Key terms

Crore (करोड): 10 ten lakh = 1,00,00,000. **Ten crore** (दश करोड): 10,00,00,000.

National system (राष्ट्रिय पद्धति): places named with lakh and crore; Nepal, India, Pakistan, Bangladesh.

International system (अन्तर्राष्ट्रिय पद्धति): thousands and millions; most of the world.

Period: a group of three places (Units, Thousands, Millions).

Million: 1,000 thousands = 1,000,000 = 10 lakh.

Face value (देखिने मान): the digit as you see it.

Place value (स्थानमान): what the digit is worth in its place.

Expanded form: a number as the sum of its place values.

Rounding off (शून्यान्त गर्नु): giving the nearest ten, hundred or thousand.

Exactly divisible (निःशेष भाग जान्छ): divides with nothing left over.

Prime number (रूढ सङ्ख्या): divides exactly only by 1 and itself.

Composite number (संयुक्त सङ्ख्या): divides exactly by some other number too.

The nine places

- each place is worth **10 times** the place on its right
- 10 ten lakh = 1 crore; 10 crore = 1 ten crore

Place	Value
Ten crore (दश करोड)	10,00,00,000
Crore (करोड)	1,00,00,000
Ten lakh (दश लाख)	10,00,000
Lakh (लाख)	1,00,000
Ten thousand, thousand	10,000; 1,000
Hundred, ten, one	100; 10; 1

- groups in a table: Crore, Lakh, Thousand, Units; H, T, O inside each
- after crore: 100 crore = 1 **arab** (अर्ब); 100 arab = 1 **kharab** (खर्ब)
- **how many in all:** read every digit from the left up to that place
- 92,86,73,415
  - 92 crores
  - 9,286 lakhs
  - 9,28,673 thousands

Commas and reading

	National	International
Commas	after 3 digits from the right, then every 2	after every 3
Example	2,91,64,578	29,164,578
Groups	Units, Thousand, Lakh, Crore	Units, Thousands, Millions

- national: read each group with its name: “4 crore, 23 lakh, 15 thousand, 628”
- international: each period like a small number + its name: “358 million, 417 thousand, 692”
- 2,91,64,578: two crore ninety-one lakh sixty-four thousand five hundred seventy-eight
- 29,164,578: twenty-nine million one hundred sixty-four thousand five hundred seventy-eight
- “six hundred **and** twenty-eight” or “six hundred twenty-eight”: both fine
- the digits never change; only the commas and names do
- commas the **same** in both systems up to **5 digits** (1,234; 12,345)
- greatest 9-digit number: 99,99,99,999 = 999,999,999

National	International
1 lakh = 1,00,000	100 thousand = 100,000
10 lakh = 10,00,000	1 million = 1,000,000
1 crore = 1,00,00,000	10 million = 10,000,000
10 crore = 10,00,00,000	100 million = 100,000,000

- crores → millions: × 10 (2 crore = 20 million)
- lakhs → millions: ÷ 10 (50 lakh = 5 million)
- 8 lakh = 800,000, **less** than a million

Face value and place value

Place value = face value × the value of the place

- 92,86,**7**3,415: face value 7; place value 7 × 10,000 = 70,000
- 6 in the lakh place: 6 × 1,00,000 = 6,00,000
- only the ones digit has the same face and place value (5 × 1 = 5)

- abacus, pocket chart: each bead or stick is worth its rod's or pocket's place
- an empty rod or pocket = **0**; the 0 keeps the place

Writing a number from words

- crores, then lakhs, then thousands, then the rest; fill an empty place with 0
- one crore eight lakh sixty-nine thousand eight hundred forty-two → 1,08,69,842
- every group after the first comma has **two** digits
- international, from words: each period three digits: 506,262,121

Expanded form

- each digit × the value of its place, biggest first
- 1,82,34,567 = 1 × 1,00,00,000 + 8 × 10,00,000 + 2 × 1,00,000 + 3 × 10,000 + 4 × 1,000 + 5 × 100 + 6 × 10 + 7 × 1
- a 0 can be left out (0 × anything = 0)
- biggest number from digit cards: biggest digit in the highest place (1 to 8 → 8,76,54,321)

Devanagari digits

0	1	2	3	4	5	6	7	8	9
०	१	२	३	४	५	६	७	८	९

- commas in the same places: 4,23,15,628 = ४,२३,१५,६२८
- rupee notes show both: 100 and १००

Rounding off

- look at **one digit only**: the one just right of the place you round to
- **5 or more:** add 1 to the rounding digit; zeros after it
- **less than 5:** keep the digit; zeros after it
- exactly halfway → round **up**: 46,500 → 47,000
- on a number line: the nearer end (1,360 is 40 from 1,400, 60 from 1,300 → 1,400)

Number	Nearest	Look at	Answer
4,630	hundred	3 (tens)	4,600
32,536	thousand	5 (hundreds)	33,000
8,275	ten	5 (ones)	8,280
8,275	hundred	7 (tens)	8,300
6,950	hundred	5 (tens)	7,000

- 9 hundreds + 1 = ten hundreds = a thousand (6,950 → 7,000)
- "about 3 crore people" = 2,91,64,578 to the nearest crore

Prime and composite numbers

- **prime:** only 1 and itself: 2, 3, 5, 7, 11…
- **composite:** some other number too: 4, 6, 8, 9…
- **1** is **neither** (only one number divides it)
- **2** is the only even prime; odd isn't always prime (9, 15, 21, 25, 27, 49)
- every even number except 2 is **composite**
- 1 to 10: 4 primes (2, 3, 5, 7); 5 composites (4, 6, 8, 9, 10)
- 9 composite (1, 3, 9); 19 prime (1, 19)

Sieve of Eratosthenes (चाल्नो, a sieve):

1. circle 1
2. keep 2, cross out its multiples
3. keep 3, cross out its multiples; then 5; then 7
4. what is left are the primes; 2, 3, 5, 7 are enough up to 100

Primes up to 100 (25):
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47 (15 up to 50);
53, 59, 61, 67, 71, 73, 79, 83, 89, 97 (10 from 50 to 100)

COMMON MISTAKES

✗ 1,8,69,842 for one crore eight lakh …
✓ eight lakh fills two places: 1,08,69,842.

✗ the place value of 8 in 6,18,42,507 is 8
✓ 8 is its face value; place value 8,00,000.

✗ 3 lakhs in all in 3,45,67,890
✓ read up to the lakh place: 345 lakhs.

✗ 1 million = 1 lakh
✓ 1 million = 10 lakh; 1 crore = 10 million.

✗ rounding step by step, 4,450 → 4,500 → 5,000
✓ look at one digit only: 4,000.

✗ every odd number is prime
✓ 9, 15, 21 are odd and composite.

✗ 1 is prime
✓ 1 is neither prime nor composite.