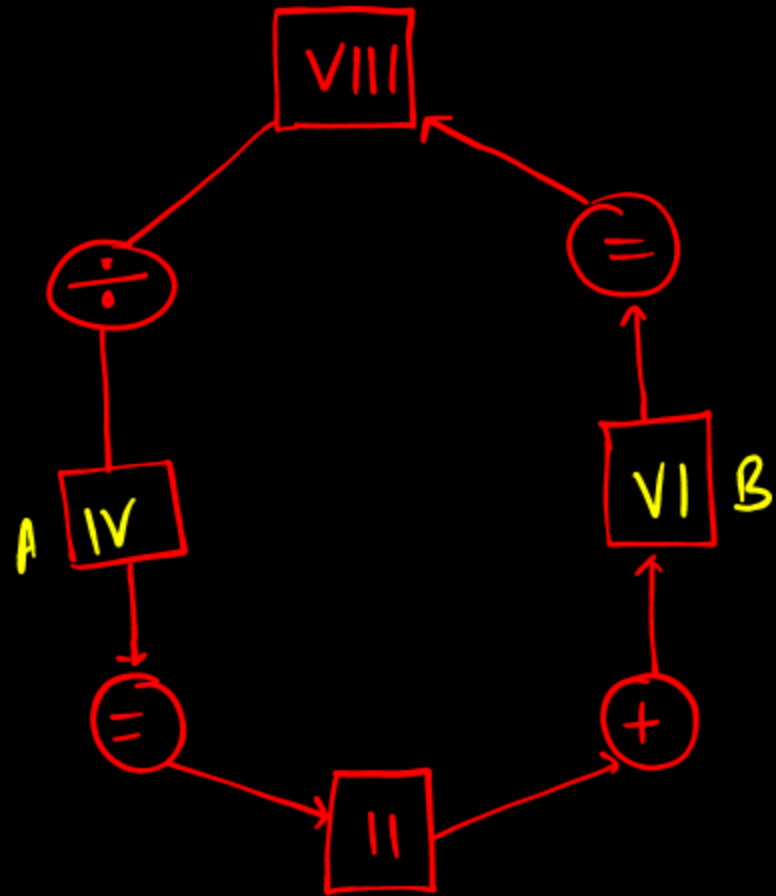


Roman Numerals

4th century B.C.



10_x

⇒ Total 7 symbols in Roman numerals

Roman Numerals	I	V	X	L	C	D	M
<u>Hindu-Arabic Numerals</u>	1	5	10	50	100	500	1000

⇒ 7 symbols

Indo-Arabic Numerals
(Arabic Numerals)

III ⇒ 3

Rules:

- ① Repetition of a Roman numeral means addition.
- No numeral can be repeated more than 3 times

~~IIII~~ $\neq 4$
↓
IV = 4

- V, L and D can never be repeated.

~~VV~~ \Rightarrow X ✓

- Only I, X, C and M can be repeated.

XX \Rightarrow 20
CC \Rightarrow 200
CCC \Rightarrow 300
CCCC \Rightarrow X

MM \Rightarrow 2000
MMM \Rightarrow 3000

* * A bar (—) over Roman numerals increases its value by 1000 times (multiplied)

eg. III \Rightarrow 3

XV \Rightarrow 15

$\overline{\text{XV}}$ \Rightarrow 15 \times 1000 = 15000

Rule 2: If smaller numeral written to the left of a larger numeral, smaller is subtracted from the larger.

\Rightarrow ⁵ V, ⁵⁰ L, ⁵⁰⁰ D are never subtracted.
 \Rightarrow I can be subtracted from V and X only.

$\overline{\text{VX}}$, $\boxed{\text{VC} = 95}^{\text{X}}$

$\boxed{\text{IC}}^{\text{X}} \Rightarrow$

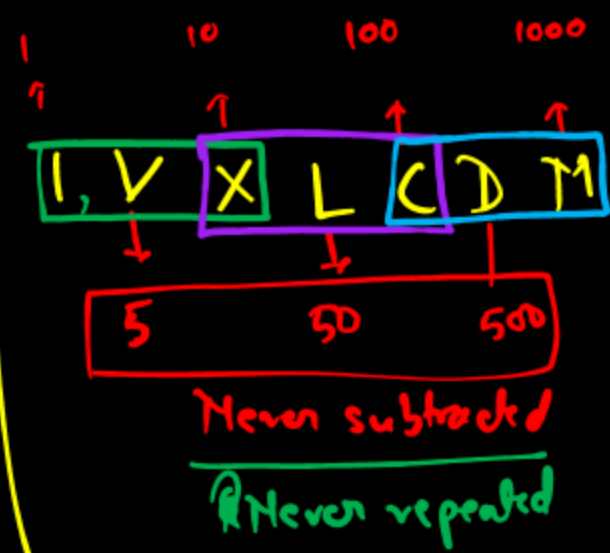
90

95

$$\begin{aligned}
 95 &= 90 + 5 \\
 &= XC V \\
 &= \underline{\underline{XCV}}
 \end{aligned}$$

✓ $\boxed{LXL} = 90 \text{ | } X$

✓ $\boxed{XC} = 90 \text{ ✓}$



⇒ X can be subtracted from L and C only.



⇒ C can be subtracted from D and M only.

Rule 3: When a smaller numeral is written right to a larger numeral, smaller is always added in the larger.

$\overline{\text{L}} \overline{\text{XL}} \overline{\text{L}}$

403

CDIII

$$\underline{\text{VI}} \rightarrow \underline{\underline{5+1=6}}$$

Rule 4: When a smaller numeral is placed between two large numerals, always subtract smaller numeral from the large numeral immediately following it.

$$95 = \underbrace{90} + \underbrace{5}$$

eg. $\boxed{\text{XIV}} = 10 + (5 - 1) = \underline{\underline{14}}$

* Arabic numbers into Roman numeral.

- ↳ Write it in expanded form.
- ↳ Write the roman numeral for hundreds first, followed by Roman numeral for tens and then for ones to the right of it.

$$412 \Rightarrow \underbrace{400} + \underbrace{10} + \underbrace{2}$$

For eg:

$$\begin{aligned} 89 &= \underline{80} + 9 \\ &= (\text{LXXX}) + (\text{IX}) \\ &= \text{LXXXIX} \end{aligned}$$

$$\begin{aligned} \underline{146} &= 100 + 40 + 6 \\ &= \text{C} + \text{XL} + \text{VI} \\ &= \underline{\text{CXLVI}} \end{aligned}$$

$$\begin{aligned} 97 &= 90 + 7 \\ &= \text{XC} + \text{VII} \\ &= \underline{\underline{\text{XCVII}}} \end{aligned}$$

$$\begin{aligned} 199 &= 100 + 90 + 9 \\ &= \text{C} + \text{XC} + \text{IX} \\ &= \underline{\underline{\text{CXCIX}}} \end{aligned}$$

$$\begin{aligned} \underline{258} &\Rightarrow 200 + 50 + 8 \\ &\Rightarrow CC + L + VIII \\ &= CCLVIII \end{aligned}$$

$$335 \Rightarrow \underline{CCCLXXXV} \checkmark$$

$$410 \Rightarrow \underline{\underline{CDX}} \checkmark$$

$$444 \Rightarrow \underline{CDXLIV} \checkmark$$

Roman \rightarrow Hindu-Arabic

$$\textcircled{i} \quad \text{CIX} \rightarrow C + IX = 109$$

$$\textcircled{ii} \quad \text{CLXIX} \rightarrow C + L + X + IX \\ (100 + 50 + 10 + 9) \\ 169$$

$$\textcircled{iii} \quad \text{CXCIV} = C + XC + IV \\ = 100 + 90 + 4 \\ = \underline{\underline{194}}$$

$$\textcircled{iv} \quad \text{CCXLVII} = 247 \checkmark$$

$$\textcircled{v} \quad \text{CDXXXVII} = 437$$

25-09-2015

XXV - IX - MMMXV

$$\begin{array}{r} \textcircled{X} \\ + \\ \textcircled{IV} \\ + \\ \textcircled{I} \end{array} - \textcircled{II} = ? \quad \boxed{XIII}$$

$$498 = \underline{CDXCVIII}$$

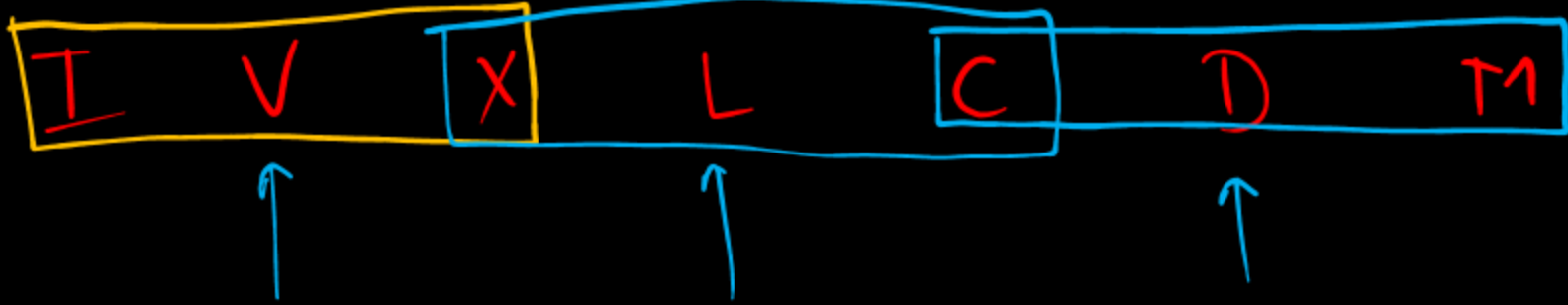
$$1296 = \underline{MCCXCVI} \quad \checkmark$$

$$\begin{array}{c} \downarrow \\ \textcircled{XLIX} \end{array} + \begin{array}{c} \downarrow \\ \textcircled{XXXIX} \end{array} = \underline{88} \quad \left(\begin{array}{l} 80 + 8 \\ \boxed{LXXXVIII} \end{array} \right)$$

Pick odd one out:

- a) XIX \Rightarrow 19₁₂
- b) XXI \Rightarrow 21₁₂
- c) XXIV \Rightarrow 24₁₂ 23₁₂
- d) XXV \Rightarrow 25₁₂

- ✓ a) L
- b) XIV
- ~~c) XXXX~~
- d) XVI



|

End of the chapter