1, 2, 3, 4, ...

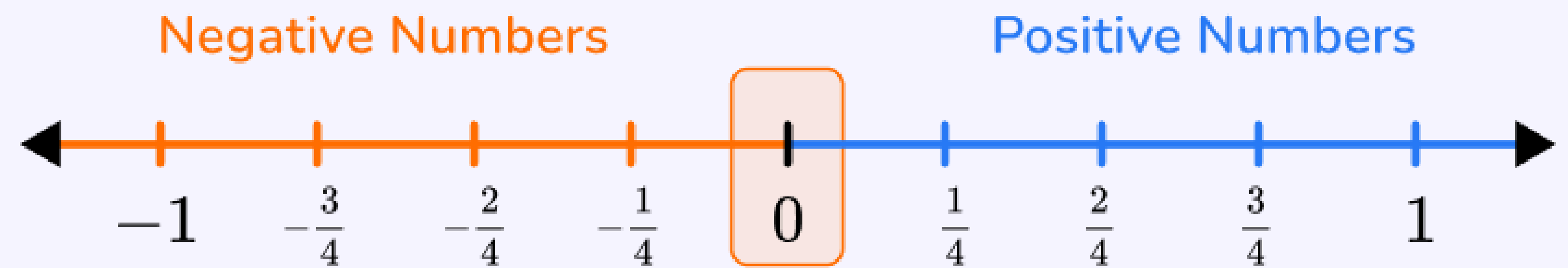
$\sqrt{-1} = i$

$\sqrt{-1} = i$

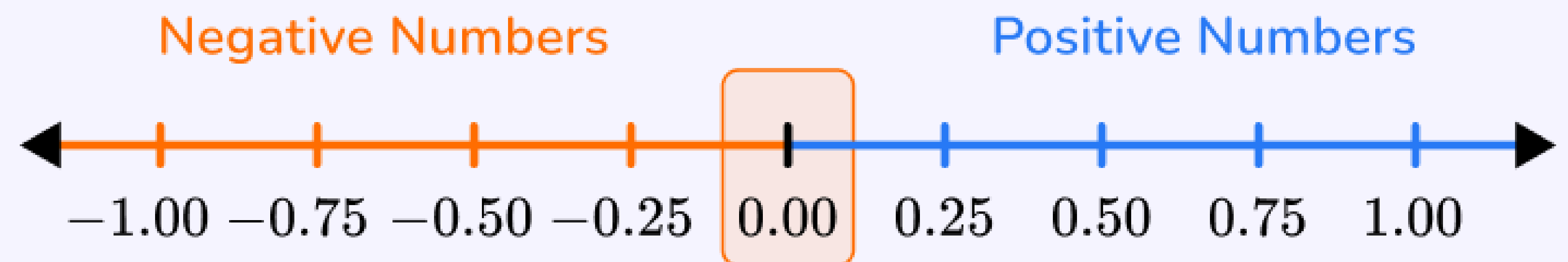
Integers

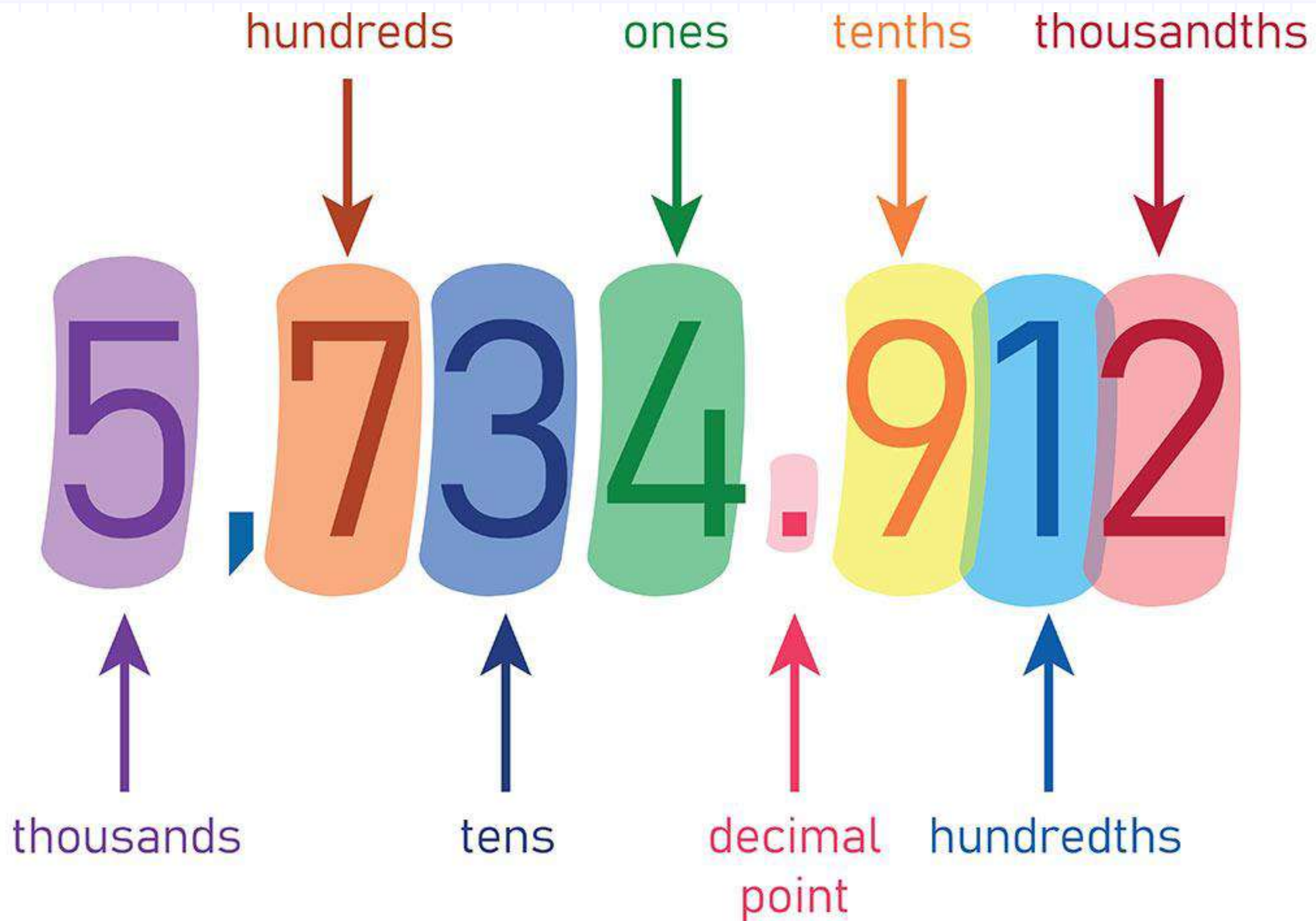
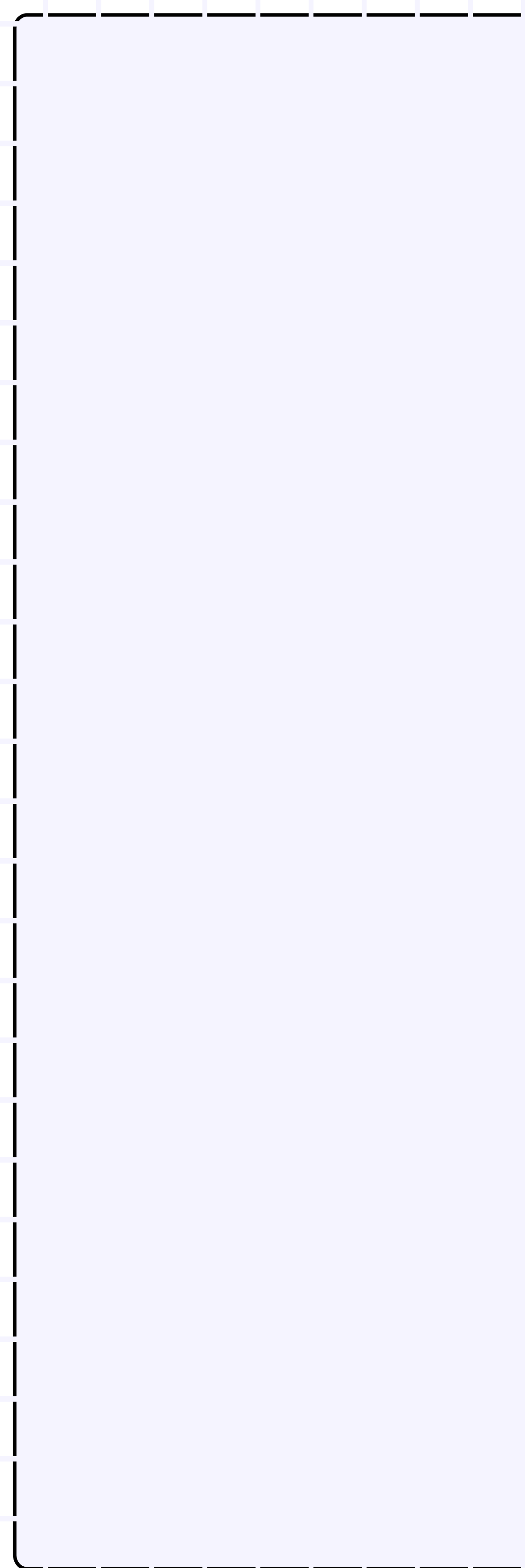


Rational Numbers (Fractions)



Rational Numbers (Decimals)





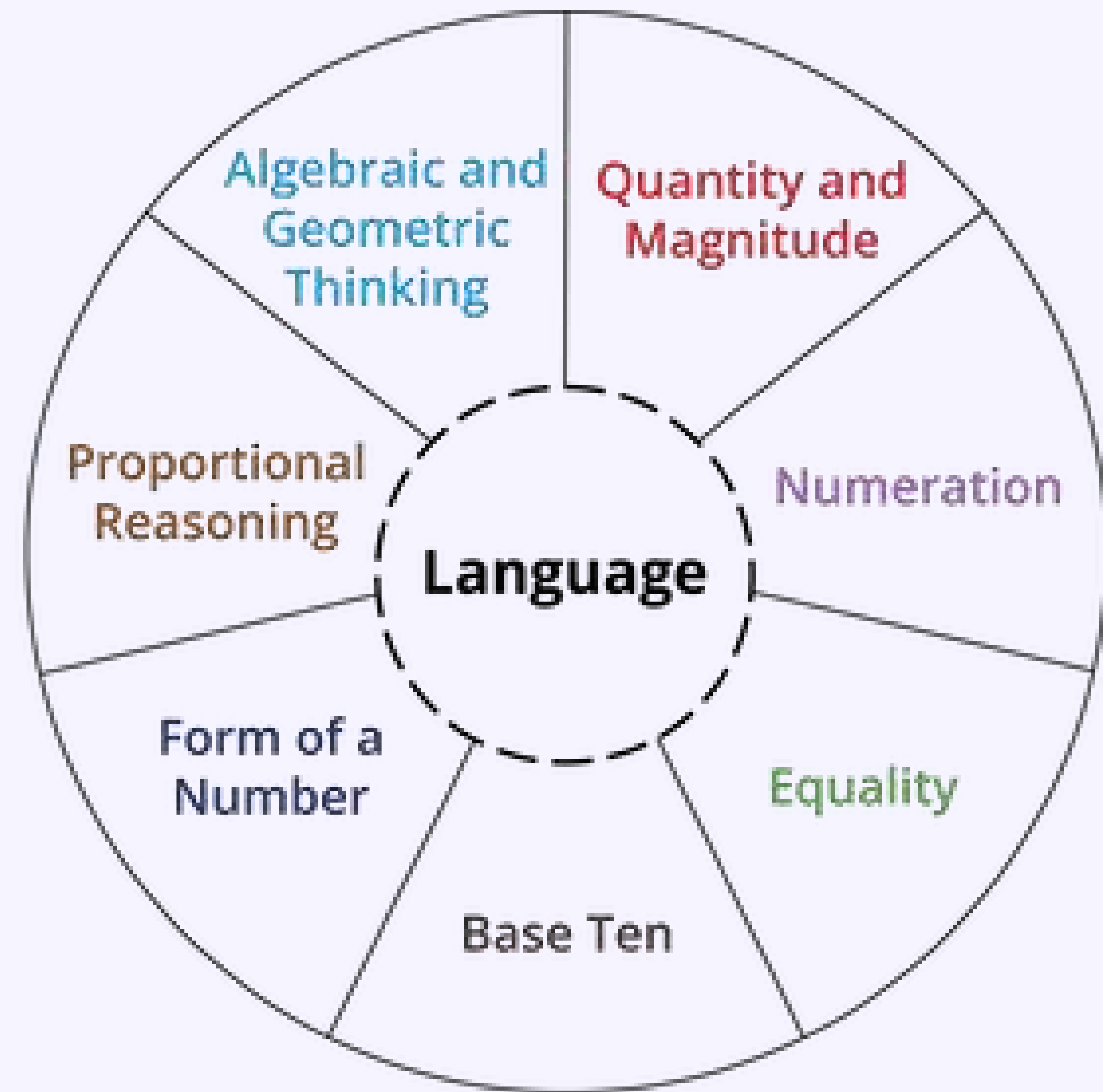
[illegible]

Even number
सम संख्याये

0, 2, 4, 6

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
1 to 100	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
101–200	21 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



Square (1-50)

Square	Value	Square	Value	Square	Value	Square	Value	Square	Value
1²	1	11²	121	21²	441	31²	961	41²	1681
2²	4	12²	144	22²	484	32²	1024	42²	1764
3²	9	13²	169	23²	529	33²	1089	43²	1849
4²	16	14²	196	24²	576	34²	1156	44²	1936
5²	25	15²	225	25²	625	35²	1225	45²	2025
6²	36	16²	256	26²	676	36²	1296	46²	2116
7²	49	17²	289	27²	729	37²	1369	47²	2209
8²	64	18²	324	28²	784	38²	1444	48²	2304
9²	81	19²	361	29²	841	39²	1521	49²	2401
10²	100	20²	400	30²	900	40²	1600	50²	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



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



Powers

2	$2^2 = 4$	$2^3 = 8$	$2^4 = 16$	$2^5 = 32$	$2^6 = 64$	$2^7 = 128$	$2^8 = 256$	$2^9 = 512$
3	$3^2 = 9$	$3^3 = 27$	$3^4 = 81$	$3^5 = 243$	$3^6 = 729$	$3^7 = 2187$	$3^8 = 15309$	$3^9 = 45927$
4	$4^2 = 16$	$4^3 = 64$	$4^4 = 256$	$4^5 = 1024$	$4^6 = 4096$	$4^7 = 16384$	$4^8 = 65536$	$4^9 = 262144$
5	$5^2 = 25$	$5^3 = 125$	$5^4 = 625$	$5^5 = 3125$	$5^6 = 15625$	$5^7 = 78125$	$5^8 = 390625$	$5^9 = 1953125$
6	$6^2 = 36$	$6^3 = 216$	$6^4 = 1296$	$6^5 = 7776$				
7	$7^2 = 49$	$7^3 = 343$	$7^4 = 2401$	$7^5 = 16807$				
8	$8^2 = 64$	$8^3 = 512$	$8^4 = 4096$	$8^5 = 32768$				
9	$9^2 = 81$	$9^3 = 729$	$9^4 = 6561$	$9^5 = 59049$				

Triplet

$x \times \frac{1}{2}$ (Times $\frac{1}{2}$)	Pythagorean Triples	$\times 2$ (Times 2)	$\times 3$ (Times 3)	$\times 4$ (Times 4)
1.5 – 2 – 2.5	3 – 4 – 5	6 – 8 – 10	9 – 12 – 15	12 – 16 – 20
2.5 – 6.5 – 6.5	5 – 12 – 13	10 – 24 – 26	15 – 36 – 39	20 – 48 – 52
3.5 – 12 – 12.5	7 – 24 – 25	14 – 48 – 50	21 – 72 – 75	28 – 96 – 100
4.5 – 20 – 20.5	9 – 40 – 41	18 – 80 – 82	27 – 120 – 123	36 – 160 – 164
5.5 – 30 – 30.5	11 – 60 – 61	22 – 120 – 122	33 – 180 – 183	44 – 240 – 244

(25, 312, 313)	(27, 364, 365)	(8, 15, 17)	(7, 24, 25)
(20, 21, 29)	(12, 35, 37)	(9, 40, 41)	(28, 45, 53)
(11, 60, 61)	(16, 63, 65)	(33, 56, 65)	(48, 55, 73)
(13, 84, 85)	(36, 77, 85)	(39, 80, 89)	(65, 72, 97)
(20, 99, 101)	(60, 91, 109)	(15, 112, 113)	(44, 117, 125)
(88, 105, 137)	(17, 144, 145)	(24, 143, 145)	(51, 140, 149)
(85, 132, 157)	(119, 120, 169)	(52, 165, 173)	(19, 180, 181)
(57, 176, 185)	(104, 153, 185)	(95, 168, 193)	(28, 195, 197)
(84, 187, 205)	(133, 156, 205)	(21, 220, 221)	(140, 171, 221)
(60, 221, 229)	(105, 208, 233)	(120, 209, 241)	(32, 455, 257)
(23, 264, 265)	(96, 247, 265)	(69, 260, 269)	(115, 252, 277)

Table of 2	Table of 3	Table of 4	Table of 5	Table of 6	Table of 7	Table of 8	Table of 9	Table of 10
2	3	4	5	6	7	8	9	10
4	6	8	10	12	14	16	18	20
6	9	12	15	18	21	24	27	30
8	12	16	20	24	28	32	36	40
10	15	20	25	30	35	40	45	50
12	18	24	30	36	42	48	54	60
14	21	28	35	42	49	56	63	70
16	24	32	40	48	56	64	72	80
18	27	36	45	54	63	72	81	90
20	30	40	50	60	70	80	90	100

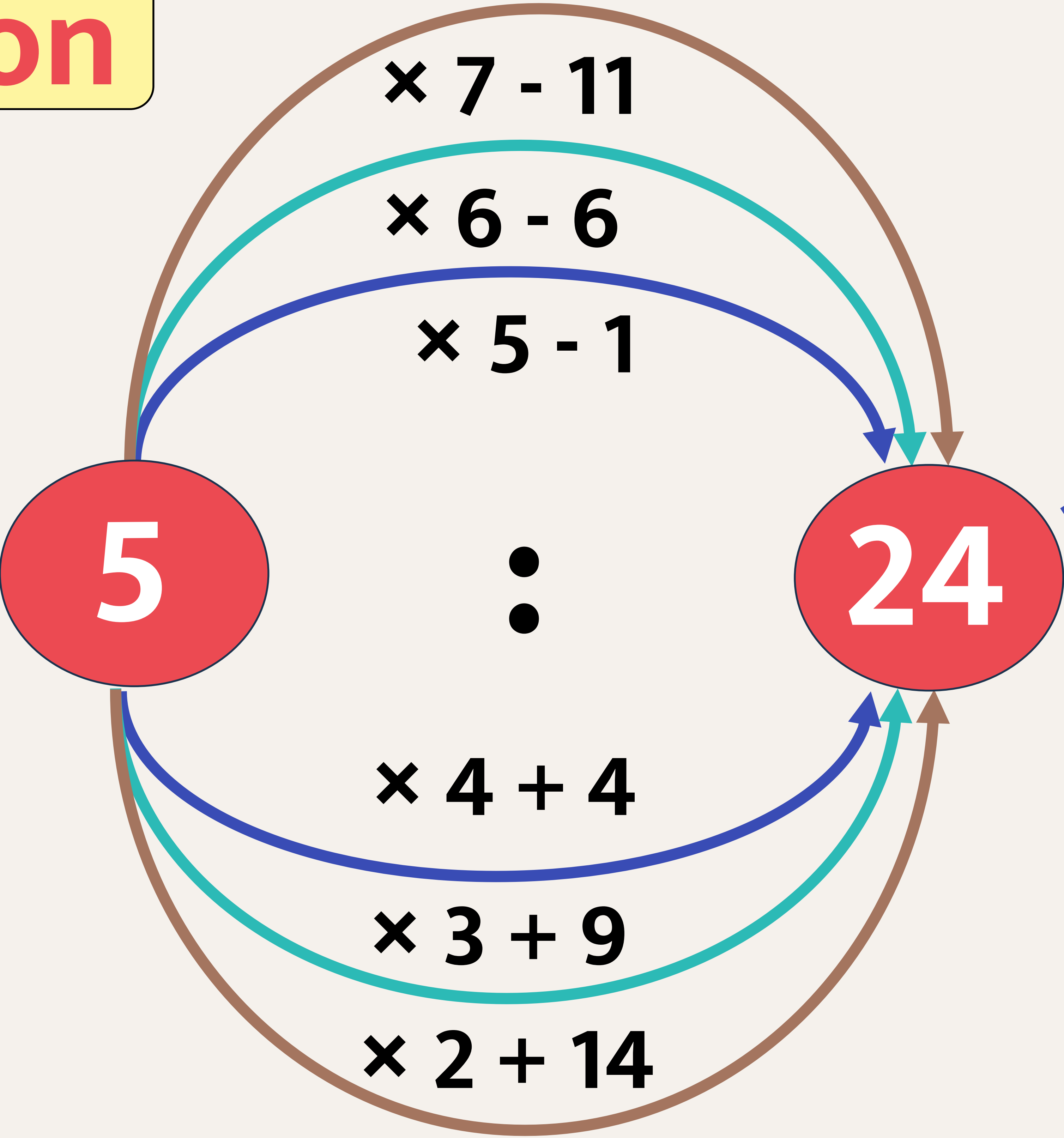
Table of 11	Table of 12	Table of 13	Table of 14	Table of 15	Table of 16	Table of 17	Table of 18	Table of 19	Table of 20
11	12	13	14	15	16	17	18	19	20
22	24	26	28	30	32	34	36	38	40
33	36	39	42	45	48	51	54	57	60
44	48	52	56	60	64	68	72	76	80
55	60	65	70	75	80	85	90	95	100
66	72	78	84	90	96	102	108	114	120
77	84	91	98	105	112	119	126	133	140
88	96	104	112	120	128	136	144	152	160
99	108	117	126	135	144	153	162	171	180
110	120	130	140	150	160	170	180	190	200

Table of 21	Table of 22	Table of 23	Table of 24	Table of 25	Table of 26	Table of 27	Table of 28	Table of 29	Table of 30
21	22	23	24	25	26	27	28	29	30
42	44	46	48	50	52	54	56	58	60
63	66	69	72	75	78	81	84	87	90
84	88	92	96	100	104	108	112	116	120
105	110	115	120	125	130	135	140	145	150
126	132	138	144	150	156	162	168	174	180
147	154	161	168	175	182	189	196	203	210
168	176	184	192	200	208	216	224	232	240
189	198	207	216	225	234	243	252	261	270
210	220	230	240	250	260	270	280	290	300

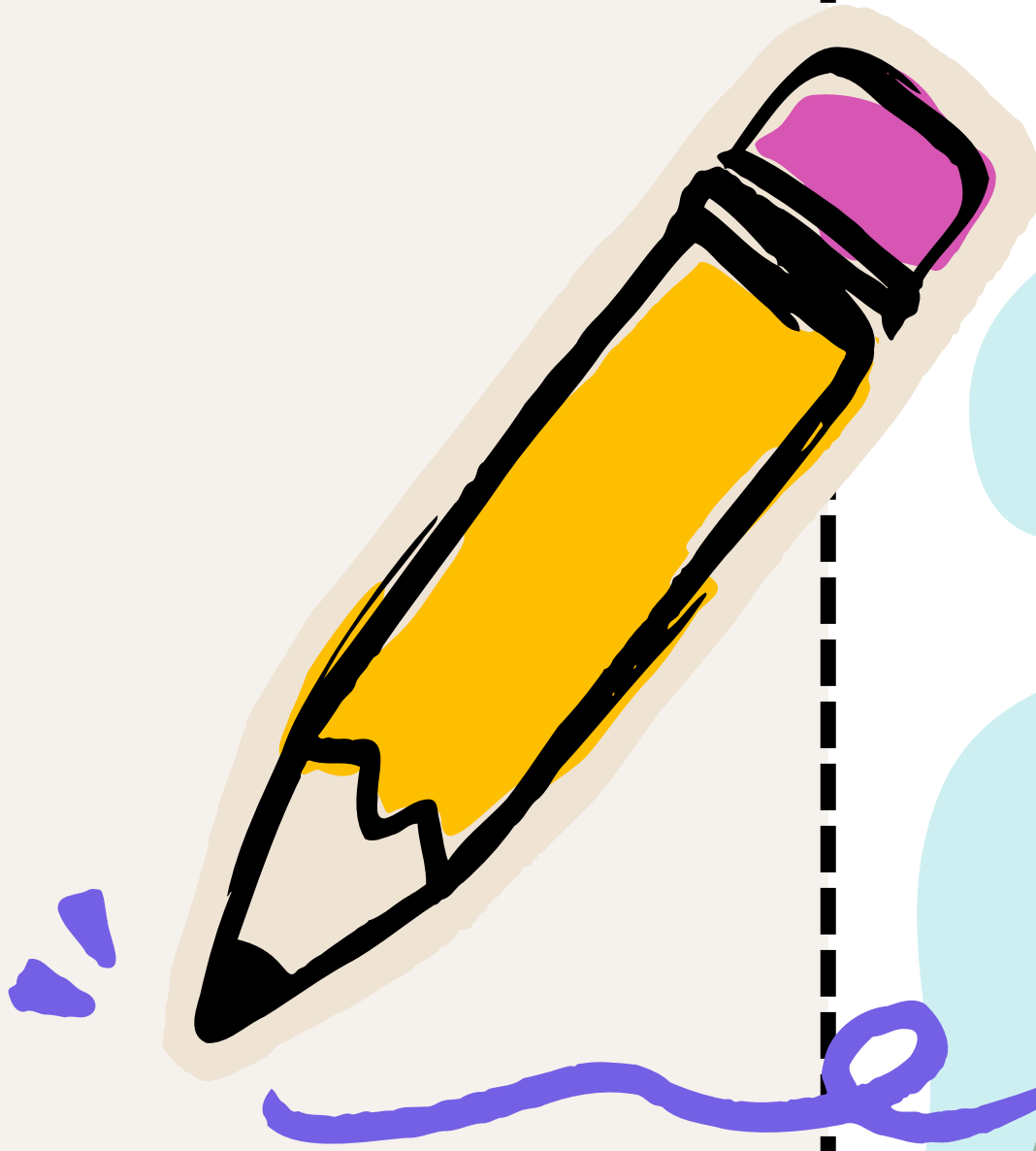
Table of 31	Table of 32	Table of 33	Table of 34	Table of 35	Table of 36	Table of 37	Table of 38	Table of 39	Table of 40
31	32	33	34	35	36	37	38	39	40
62	64	66	68	70	72	74	76	78	80
93	96	99	102	105	108	111	114	117	120
124	128	132	136	140	144	148	152	156	160
155	160	165	170	175	180	185	190	195	200
186	192	198	204	210	216	222	228	234	240
217	224	231	238	245	252	259	266	273	280
248	256	264	272	280	288	296	304	312	320
279	288	297	306	315	324	333	342	351	360
310	320	330	340	350	360	370	380	390	400

Table of 41	Table of 42	Table of 43	Table of 44	Table of 45	Table of 46	Table of 47	Table of 48	Table of 49	Table of 50
41	42	43	44	45	46	47	48	49	50
82	84	86	88	90	92	94	96	98	100
123	126	129	132	135	138	141	144	147	150
164	168	172	176	180	184	188	192	196	200
205	210	215	220	225	230	235	240	245	250
246	252	258	264	270	276	282	288	294	300
287	294	301	308	315	322	329	336	343	350
328	336	344	352	360	368	376	384	392	400
369	378	387	396	405	414	423	432	441	450
410	420	430	440	450	460	470	480	490	500

Relation



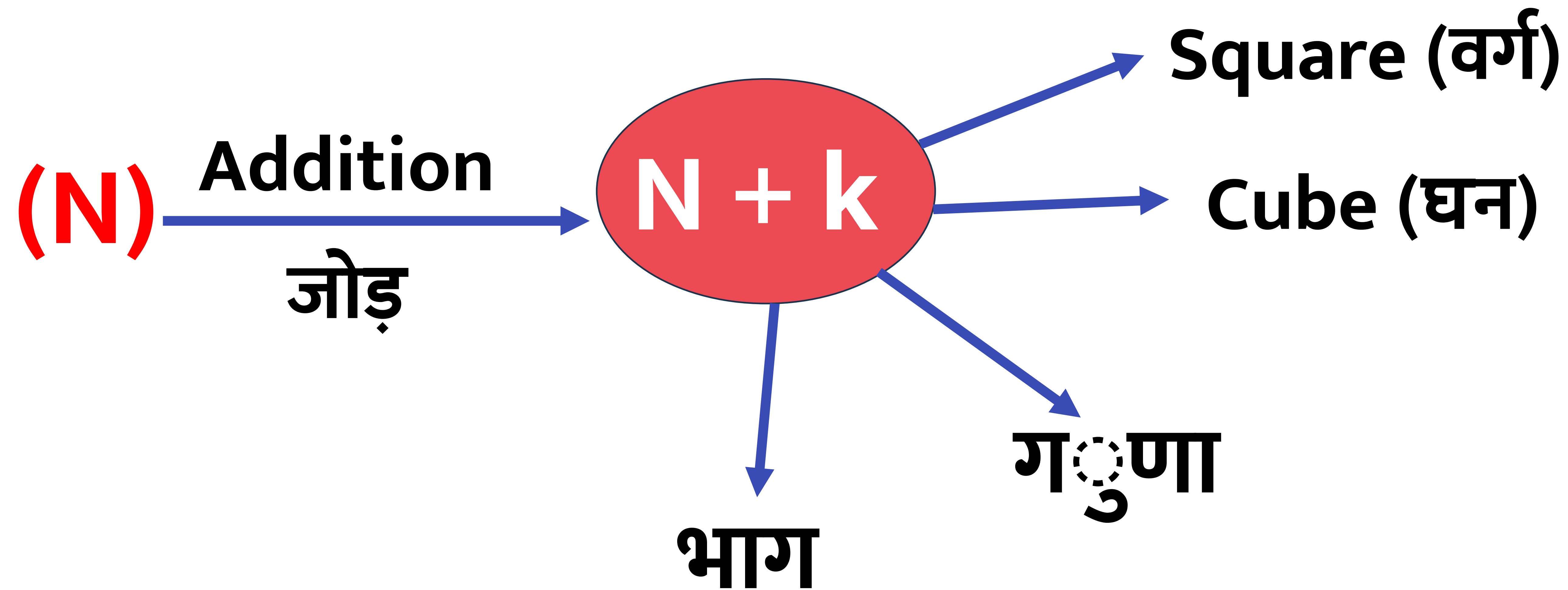
$5^2 - 1 = 24$



Relation

Number $\rightarrow (N)$

(1) Addition / Subtraction (जोड़ / घटाव)



Example

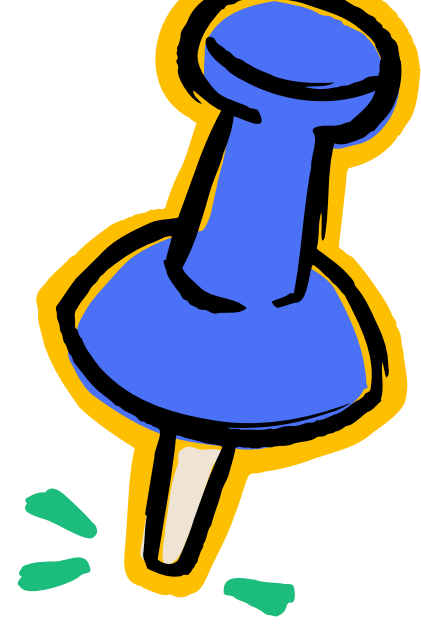
$$8 \xrightarrow{+2} 10$$

$$(10)^2 + 2 = 102$$

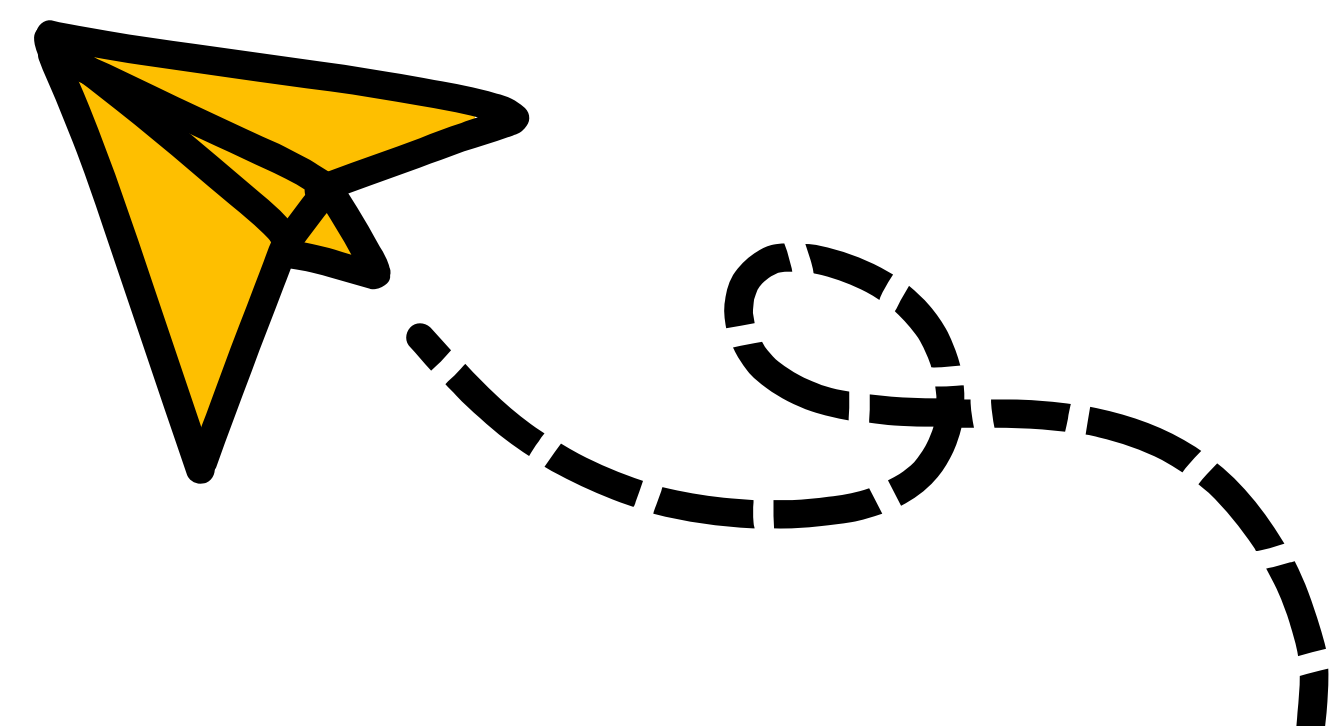
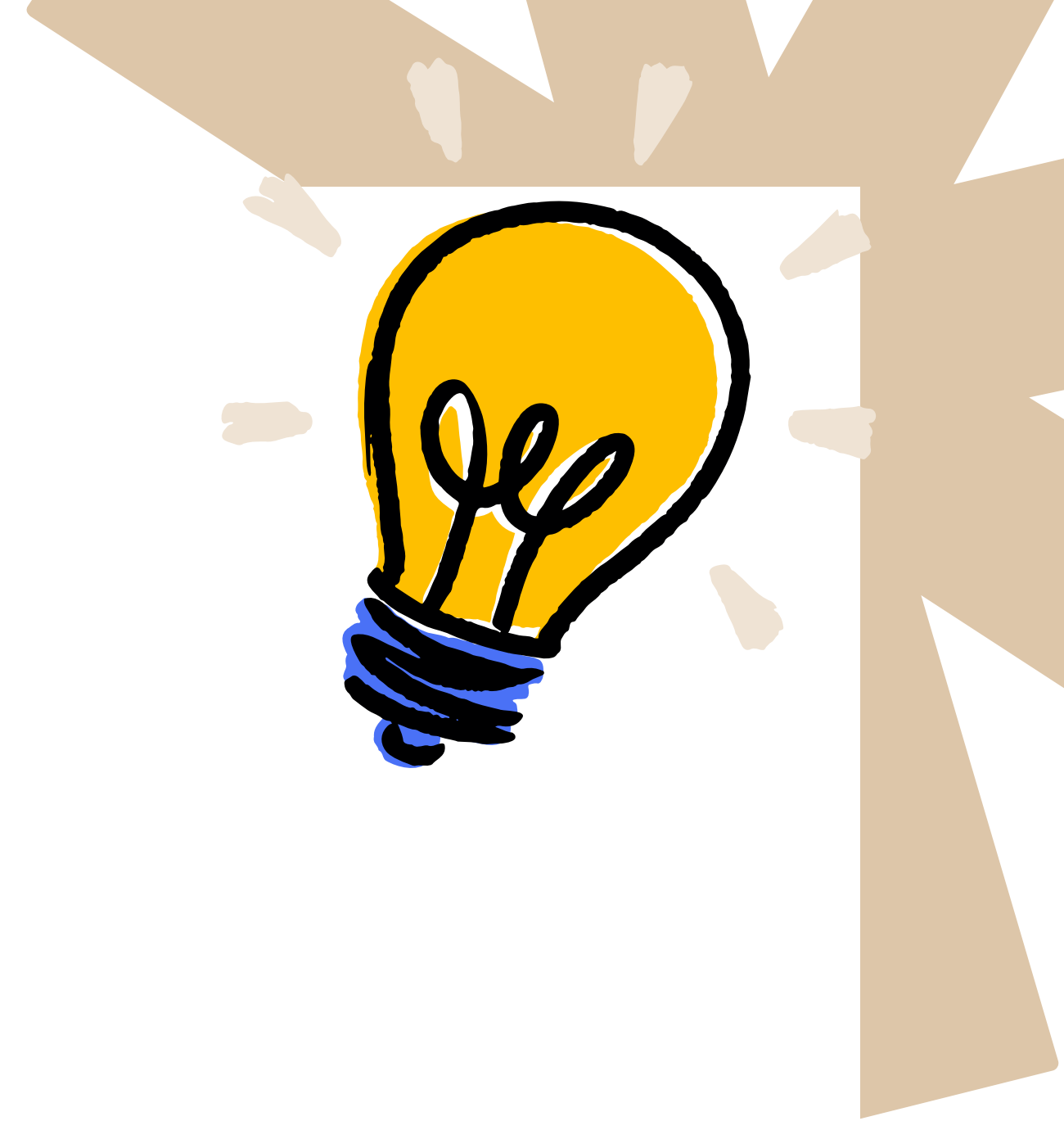
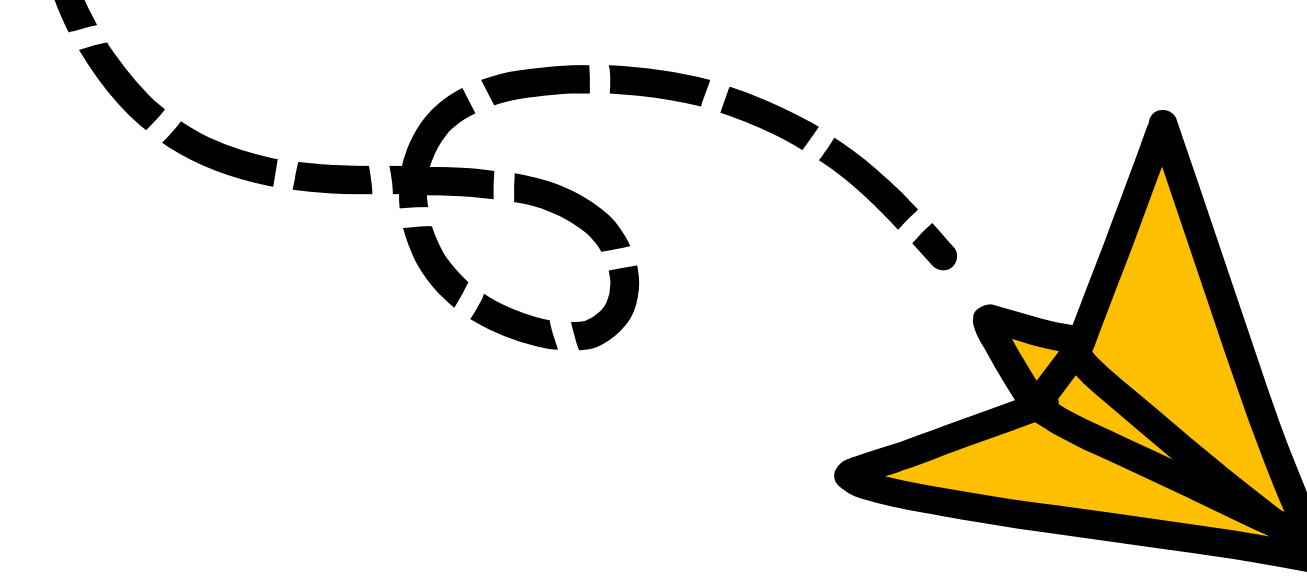
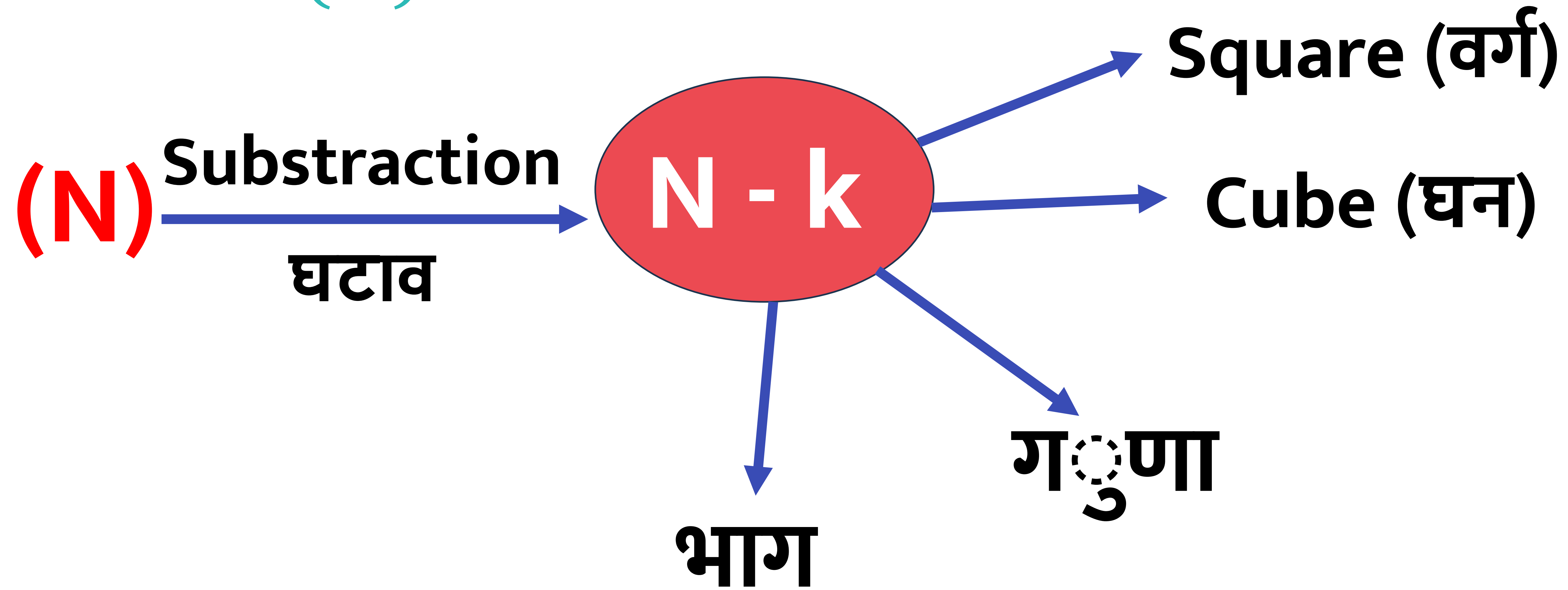
$$(10)^3 + 10 = 1010$$

$$10 \times 7 + 2 = 72$$

$$10 \times 8 - 8 = 72$$



Number $\rightarrow (N)$



Example

$$17 \xrightarrow{-4} 13$$

$$(13)^2 + 14 = 183$$

$$(13)^3 - 17 = 2180$$

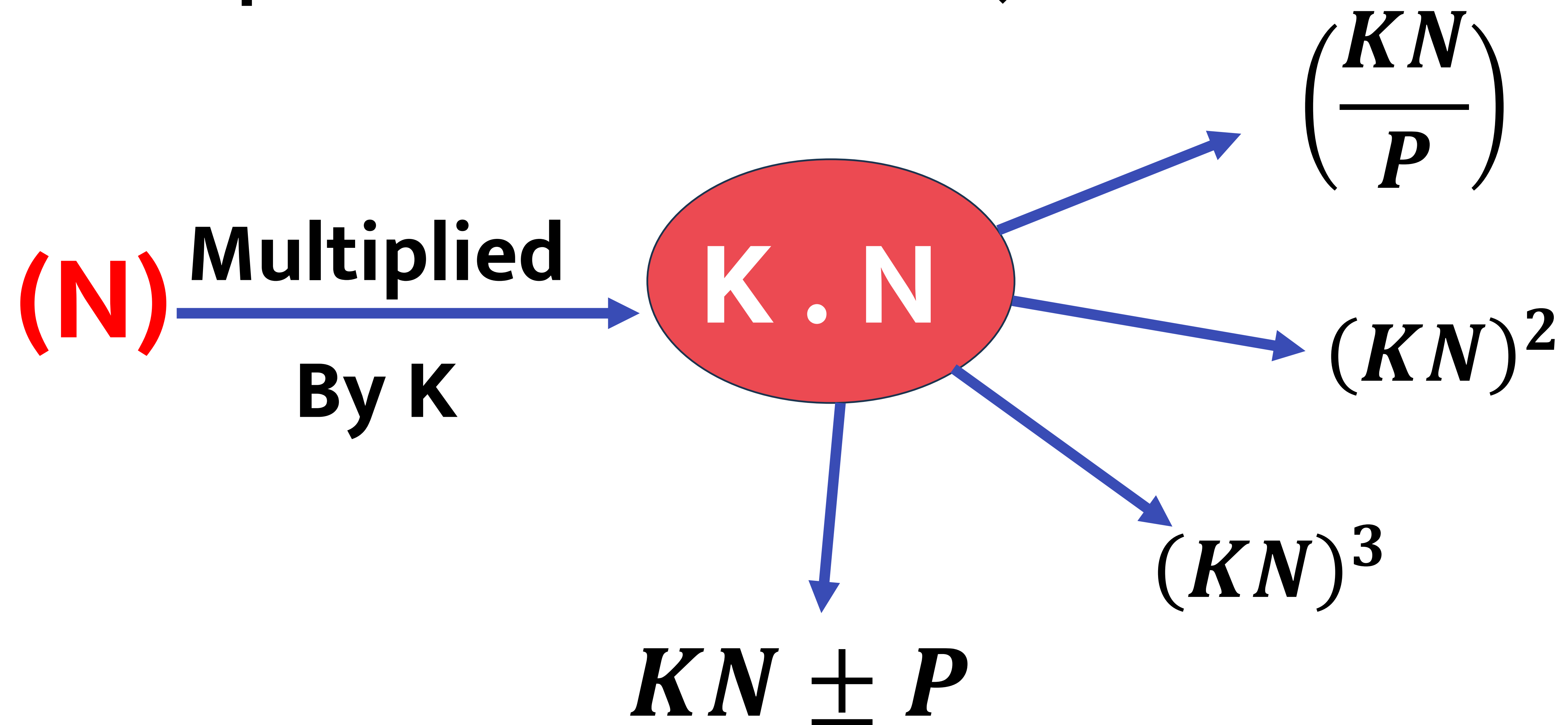
$$13 \times 12 + 2 = 158$$

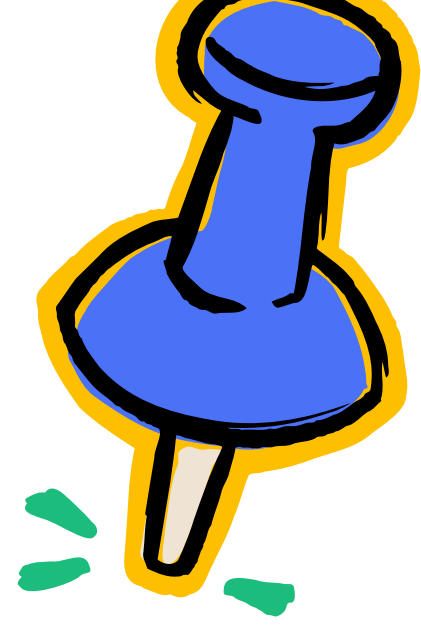
$$\frac{(13)^2 + 3}{4} = 43$$



Number $\rightarrow (N)$

(2) Multiplication / division (जोड़ / घटाव)





Example

12 $\xrightarrow[\text{By 3}]{\text{Multiplied}}$ **$12 \times 3 = 36$**

$(36)^2 = 1296$

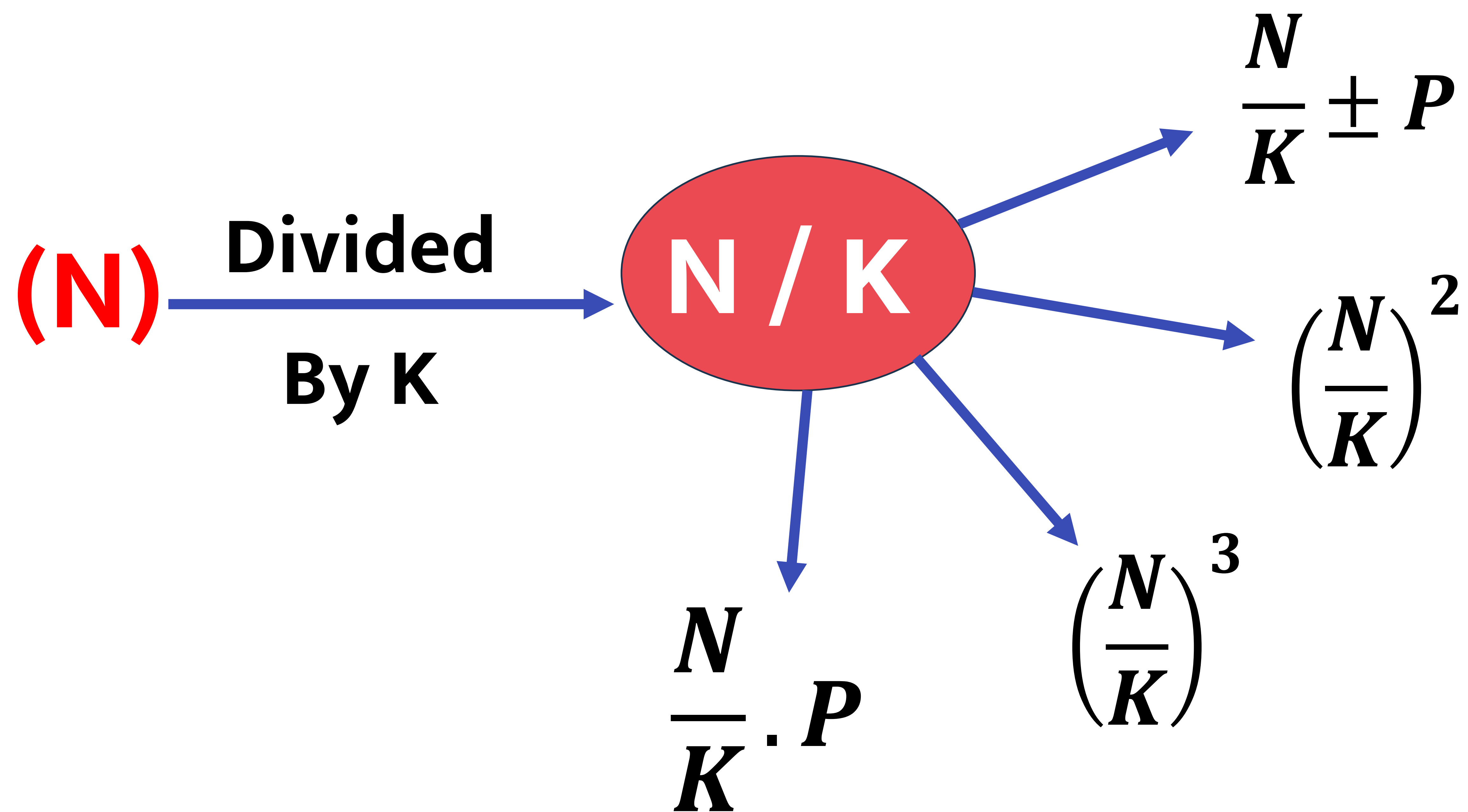
$(36)^3 = 46656$

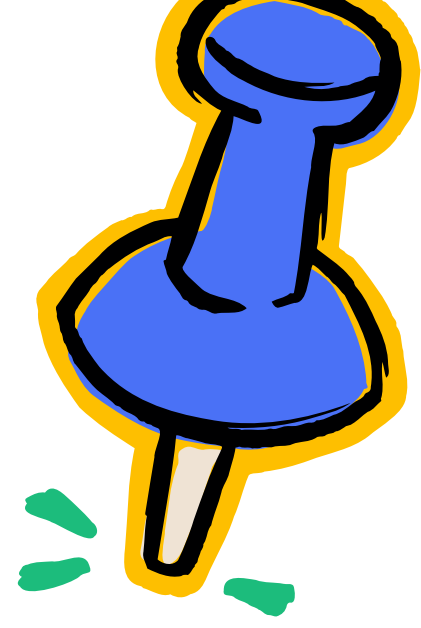
$\left(\frac{36}{2}\right)^2 = 324$

$36 + 12 = 48$



Number $\rightarrow (N)$





Example

144 $\xrightarrow[\text{By 3}]{\text{Multiplied}}$ **144/12 = 12**

$$(12)^2 + 10 = 154$$

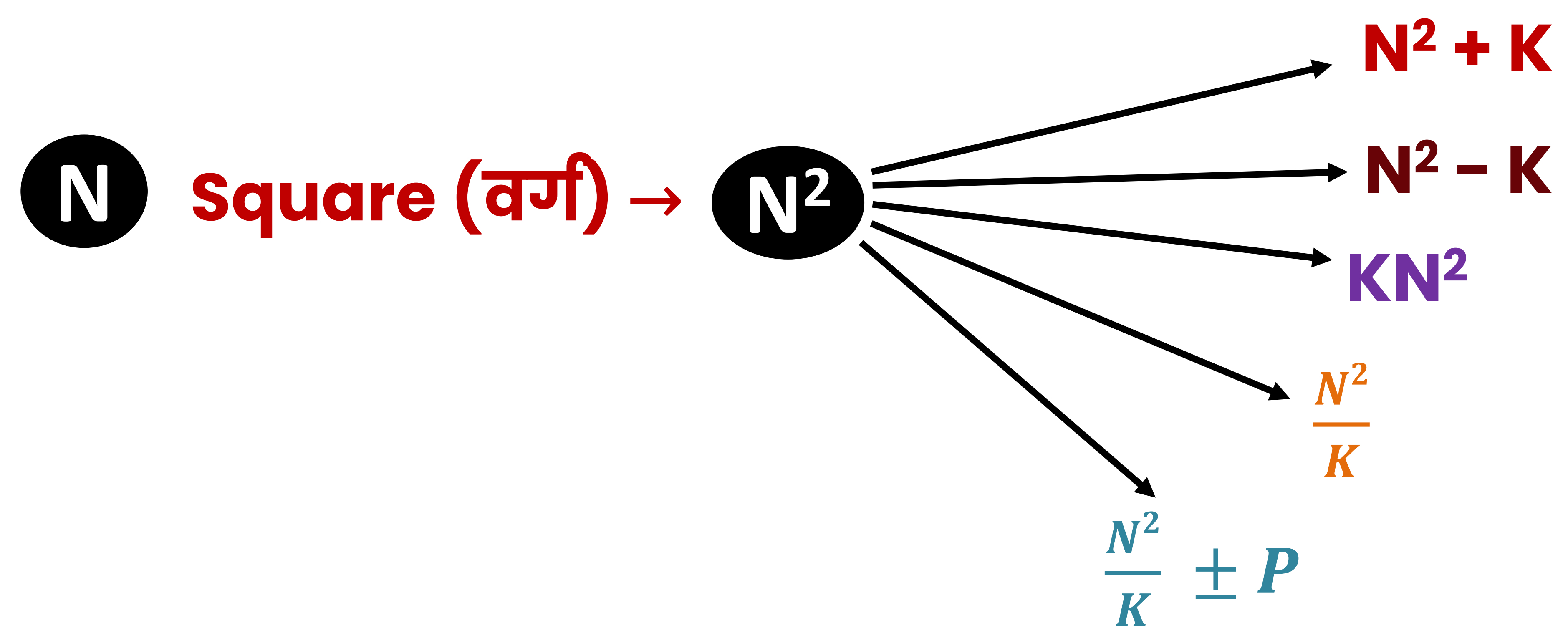
$$(12)^3 = 1728$$

$$12 + 4 = 16$$

$$12 - 4 = 8$$

$$12 \times 5 = 60$$





EXAMPLE : -

18

Square (वर्ग) $\rightarrow$ 324

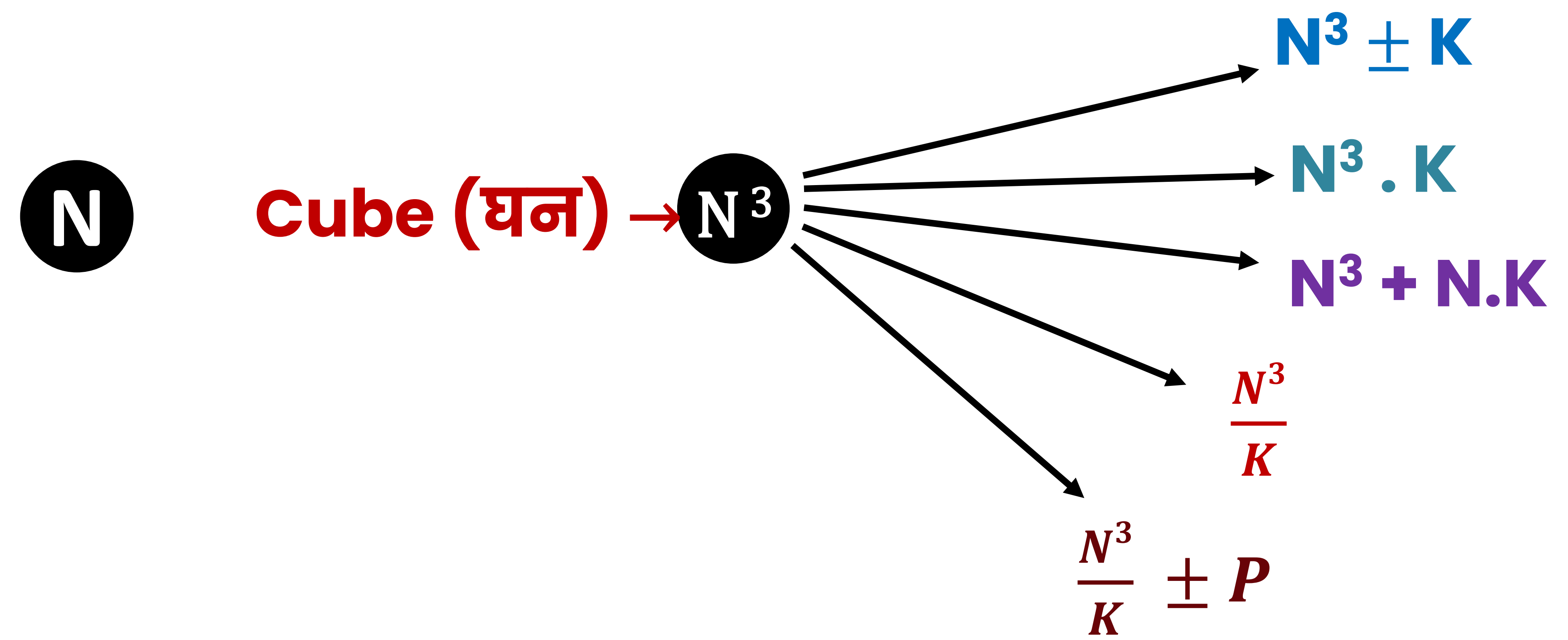
$$324 + 11 = 335$$

$$324 - 11 = 313$$

$$324 \times 3 = 972$$

$$324 \div 4 = 81$$

$$\frac{324}{4} + 7 = 88$$



EXAMPLE : -

12 **Cube (घन) → 1728**

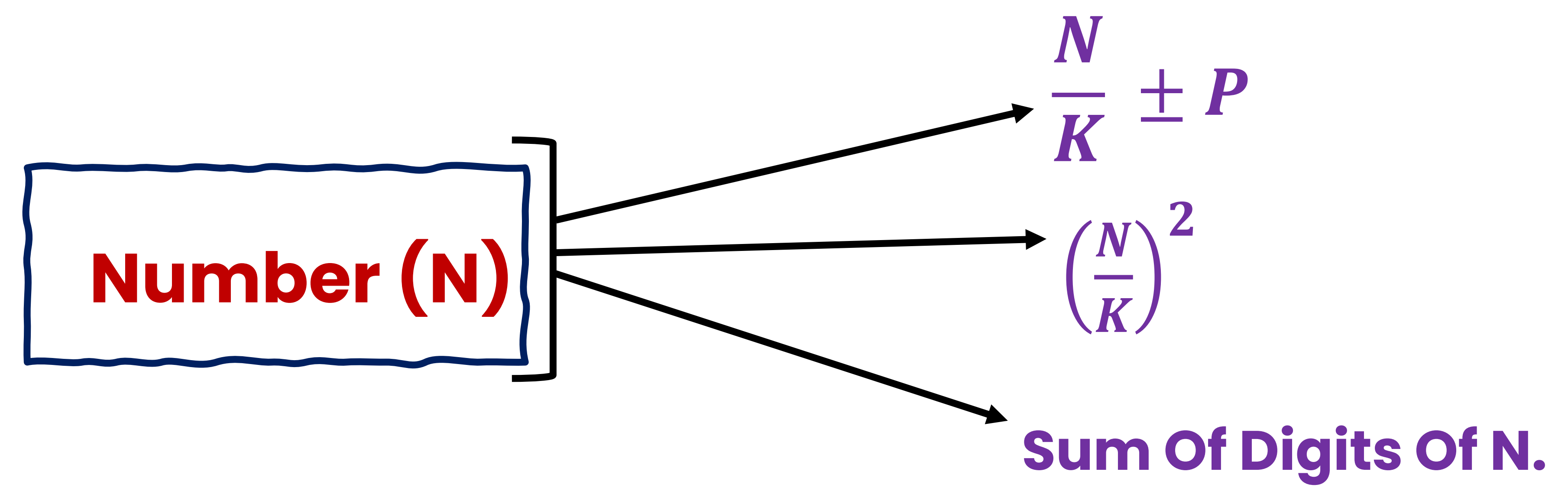
$$1728 + 12 = 1740$$

$$1728 - 12 = 1716$$

$$1728 \times 2 = 3456$$

$$1728 \div 9 = 192$$

$$\frac{1728}{9} + 4 = 196$$



EXAMPLE : -

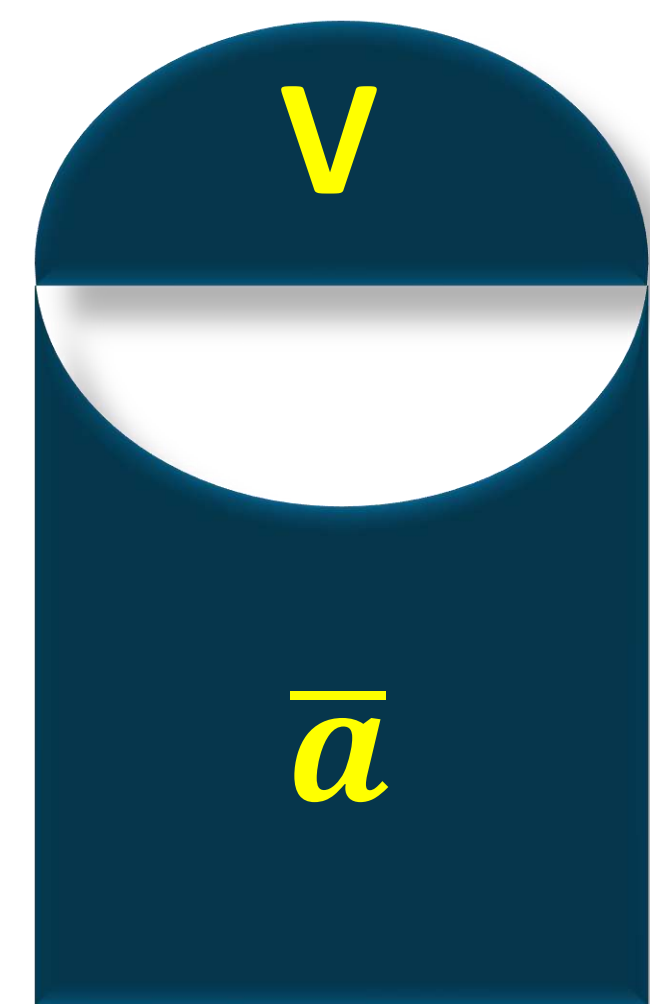
$$\begin{array}{l}
 144 \left\{ \begin{array}{l} \frac{144}{4} + 12 = 48 \\ \left(\frac{144}{18} \right)^2 = 64 \\ 1+4+4 = 9 \\ \text{(Digit sum)} \end{array} \right.
 \end{array}$$

SIMPLIFICATION

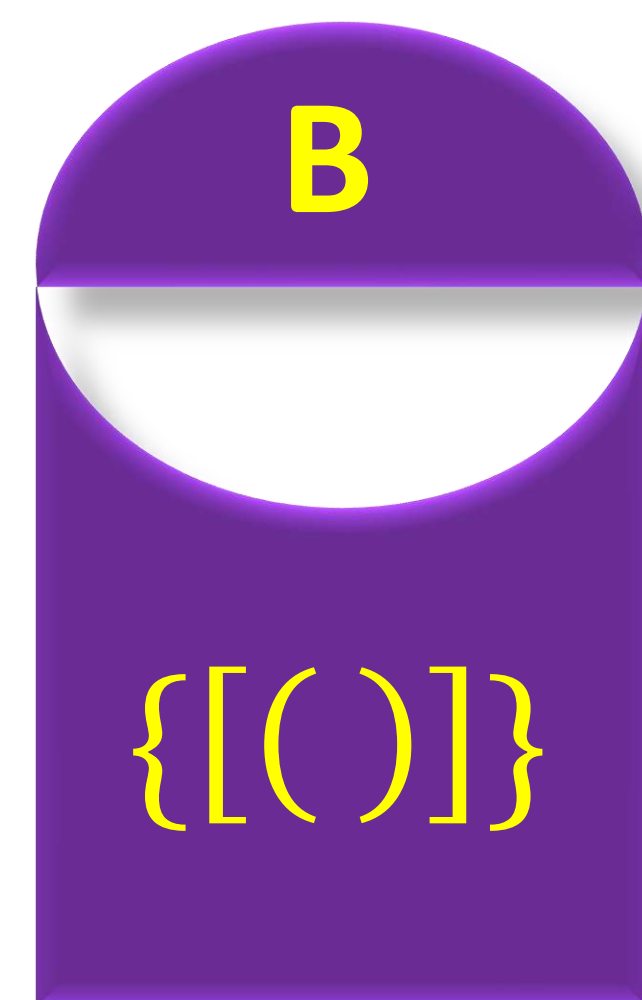
(सरलीकरण)

BODMAS

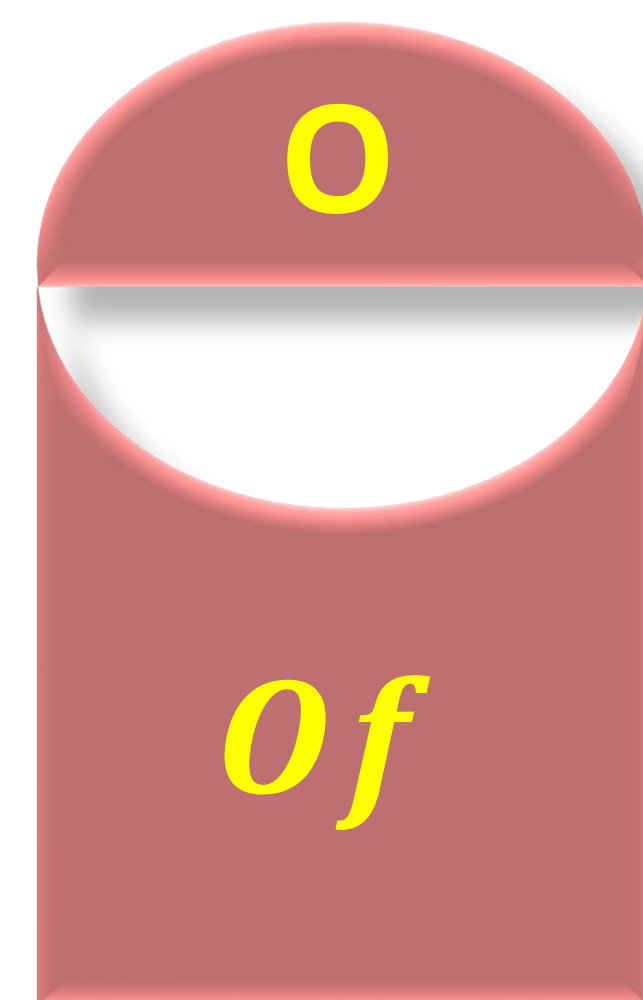
❖ Mathematical Operations →



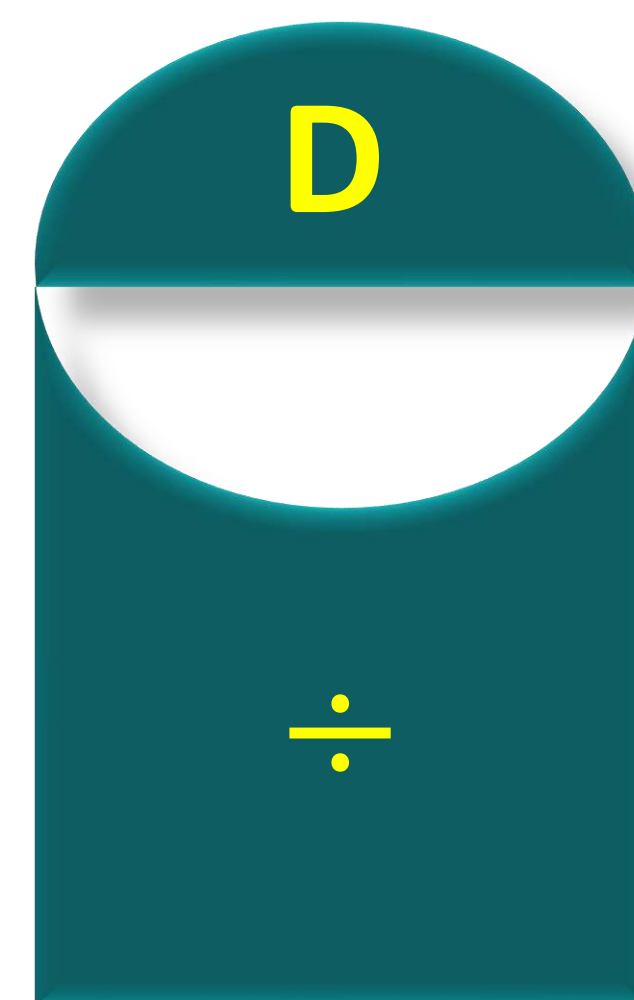
Vineculum
bar



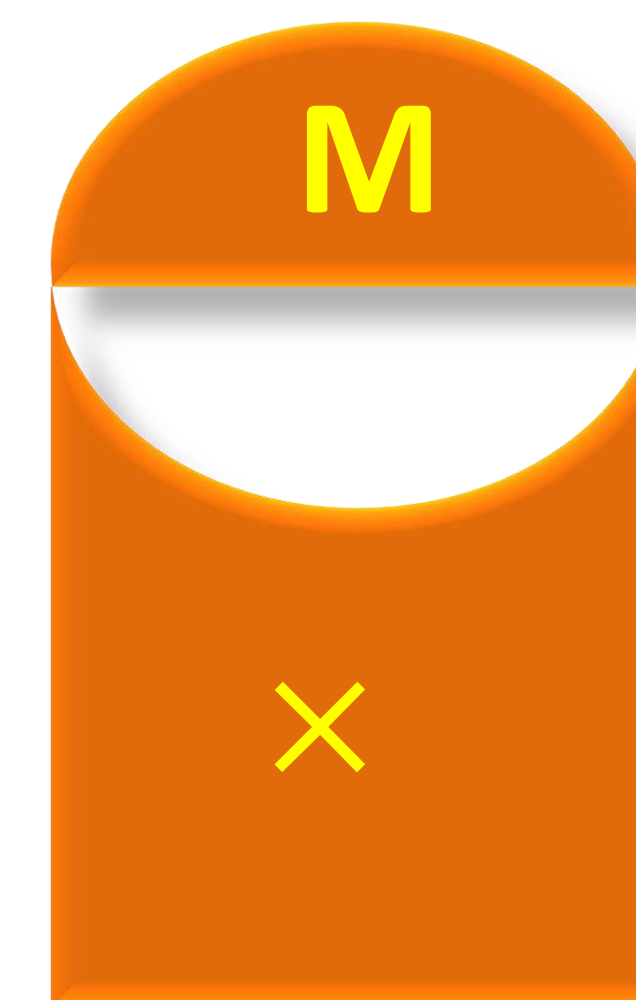
Bracket



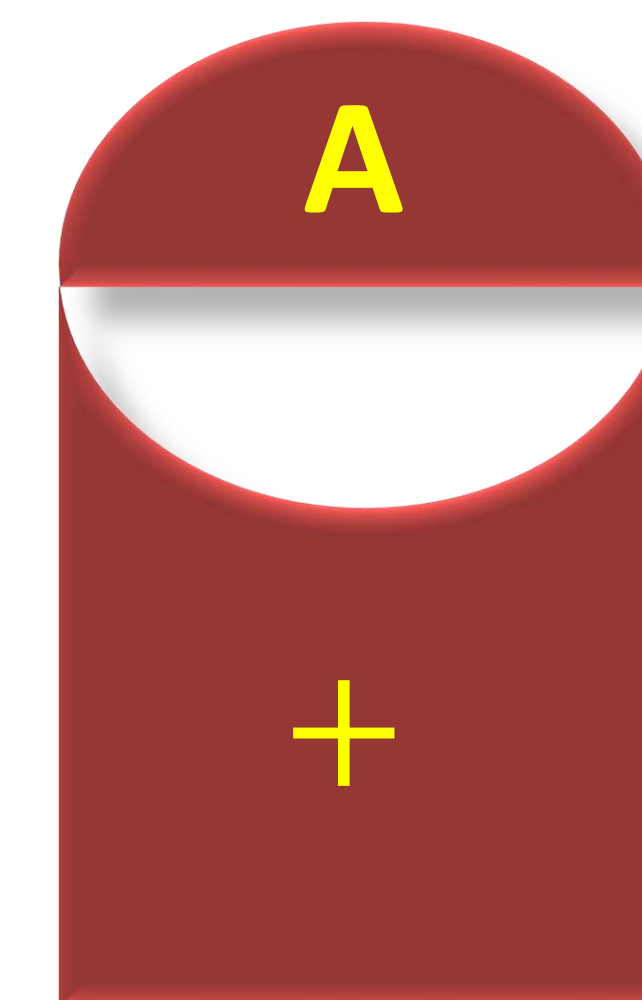
Order



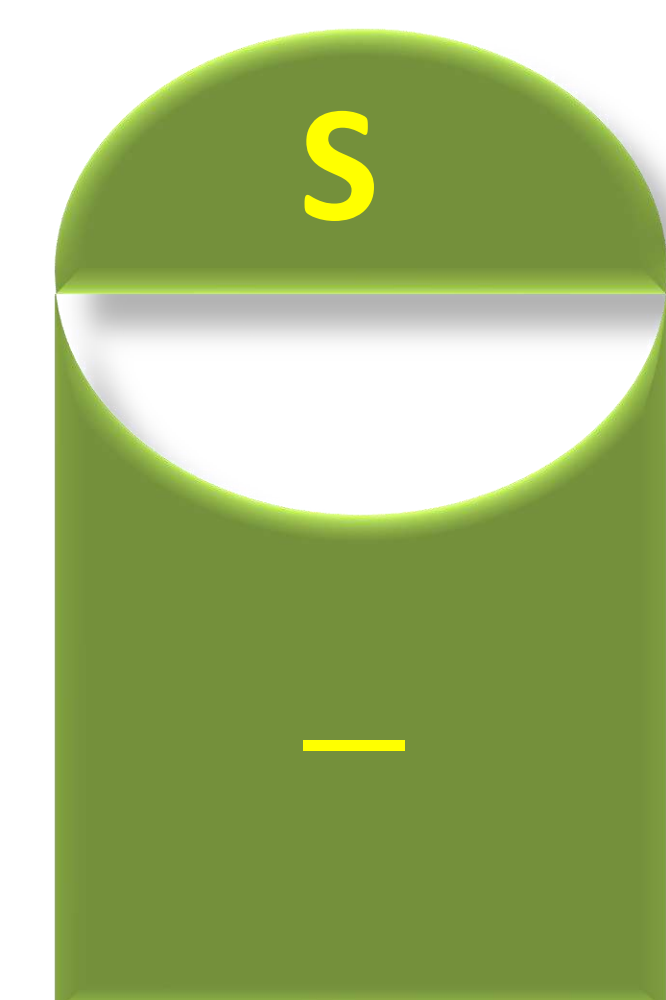
Division



multiplication



Addition



Subtraction



Mod (%) → शेषफल

Eg :- (i) 19 MOD 6

Eg :- (ii) $(3^2 - 4 + 5)$ MOD 7

RELATION BETWEEN 3 NUMBER

$(A, B, C) \rightarrow \text{SET}$

(1) $C = K(a + b), \quad C = K(a + b) \pm P, \quad C = K(a - b),$

(2) $b = (c - a) + c$

(3) $b = k.(a \times c), \quad b = \frac{a \times c}{K}, \quad b = \frac{a^2 \times c}{K}$

(4) $b = ac + k$

(5) $c = a^2 \pm \left(\frac{b}{k}\right)^2$

(6) $c = \frac{a+b}{K},$

(7) $c = \frac{a}{b} \times k,$

(8) $b = \sqrt{a + c}$

(9) $a - b = b - c = \text{Constant}$

$$(10) \quad c = (a + b)^2 \pm P$$

$$(11) \quad c = \frac{a}{b}, \quad c = \left(\frac{a}{b}\right)^2$$

$$(12) \quad c = a^2 + b, \quad c = a^2 + b^2, \quad c = (a - b)^2$$

$$(13) \quad c = \frac{a}{b} \pm P$$

$$(14) \quad c = \frac{a - b}{k}$$

$$(15) \quad c = \frac{a}{k} + \frac{b}{P}, \quad c = ka + Pb$$

$$(16) \quad c = a \times b - \frac{a}{b}$$

$$(17) \quad c = a^3 - b^3, \quad c = k(a^3 - b^3)$$

$$(18) \quad c = a^2 - b^2, \quad c = k(a^2 - b^2), \quad c = (a^2 - b^2) \pm P$$

$$(19) \quad c = \frac{a^2 - b^2}{k}$$

$$(20) \quad c = a^2 + b^2, \quad c = k(a^2 + b^2), \quad c = \frac{a^2 + b^2}{k}$$

$$(21) \quad c = a^2 + b^2 + (a + b) \quad c = a^2 + b^2 + ab$$

$$(22) \quad c = \left(\frac{a}{k}\right)^2 \pm \left(\frac{b}{p}\right)^2$$

$$(23) \quad c = \sqrt{ab}$$

$$(24) \quad c = \frac{a}{b} + a, \quad c = \frac{a}{b} + a^2,$$

❖ MORE THAN 3 NUMBERS

□ (A, B, C, D, E)

□ A – B – C – D

□ A : B : C : D

A^2



A



A^3

+

-

×

÷

B^2



B



B^3

+

-

×

÷

C^2



C



C^3

+

-

×

÷

D^2



D



D^3

*Thank
you*

The background is a solid light beige color. It is decorated with several small, faint floral motifs arranged in a circular pattern around the central text. These motifs consist of small circles with radiating lines, resembling stylized flowers or sunbursts. Additionally, there are small, solid-colored dots in shades of green, orange, and pink scattered across the background. Two small, stylized green leafy branches are positioned near the text, one above the 'k' in 'Thank' and one below the 'y' in 'you'.