

AI Prompt: Summarize Roman Numerals. Give several examples. Explain at the level of a 15 year old who hasn't learnt Roman numerals before. Give advantages/disadvantages compared to Indo-Arabic numerals.

Roman Numerals: An Introduction

Imagine a number system built not on position (like how the "5" in 500 is different from the "5" in 50), but on simple building blocks. That's what Roman numerals are!

They are based on **seven fixed symbols**, all of which are letters from the Latin alphabet.

1. The Seven Symbols and Their Values

Roman Numeral	Value	Note
I	1	Think of it like a tally mark
V	5	
X	10	
L	50	L, C, D, M are the bigger-value letters
C	100	'C' stands for <i>Centum</i> , the Latin for 100
D	500	
M	1,000	'M' stands for <i>Mille</i> , the Latin for 1,000

2. How to Read and Write Roman Numerals (The Rules)

You figure out the number by reading the symbols from left to right and applying two main rules:

Rule A: The Addition Rule (Most Common)

If a symbol is followed by a symbol of **equal or lesser value**, you add them together.

- VI = $5 + 1 = 6$
- XV = $10 + 5 = 15$
- LXX = $50 + 10 + 10 = 70$
- MMCL = $1000 + 1000 + 100 + 50 = 2150$

Rule B: The Repetition Limit

You can only use the symbols I, X, C, and M up to three times in a row. You cannot use V, L, or D more than once in a number.

- **Correct:** III (3)
- **Incorrect:** IIII (You can't have four I's—you use the subtraction rule instead!)

Rule C: The Subtraction Rule (To avoid repetition)

To avoid using four symbols in a row (like IIII for 4), the Romans invented a trick. If a symbol of **smaller value** is placed **before** a symbol of **greater value**, you subtract the smaller one from the larger one.

This rule only applies to these six combinations:

Roman Numeral	Calculation	Value	Rule
IV	$5 - 1$	4	I before V
IX	$10 - 1$	9	I before X
XL	$50 - 10$	40	X before L
XC	$100 - 10$	90	X before C
CD	$500 - 100$	400	C before D
CM	$1000 - 100$	900	C before M

3. Examples

When reading a long number, you look for those subtractive pairs first, and then add everything else up.

Number	Breakdown	Roman Numeral
19	$10 + (10 - 1)$	XIX
44	$(50 - 10) + (5 - 1)$	XLIV
88	$50 + 10 + 10 + 10 + 5 + 1 + 1 + 1$	LXXXVIII
1492	$1000 + 400 + 90 + 2$	MCDXCII
2025	$1000 + 1000 + 20 + 5$	MMXXV

4. Comparison to Indo-Arabic Numerals (1, 2, 3...)

The number system you use every day, called Indo-Arabic, is fundamentally different because it is a **place value system** (the position of the digit matters).

Advantages of Roman Numerals

1. **Formality and Tradition:** They look neat and formal, which is why they are still used in specific contexts (Super Bowl titles, dates on buildings, chapters in books, or for monarchs like Queen Elizabeth II).
2. **Tallying/Counting:** For very basic counting or tallying, the repetitive symbols (I, II, III) are intuitive and easy to write quickly.

Disadvantages of Roman Numerals

1. **No Zero:** The Romans had no concept of the number zero as a placeholder, making complex math impossible.
2. **Difficult for Math:** Try multiplying MDCCCLXXXVIII (1888) by XLIX (49). It's a nightmare! Indo-Arabic numerals' place value system (8×9 , then 80×9 , etc.) makes arithmetic far easier.
3. **No Place Value:** Since there's no place value, every new, larger value needs a completely new symbol (L for 50, C for 100, D for 500, etc.). This makes large numbers bulky and hard to manage.
4. **Limited Range:** Without a zero and simple place-value rules, it's very difficult to represent extremely large or negative numbers, and impossible to represent fractions or decimals in a practical way.