

MATH



CHAPTER 3: ROMAN NUMERALS

ROMAN NUMERALS

➤ Introduction

The numerals, we use is commonly known as hindu -Arabic Numerals. 0, 1, 2, 3, 4, 5,6, 7, 8, 9 _ _ _ _ etc. are example of hindu-Arabic numerals. In ancient time Romans developed a system of numerations (numbering) which is known as Roman Numerals. I, II, III, IV, V, VI, VII, VIII, IX, _ _ _ etc. are example of Roman Numerals.

❖ Roman numerals are formed by using the following symbols:

Roman Numeral	Value
I	1
V	5
X	10
L	50
C	100
D	500

❖ Note the following points with reference to the Roman Numerals:

- In the Roman Numerals there is no separate notation for zero.
- Big numerals are obtained by adding smaller numerals.
- $1 = I$, $II = 1 + 1 = 2$, $III = 1 + 1 + 1 = 3$, $10 + 10 = 20$ and so on.
- If a big numeral is followed by a small numeral then they are added to get the resulting numeral, e.g.
- $VI = 5 + 1 = 6$, $XXIII = 10 + 10 + 1 + 1 + 1 = 23$
- If a small numeral is followed by a big numeral then the smaller numeral is subtracted to get the resulting numeral.

e.g. $IV = 5 - 1 = 4$, $IX = X - 1 = 9$, $XIX = 10 + (10 - 1) = 10 + 9 = 19$.

- All numerals up to 39 can be expressed by the symbol I, V and X only.

❖ See the following table:

I	II	III	IV	V	VI	VII	VIII	IX	X
1	2	3	4	5	6	7	8	9	10
XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
11	12	13	14	15	16	17	18	19	20
XXI	XXII	XXIII	XXIV	XXV	XXVI	XXVII	XXVIII	XXIX	XXX
21	22	23	24	25	26	27	28	29	30
XXXI	XXXII	XXXIII	XXXIV	XXXV	XXXVI	XXXVII	XXXVIII	XXXIX	XL
31	32	33	34	35	36	37	38	39	40

LEARNING OBJECTIVES

❖ This lesson will help you to:—

- be able to know the history & use of roman numerals.
- be able to solve real life problems based on roman numerals.
- explore various principles of roman numerals.
- be able to define roman numerals.
- be able to convert roman numerals into Arabic numerals and vice versa.

❖ **Real Life Example**

Roman numbers are used widely in real life. The most important & common example is watches & clocks with Roman numbers on it. Many monuments & buildings engrave numbers in Roman system of numeration. Games & sports also use Roman numbers instead of traditional system of numbering.

M's "mile" (or 1000 said)

D's half (500 – quickly read!)

C's just a 100 (century)

And L is half again – 50!

So all that's left is X and V

(or 10 and 5) – and I – easy!

QUICK CONCEPT REVIEW

❖ ROMAN NUMERALS



Sam's father brought a new wall clock. Sam was amazed to see some alphabet instead of numbers on the clock. He asked his father about it. Father told him that these are numbers based on the Roman system of numeration. Let us all learn about it.

When Romans learned to write they needed a way to write their numbers. For this they developed a numeric system which uses combinations of letters to signify values. This system is known as Roman system of numeration.

Romans used these numbers for trading & commerce. These numbers are still used today in many different ways.

This system of numeration does not use place value like the Arabic system of numeration.

There are seven symbols used in this system which are as follows:

I, V, X, L, C, D & M.

❖ **Each symbol has a corresponding value:**

I stands for 1

V stands for 5

X stands for 10

L stands for 50

C stands for 100

D stands for 500

M stands for 1000

➤ **PRINCIPLES USED IN ROMAN NUMERATION SYSTEM**

❖ **Principle of Addition:** Tina wants to meet her brother who studies in class 11, but the number written on the name plate is a Roman numeral so she is confused whether she is going to the right classroom. Can you help her?

Class XI

⇒ $X = 10$ and $I = 1$

Therefore, $XI = 10 + 1 = 11$

Hence, Tina is going to the correct classroom.

This example uses the principle of addition.

Addition is only applicable when the first symbol is greater than the second, third etc.

When a symbol appears after a larger symbol it is added.

When the principle of addition is used. A symbol can be used only three times.

Let us take another example:

LXX \Rightarrow L = 50

X = 10

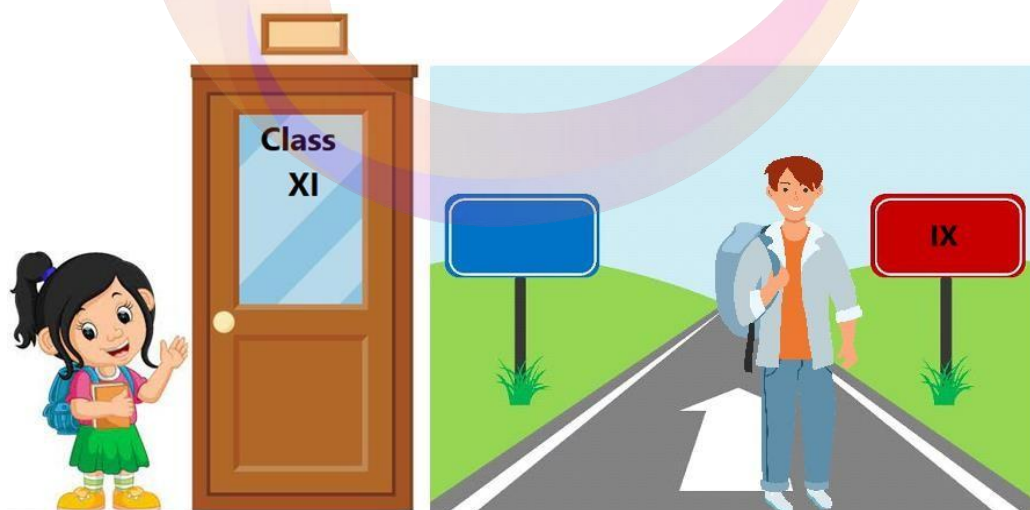
X = 10

Therefore, LXX = 50 + 10 + 10 = 70

- ❖ **Principle of Subtraction:** Jojo was waiting for his friend on a street. He saw a board on which two numbers were written. One was a Roman numeral another was an Arabic numeral. But he is confused that which number is written on the board.

Amazing Fact

Roman numerals don't have a symbol for zero.



Historical Preview

The history of Roman numerals is not well documented and written accounts are contradictory. It is likely that counting began on the fingers and that is why we count in tens. A single stroke I represents one finger, five or a handful could possibly be represented by V and the X may have been used because if you stretch out two handfuls of fingers and place them close the two little fingers cross in an X. Alternatively, an X is like two Vs, one upside down.

Roman number written on board = IX

$$\begin{array}{r}
 I = 1 \quad \nearrow 10 \\
 X = 10 \quad \searrow -1 \\
 \hline
 9
 \end{array}$$

Therefore, IX = 9

- ❖ **Subtraction is only applicable when the first symbol is less than the second one.**

If the symbol appears before a larger symbol it is subtracted.

Another example,

CD ⇒

$$\begin{array}{r}
 C = 100 \quad \nearrow 500 \\
 D = 500 \quad \searrow -100 \\
 \hline
 400
 \end{array}$$

Therefore, CD = 400

- ❖ **Principle of addition & subtraction are used in combination.**

Rohan was reading an article.

Super Bowl XLVIII

The Super Bowl is the annual championship game of the National Football League (NFL), the highest level of professional American Football in the United States, culminating a season that begins in the late summer of the previous calendar year. The Super Bowl uses Roman numerals to identify each game, rather than the year in which it is held. For example, Super Bowl I was played on January 15, 1967, following the 1966 regular season, while Super Bowl XLVII was played on February 3, 2013, following the 2012 season.

He saw numbers written in roman numerals. Let us have a look.

Roman number XL VIII \Rightarrow

X = 10

L = 50

V = 5

I = 1

I = 1

I = 1

$$\Rightarrow (50 - 10) + (5 + 1 + 1 + 1) = 40 + 8 = 48$$

Therefore, XL VIII = 48

This is an example where principle of addition & subtraction are used in combination.