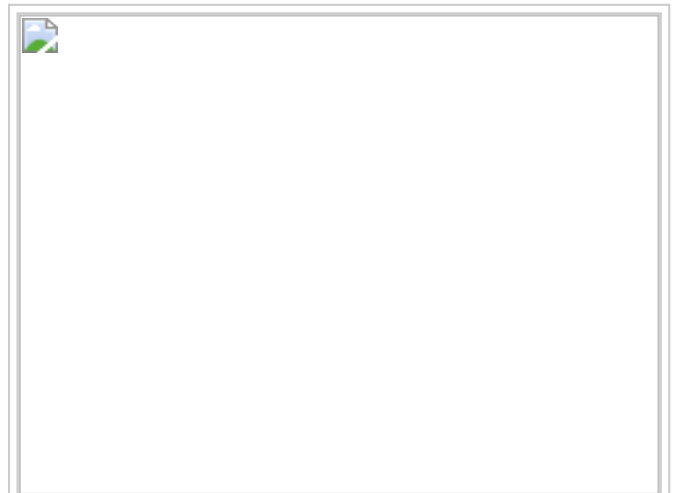# Roman numerals

From Wikipedia, the free encyclopedia

Roman numerals, the numeric system used in ancient Rome, employs combinations of letters from the Latin alphabet to signify values. The numbers 1 to 10 can be expressed in Roman numerals as follows:

I, II, III, IV, V, VI, VII, VIII, IX, X.

The Roman numeral system is a cousin of Etruscan numerals. Use of Roman numerals continued after the decline of the Roman Empire. From the 14th century on, Roman numerals began to be replaced in most contexts by more convenient Hindu-Arabic numerals; however, this process was gradual, and the use of Roman numerals in some minor applications continues to this day.

Entrance to section LII (52) of the Colosseum, with numerals still visible

Contents

Reading Roman numerals

Roman numerals, as used today, are based on seven symbols:[1]

Symbol	Value
I	1
V	5
X	10
L	50
C	100
D	500
M	1,000

MMXV

"2015" as a Roman numeral

Numbers are formed by combining symbols and adding the values. So II is two ones, i.e. 2, and XIII is a ten and three ones, i.e. 13. There is no zero in this system, so 207, for example, is CCVII, using the symbols for two hundreds, a five and two ones. 1066 is MLXVI, one thousand, fifty and ten, a five and a one.

Symbols are placed from left to right in order of value, starting with the largest. However, in a few specific cases,[2] to avoid four characters being repeated in succession (such as IIII or XXXX) these can be reduced using subtractive notation as follows:[3][4]

- the numeral I can be placed before V and X to make 4 units (IV) and 9 units (IX) respectively
- X can be placed before L and C to make 40 (XL) and 90 (XC) respectively
- C can be placed before D and M to make 400 (CD) and 900 (CM) according to the same pattern[5]

An example using the above rules would be 1904: this is composed of 1 (one thousand), 9 (nine hundreds), 0 (zero tens), and 4 (four units). To write the Roman numeral, each of the non-zero digits should be treated separately. Thus 1,000 = M, 900 = CM, and 4 = IV. Therefore, 1904 is MCMIV.

Below are some examples of the modern use of Roman numerals:

- 1954 as MCMLIV, as in the trailer for the movie *The Last Time I Saw Paris*)[6]
- 1990 as MCMXC, used as the title of musical project Enigma's debut album *MCMXC a.D.*, named after the year of its release.)
- 2014 as MMXIV, the year of the games of the XXII (22nd) Olympic Winter Games (in Sochi)

Alternative forms

The "standard" forms described above reflect typical modern usage rather than a universally accepted convention. Usage in ancient Rome varied greatly and remained inconsistent in medieval and modern times.[7]

Roman inscriptions, especially in official contexts, seem to show a preference for additive forms such as IIII and VIIII instead of (or even as well as) subtractive forms such as IV and IX. Both methods appear in documents from the Roman era, even within the same document. "Double subtractives" also occur, such as XIIX or even IIXX instead of XVIII. Sometimes V and L are not used, with instances such as IIIIII and XXXXXX rather than VI or LX.[8][9]

Such variation and inconsistency continued through the medieval period and into modern times, even becoming conventional. Clock faces that use Roman numerals normally show IIII for four o'clock but IX for nine o'clock,[10][11][12] a practice that goes back to very early clocks such as the Wells Cathedral clock. This is far from being an unvarying convention; the clock in Elizabeth Tower on the Palace of Westminster in London (aka "Big Ben"), for example, uses IV.[11]

At the beginning of the 20th century, confusion over the correct representation of 900 (conventionally CM) was reflected in several inscribed dates: for instance 1910 is shown on Admiralty Arch, London, as MDCCCCX rather than MCMX. On the north entrance to the Saint Louis Art Museum, 1903 was inscribed as MDCDIII rather than MCMIII.[13]

A typical clock face with Roman numerals in Bad Salzdetfurth, Germany

An inscription on Admiralty Arch, London. The number is 1910, for which MCMX would be more usual

History

Pre-Roman times and ancient Rome

Although Roman numerals came to be written with letters of the Roman alphabet, they were originally independent symbols. The Etruscans, for example, used I, Λ, X, ⋔, 8, and ⊕ for I, V, X, L, C, and M, of which only I and X happened to be letters in their alphabet.

Hypotheses about the origin of Roman numerals

Tally marks

One hypothesis is that the Etrusco-Roman numerals actually derive from notches on tally sticks, which continued to be used by Italian and Dalmatian shepherds into the 19th century.[14]

Thus, □I□ descends not from the letter □I□ but from a notch scored across the stick. Every fifth notch was double cut i.e. Λ, V, ⋋, ⋌, *etc.*), and every tenth was cross cut (X), IIIIΛIIIIXIIIIΛIIIIXII..., much like European tally marks today. This produced a positional system: *Eight* on a counting stick was eight tallies, IIIIΛIII, or the eighth of a longer series of tallies; either way, it could be abbreviated ΛIII (or VIII), as the existence of a Λ implies four prior notches. By extension, *eighteen* was the eighth tally after the first ten, which could be abbreviated X, and so was XΛIII. Likewise, number *four* on the stick was the I-notch that could be felt just before the cut of the Λ (V), so it could be written as either IIII or IΛ (IV). Thus the system was neither additive nor subtractive in its conception, but *ordinal*. When the tallies were transferred to writing, the marks were easily identified with the existing Roman letters I, V and X.

The tenth V or X along the stick received an extra stroke. Thus 50 was written variously as N, И, K, Ψ, ⋔, etc., but perhaps most often as a chicken-track shape like a superimposed V and I: Ѵ. This had flattened to ⊥ (an inverted T) by the time of Augustus, and soon thereafter became identified with the graphically similar letter L. Likewise, 100 was variously Ж, ⋉, ⋈, H, or as any of the symbols for 50

above plus an extra stroke. The form Ж (that is, a superimposed X and I) came to predominate. It was written variously as >I< or ƆIC, was then abbreviated to Ɔ or C, with C variant finally winning out because, as a letter, it stood for *centum*, Latin for "hundred".

The hundredth V or X was marked with a box or circle. Thus 500 was like a Ɔ superimposed on a ⤫ or ⊢ — that is, like a thorn □Þ□ with a cross bar or an eth, becoming Ð or Đ by the time of Augustus, under the graphic influence of the letter □D□. It was later identified *as* the letter D; an alternative symbol for "thousand" was (I) (or CIƆor C□Ɔ), and half of a thousand or "five hundred" is the right half of the symbol, I) (or IƆor □Ɔ), and this may have been converted into □D□.[15] This at least was the etymology given to it later on.

Meanwhile, 1000 was a circled or boxed X: ⊗, ⊗, ⊕, and by Augustinian times was partially identified with the Greek letter Φ *phi*. Over time, the symbol changed to Ψ and ⏀. The latter symbol further evolved into ∞, then ⋈, and eventually changed to M under the influence of the Latin word *mille* "thousand".

Hand signals

Alfred Hooper has an alternative hypothesis for the origin of the Roman numeral system, for small numbers.[16] Hooper contends that the digits are related to hand gestures for counting. For example, the numbers I, II, III, IIII correspond to the number of fingers held up for another to see. V, then represents that hand upright with fingers together and thumb apart. Numbers 6–10, are represented with two hands as follows (left hand, right hand) 6=(V,I), 7=(V,II), 8=(V,III), 9=(V,IIII), 10=(V,V) and X results from either crossing of the thumbs, or holding both hands up in a cross.

Intermediate symbols deriving from few original symbols

A third hypothesis about the origins states that the basic ciphers were I, X, C and Φ (or ⊕) and that the intermediary ones were derived from taking half of those (half a X is V, half a C is L and half a Φ/⊕ is D).[17]

Middle Ages and Renaissance

Minuscule (lower-case) letters were developed in the Middle Ages, well after the demise of the Western Roman Empire, and since that time lower-case versions of Roman numbers have also been commonly used: i, ii, iii, iv, and so on.

Since the Middle Ages, a "j" has sometimes been substituted for the final "i" of a "lower-case" Roman numeral, such as "iij" for 3 or "vij" for 7. This "j" can be considered a swash variant of "i". (see example [1] (http://www.marriagerecords.me.uk/roman-numerals/#.U764YkA1CSo)) The use of a final "j" is still used in medical prescriptions to prevent tampering with or misinterpretation of a number after it is written.[18][19]

Numerals in documents and inscriptions from the Middle Ages sometimes include additional symbols, which today are called "medieval Roman numerals." Some simply substitute another letter for the standard one (such as "A" for "V", or "Q" for "D") while others serve as abbreviations for compound numerals ("O" for "XI", or "F" for "XL"). Although they are still listed today in some dictionaries, they are long out of use.[20]

Num.	Medieval abbr.	Notes and etymology
5	A	Resembles an upside-down V. Also said to equal 500.
6	Ϲ	Either from a ligature of VI, or the Greek numeral 6: stigma (Ϲ).[21]
7	S, Z	Presumed abbreviation of *septem*, Latin for 7.
11	O	Presumed abbreviation of *onze*, French for 11.
40	F	Presumed abbreviation of English *forty*.
70	S	Also could stand for 7, with the same derivation.
80	R	
90	N	Presumed abbreviation of *nonaginta*, Latin for 90.
150	Y	Possibly derived from the lowercase y's shape.
151	K	Unusual, origin unknown; also said to stand for 250.[22]
160	T	Possibly derived from Greek *tetra*, as 4 x 40 = 160.
200	H	
250	E	
300	B	
400	P, G	
500	Q	Redundant with D, abbreviates *quingenti*, Latin for 500.
2000	Z	

Chronograms, messages with a numbers encoded into them, were popular during the Renaissance era. The chronogram would be a phrase containing the letters I, V, X, L, C, D, and M. By putting these letters together, the reader would obtain a number, usually indicating a particular year.

Modern use

By the 11th century, Hindu–Arabic numerals had been introduced into Europe from al-Andalus, by way of Arab traders and arithmetic treatises. Roman numerals however proved very persistent, remaining in common use in the West well into the 14th and 15th centuries, even in accounting and other business records (where the actual calculations would have been by abacus). Their eventual, *almost* complete replacement by their more convenient "Arabic" equivalents happened quite gradually; in fact Roman numerals are still sometimes used today, especially in certain niche contexts. A few examples of their current use are:

- Names of monarchs and popes, e.g. Elizabeth II of the United Kingdom, Pope Benedict XVI. These are referred to as regnal numbers; e.g. II is pronounced "the second". This tradition began in Europe sporadically in the Middle Ages, gaining widespread use in England only during the reign of Henry VIII. Previously, the monarch was not known by numeral but by an epithet such as Edward the Confessor. Some monarchs (e.g. Charles IV of Spain and Louis XIV of France) seem to have preferred the use of IIII instead of IV on their coinage (see illustration).
- Generational suffixes, particularly in the USA, for people sharing the same name across generations, for example William Howard Taft IV.

- The year of production of films, television shows and other works of art within the work itself. It has been suggested – by BBC News, perhaps facetiously – that this was originally done "in an attempt to disguise the age of films or television programmes."[23] Outside reference to the work will use regular Hindu–Arabic numerals.
- Hour marks on timepieces. In this context, 4 is usually written IIII.

- The year of construction on building faces and cornerstones.
- Page numbering of prefaces and introductions of books, and sometimes of annexes, too.
- Book volume and chapter numbers, as well as the several acts within a play (e.g. Act iii, Scene 2).
- Sequels of movies, video games, and other works (as in *Jaws IV*).
- Outlines that use numbers to show hierarchical relationships.
- Occurrences of a recurring grand event, for instance:
  - The Summer and Winter Olympic Games (e.g. the XXI Olympic Winter Games; the Games of the XXX Olympiad)
  - The Super Bowl, the annual championship game of the National Football League (e.g. Super Bowl XLVIII; Super Bowl 50 is a one-time exception[24])
  - WrestleMania, the annual professional wrestling event for the WWE (e.g. WrestleMania XXX). This usage has also been inconsistent.

Spanish Real using "IIII" instead of IV

In astronomy, the natural satellites or "moons" of the planets are traditionally designated by capital Roman numerals appended to the planet's name. For example, Titan's designation is Saturn VI.

In chemistry, Roman numerals are often used to denote the groups of the periodic table. They are also used in the IUPAC nomenclature of inorganic chemistry, for the oxidation number of cations which can take on several different positive charges. They are also used for naming phases of polymorphic crystals, such as ice.

Roman numbers on stern of *Cutty Sark*, Greenwich, showing draft in feet.

In seismology, Roman numerals are used to designate degrees of the Mercalli intensity scale of earthquakes.

In music theory, the diatonic functions are identified using Roman numerals. (See: Roman numeral analysis)

In musical performance practice, individual strings of stringed instruments, such as the violin, are often denoted by Roman numerals, with higher numbers denoting lower strings.

In pharmacy, Roman numerals are used in some contexts, including S to denote "one half" and N to mean "nothing".[25] (See the sections below on "zero" and "fractions".)

In photography, Roman numerals (with zero) are used to denote varying levels of brightness when using the Zone System.

In tarot, Roman numerals (with zero) are also used to denote the cards of the Major Arcana.

In theology and biblical scholarship, the Septuagint is often referred to as *LXX*, as this translation of the Old Testament into Greek is named for the legendary number of its translators (*septuaginta* being Latin for "seventy").

In computing, Roman numerals may be used in identifiers which are limited to alphabetic characters by syntactic constraints of the programming language. In LaTeX, for instance, `\labelitemiii` refers to the label of an item in the third level iii of a nested list environment.

Modern non-English use

Capital or small capital Roman numerals are widely used in Romance languages to denote **centuries**, e.g. the French *XVIIIᵉ siècle*[26] and the Spanish *siglo XVIII* mean "18th century". Slavic languages in and adjacent to Russia similarly favour Roman numerals (XVIII век). On the other hand, in Slavic languages in Central Europe, like most Germanic languages, one writes "18." (with a period) before the local word for "century".

In many European countries, mixed Roman and Hindu-Arabic numerals are used to record dates (especially in formal letters and official documents, but also on tombstones). The **month** is written in Roman numerals, while the day is in Hindu-Arabic numerals: 14.VI.1789 is 14 June 1789.
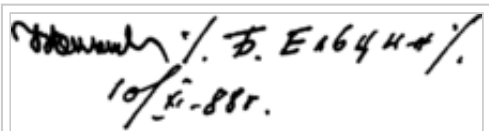
Boris Yeltsin's signature, dated 10 November 1988. The month is specified by "XI" rather than "11".

Sample hours-of-operation sign

I	9:00–17:00
II	10:00–19:00
III	9:00–17:00
IV	9:00–17:00
V	10:00–19:00
VI	9:00–13:00
VII	—

In parts of Europe it is conventional to employ Roman numerals to represent the **days of the week** in hours-of-operation signs displayed in windows or on doors of businesses,[27] and also sometimes in railway and bus timetables. Monday is represented by I, which is the initial day of the week. Sunday is represented by VII, which is the final day of the week. The hours of operation signs are tables composed of two columns where the left column is the day of the week in Roman numerals and the right column is a range of hours of operation from starting time to closing time. In the sample chart (left), the business opens from 9 AM to 5 PM on Mondays, Wednesdays, and Thursdays; 10 AM to 7 PM on Tuesdays and Fridays; and to 1 PM on Saturdays; and is closed on Sundays.

In several European countries Roman numerals are used for floor numbering.[28][29] For instance, apartments in central Amsterdam are indicated as *138-III*, with both an Hindu-Arabic numeral (number of the block or house) and a Roman numeral (floor number). The apartment on the ground floor is indicated as '138-huis'.

In Italy, where roads outside built-up areas have kilometer signs, major roads and motorways also mark 100-metre subdivisionals, using Roman numerals from I to IX for the smaller intervals. The sign "IX | 17" thus marks kilometre 17.9.

A notable exception to the use of Roman numerals in Europe is in Greece, where Greek numerals (based on the Greek alphabet) are generally used in contexts where Roman numerals would be used elsewhere.

Sign at km. 17·9 on route SS4 Salaria, north of Rome

Special values

Zero

The number zero does not have its own Roman numeral, but the word *nulla* (the Latin word meaning "none") was used by medieval computists in lieu of 0. Dionysius Exiguus was known to use *nulla* alongside Roman numerals in 525.[30][31] About 725, Bede or one of his colleagues used the letter N, the initial of *nulla*, in a table of epacts, all written in Roman numerals.[32]

Fractions

A *triens* coin (1/3 or 4/12 of an *as*). Note the four dots •••• indicating its value.

Though the Romans used a decimal system for whole numbers, reflecting how they counted in Latin, they used a duodecimal system for fractions, because the divisibility of twelve ($12 = 3 \times 2 \times 2$) makes it easier to handle the common fractions of 1/3 and 1/4 than does a system based on ten ($10 = 2 \times 5$). On coins, many of which had values that were duodecimal

A *semis* coin (1/2 or 6/12 of an *as*). Note the S indicating its value.

fractions of the unit *as*, they used a tally-like notational system based on twelfths and halves. A dot (•) indicated an *uncia* "twelfth", the source of the English words *inch* and *ounce*; dots were repeated for fractions up to five twelfths. Six twelfths (one half) was abbreviated as the letter *S* for *semis* "half". *Uncia* dots were added to *S* for fractions from seven to eleven twelfths, just as tallies were added to V for whole numbers from six to nine.[33]

Each fraction from 1/12 to 12/12 had a name in Roman times; these corresponded to the names of the related coins:

Fraction	Roman numeral	Name (nominative and genitive)	Meaning
1/12	•	*uncia, unciae*	"ounce"
2/12 = 1/6	•• or **:**	*sextans, sextantis*	"sixth"
3/12 = 1/4	••• or ∴	*quadrans, quadrantis*	"quarter"
4/12 = 1/3	•••• or **::**	*triens, trientis*	"third"
5/12	••••• or **:·:**	*quincunx, quincuncis*	"five-ounce" (*quinque unciae → quincunx*)
6/12 = 1/2	S	*semis, semissis*	"half"
7/12	S•	*septunx, septuncis*	"seven-ounce" (*septem unciae → septunx*)
8/12 = 2/3	S•• or S**:**	*bes, bessis*	"twice" (as in "twice a third")
9/12 = 3/4	S••• or S**:**·	*dodrans, dodrantis* **or** *nonuncium, nonuncii*	"less a quarter" (*de-quadrans → dodrans*) **or** "ninth ounce" (*nona uncia → nonuncium*)
10/12 = 5/6	S•••• or S**::**	*dextans* **or** decunx, decuncis	"less a sixth" (*de-sextans → dextans*) **or** "ten ounces" (*decem unciae → decunx*)
11/12	S••••• or S**:·:**	*deunx*	"less an ounce" (*de-uncia → deunx*)
12/12 = 1	I	*as, assis*	"unit"

The arrangement of the dots was variable and not necessarily linear. Five dots arranged like (:·:) (as on the face of a die) are known as a quincunx, from the name of the Roman fraction/coin. The Latin words *sextans* and *quadrans* are the source of the English words *sextant* and *quadrant*.

Other Roman fractional notations included the following:

- 1/8 *sescuncia, sescunciae* (from *sesqui-* + *uncia*, i.e. 1½ uncias), represented by a sequence of the symbols for the semuncia and the uncia.
- 1/24 *semuncia, semunciae* (from *semi-* + *uncia*, i.e. ½ uncia), represented by several variant glyphs deriving from the shape of the Greek letter Sigma (Σ), one variant resembling the pound sign (£) without the horizontal line(s) and another resembling the Cyrillic letter Є.
- 1/36 *binae sextulae, binarum sextularum* ("two sextulas") or *duella, duellae*, represented by a sequence of two reversed Ss (ƧƧ).
- 1/48 *sicilicus, sicilici*, represented by a reversed C (Ɔ).
- 1/72 *sextula, sextulae* (1/6 of an uncia), represented by a reversed S (Ƨ).
- 1/144 = 12^{-2} *dimidia sextula, dimidiae sextulae* ("half a sextula"), represented by a reversed S crossed by a horizontal line (Ƨ).
- 1/288 *scripulum, scripuli* (a scruple), represented by the symbol Э.
- 1/1728 = 12^{-3} *siliqua, siliquae*, represented by a symbol resembling closing guillemets (»).

Large numbers

Modern use of Roman numerals involves relatively small numbers (theoretically, up to 3,999); in historical times a systematic method was obviously needed for representing much larger numbers. There were at least two such systems. In one, a horizontal overline line was used above a particular numeral (or part of it) to multiply the number concerned by one thousand times; thus:

- $\overline{\mathrm{I}}$ for 1000
- $\overline{\mathrm{VI}}$ for 6000

Adding further vertical lines before and after the numeral might also be used to raise the multiplier to (say) one hundred thousand, or a million. thus:
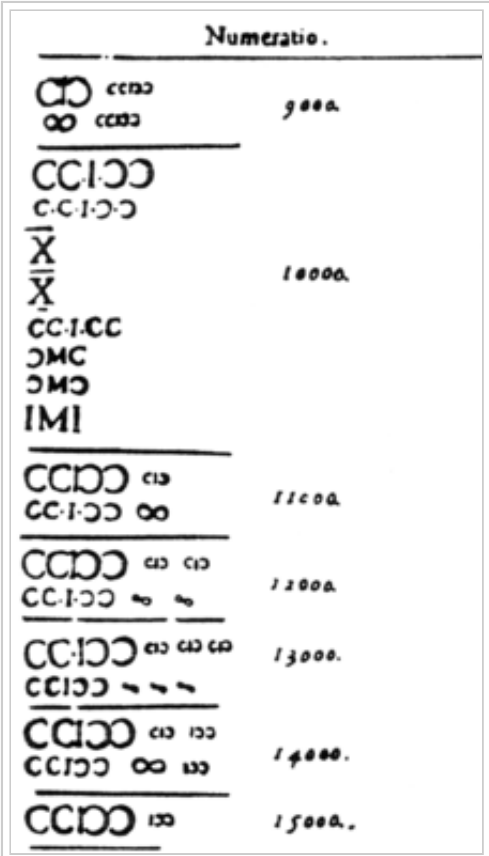
- |$\overline{\mathrm{VIII}}$| for 800,000
- |$\overline{\mathrm{XX}}$| for 2,000,000

This needs to be distinguished from the custom of adding both underline and overline to a Roman numeral, simply to make it clear that it IS a number, e.g. MCMLXVII. Certain (serif) typefaces, for example Times New Roman, are designed with serifs that simulate the appearance of the under/over bar, e.g. MCMLXVII.

In the second system, 500 (usually written as "D") was written as |Ɔ, while 1,000 was written as C|Ɔ instead of "M".[15] This is a system of encasing numbers to denote thousands (imagine the Cs and Ɔs as parentheses), which has its origins in Etruscan numeral usage. The D and M used to represent 500 and 1,000 were most likely derived from |Ɔ and C|Ɔ, respectively, and subsequently influenced the adoptions of "D" and "M" in conventional Roman numerals.

In this system, an extra Ɔ denoted 500, and multiple extra Ɔs are used to denote 5,000, 50,000, etc. For example:

Writing large numbers, from a 16th-century manual

Base number		C|Ɔ = 1,000	CC|ƆƆ = 10,000	CCC|ƆƆƆ = 100,000
1 extra Ɔ	|Ɔ = 500	C|ƆƆ = 1,500	CC|ƆƆƆ = 10,500	CCC|ƆƆƆƆ = 100,500
2 extra Ɔs	|ƆƆ = 5,000		CC|ƆƆƆƆ = 15,000	CCC|ƆƆƆƆƆ = 105,000
3 extra Ɔs	|ƆƆƆ = 50,000			CCC|ƆƆƆƆƆƆ = 150,000

"1630" on the Westerkerk in Amsterdam

Sometimes C|Ɔ was reduced to ⴖ for 1,000. John Wallis is often credited for introducing the symbol for infinity (modern ∞), and one conjecture is that he based it on this usage, since 1,000 was hyperbolically used to represent very large numbers. Similarly, |ƆƆ for 5,000 was reduced to Ð; CC|ƆƆ for 10,000 to ⴖ; |ƆƆƆ for 50,000 to □; and CCC|ƆƆƆ for 100,000 to □.

See also

- Etruscan numerals
- Kharosthi
- Roman abacus
- Roman numerals in Unicode
- Urnfield culture numerals

References

1. Alphabetic symbols for larger numbers, such as Q for 500,000, have also been used to various degrees of standardization.Gordon, Arthur E. (1982). *Illustrated Introduction to Latin Epigraphy*. Berkeley: University of California Press. ISBN 0520050797.
2. Reddy, Indra K.; Khan, Mansoor A. (2003). *Essential Math and Calculations for Pharmacy Technicians* (http://books.google.com/books?id=U3QY7gz0C2cC). CRC Press.
3. Dela Cruz, M. L. P.; Torres, H. D. (2009). *Number Smart Quest for Mastery: Teacher's Edition* (http://books.google.com/books?id=PVK6lt2xXz4C). Rex Bookstore, Inc.
4. Martelli, Alex; Ascher, David (2002). *Python Cookbook* (http://books.google.com/books?id=yhfdQgq8JF4C). O'Reilly Media Inc.
5. Stroh, Michael. *Trick question: How to spell 1999? Numerals: Maybe the Roman Empire fell because their computers couldn't handle calculations in Latin.* (http://articles.baltimoresun.com/1998-12-27/news/1998361013_1_roman-numerals-roman-numbers-information-on-roman/) *The Baltimore Sun*, December 27, 1998.
6. Hayes, David P. "Guide to Roman Numerals" (http://chart.copyrightdata.com/ch02.html). *Copyright Registration and Renewal Information Chart and Web Site*.
7. Adams, Cecil (February 23, 1990). "The Straight Dope" (http://www.straightdope.com/columns/read/1371/what-is-the-proper-way-to-style-roman-numerals-for-the-1990s). *The Straight Dope*.
8. Joyce Maire Reynolds and Anthony J. S. Spawforth, *numbers, Roman* entry in *Oxford Classical Dictionary*, 3rd edition, ed Simon Hornblower and Anthony Spawforth (Oxford University Press, 1996) ISBN 0-19-866172-X
9. Kennedy, Benjamin Hall (1923). *The Revised Latin Primer*. London: Longmans, Green & Co.
10. W.I. Milham, *Time & Timekeepers* (New York: Macmillan, 1947) p. 196
11. Pickover, Clifford A. (2003), *Wonders of Numbers: Adventures in Mathematics, Mind, and Meaning* (http://books.google.com/books?id=52N0JJBspM0C&pg=PA282), Oxford University Press, p. 282, ISBN 9780195348002.
12. Adams, Cecil; Zotti, Ed (1988), *More of the straight dope*, Ballantine Books, p. 154, ISBN 9780345351456.
13. "Gallery: Museum's North Entrance (1910)" (http://www.slam.org/century_of_free/gallery.php). Saint Louis Art Museum. Retrieved 10 January 2014. "The inscription over the North Entrance to the Museum reads: "Dedicated to Art and Free to All · MDCDIII". These Roman numerals translate to 1903, indicating that the engraving was part of the original building designed for the 1904 World's Fair (http://1904%20World's%20Fair)."
14. Ifrah, Georges (2000). *The Universal History of Numbers: From Prehistory to the Invention of the Computer*. Translated by David Bellos, E. F. Harding, Sophie Wood, Ian Monk. John Wiley & Sons.
15. Asimov, Isaac (1977) [1966]. *Asimov On Numbers*. Pocket Books, a division of Simon & Schuster, Inc. p. 9.
16. Alfred Hooper. *The River Mathematics* (New York, H. Holt, 1945).
17. Keyser, Paul (1988). "The Origin of the Latin Numerals 1 to 1000" (http://www.jstor.org/stable/505248). *American Journal of Archaeology* **92**: 529–546.
18. Sturmer, Julius W. Course in Pharmaceutical and Chemical Arithmetic, 3rd ed. (LaFayette, IN: Burt-Terry-Wilson, 1906). p25 (http://books.google.com/books?id=-uHqQSWSPdwC&pg=PA25#v=onepage&q=&f=false) Retrieved on 2010-03-15.
19. Bastedo, Walter A. Materia Medica: Pharmacology, Therapeutics and Prescription Writing for Students and Practitioners, 2nd ed. (Philadelphia, PA: W.B. Saunders, 1919) p582 (http://books.google.com/books?id=XesRAAAAYAAJ&pg=PA582#v=onepage&q=&f=false) Retrieved on 2010-03-15.
20. Capelli, A. *Dictionary of Latin Abbreviations*. 1912.
21. Perry, David J. Proposal to Add Additional Ancient Roman Characters to UCS (http://std.dkuug.dk/jtc1/sc2/wg2/docs/N3218.pdf).
22. Bang, Jørgen. *Fremmedordbog*, Berlingske Ordbøger, 1962 (Danish)

23. Owen, Rob (2012-01-13). "TV Q&A: ABC News, 'Storage Wars' and 'The Big Bang Theory'" (http://communityvoices.sites.post-gazette.com/index.php/arts-entertainment-living/tuned-in-journal/31514-tv-qaa-abc-news-storage-wars-and-the-big-bang-theory). *Pittsburgh Post-Gazette.* Retrieved 2012-01-13.
24. NFL won't use Roman numerals for Super Bowl 50 (http://www.nfl.com/news/story/0ap2000000355943/article/nfl-wont-use-roman-numerals-for-super-bowl-50), nfl.com, Retrieved November 5, 2014
25. Bachenheimer, Bonnie S. (2010). *Manual for Pharmacy Technicians*. ISBN 158528307X.
26. *Lexique des règles typographiques en usage à l'imprimerie nationale* (in French) (6th ed.). Paris: Imprimerie nationale. March 2011. p. 126. ISBN 978-2-7433-0482-9. *On composera en chiffres romains petites capitales les nombres concernant : ↵ 1. Les siècles.*
27. Beginners latin (http://www.nationalarchives.gov.uk/latin/beginners/dating/default.htm), Nationalarchives.gov.uk, Retrieved December 1, 2013
28. Roman Arithmetic (http://turner.faculty.swau.edu/mathematics/materialslibrary/roman/), Southwestern Adventist University, Retrieved December 1, 2013
29. Roman Numerals History (http://romannumerals.info/roman-numerals-history/), Retrieved December 1, 2013
30. Faith Wallis, trans. *Bede: The Reckoning of Time* (725), Liverpool: Liverpool Univ. Pr., 2004. ISBN 0-85323-693-3.
31. *Byrhtferth's Enchiridion* (1016). Edited by Peter S. Baker and Michael Lapidge. Early English Text Society 1995. ISBN 978-0-19-722416-8.
32. C. W. Jones, ed., *Opera Didascalica*, vol. 123C in *Corpus Christianorum, Series Latina*.
33. Maher, David W.; Makowski, John F., "Literary Evidence for Roman Arithmetic with Fractions (http://dmaher.org/Publications/romanarithmetic.pdf)", *Classical Philology* **96** (2011): 376–399.

Sources

- Menninger, Karl (1992). *Number Words and Number Symbols: A Cultural History of Numbers*. Dover Publications. ISBN 978-0-486-27096-8.

External links

- FAQ: Why do clocks with Roman numerals use "IIII" instead of "IV"? (http://www.ubr.com/clocks/faq/iiii.html)

Look up *Appendix:Roman numerals* or *roman numeral* in Wiktionary, the free dictionary.

Wikimedia Commons has media related to *Roman numerals*.

Retrieved from "http://en.wikipedia.org/w/index.php?title=Roman_numerals&oldid=661923000"

Categories: Numerals │ Numeral systems │ Roman mathematics │ Latin alphabet