

# Roman Numerals Presentation

**Intended for Grade:** 3<sup>rd</sup> grade

**Subject:** Math

**Description:** This lesson is to teach the children about their math symbols (specifically <, >, =) using numbers and Roman numerals. They will learn to distinguish among I=1, V=5, X=10, L=50, C=100, D=500, and M=1000. This lab is interesting to children because it teaches them math in a language that was used in ancient times.

**Objective:** The student will be able to recognize roman numerals 1 to 100, write roman numerals 1 to 100, order roman numerals (less than, greater than, equal to). They should be able to interpret Roman numerals in the uses they still have today (in an outline, as part of chapters in a book, numbers on a clock face, describing which Super Bowl is which, etc.). As a result of doing this activity, the students will learn that there is more than one way to represent a number; just as there are different languages for words, there are different languages for numbers as well.

## **State Framework addressed:**

- Math Framework Some number and letter 6: Read and write Roman Numerals 1 to 100.

## **National Standard addressed:**

- Math Standard: Numbers and Operations

## **Materials:**

- Pixy stix
- An equation sign card with < on one side and = on the back
- Roman Numerals displayed in room

- Cards of Arabic and Roman Numerals

## Background:

Roman numerals are letters that the Romans used in their time to represent numbers. The letters and values are: I=1, V=5, X=10, L=50, C=100, D=500, M=1000. Numbers are constructed by putting these values together from highest to lowest (i.e. XVII=17, DCLXI=661). However, no more than three of a given Roman numeral in a row is considered proper; instead of four in a row of a Roman numeral  $n$ , you just write the symbol for the value that it would equal if you were to add one more  $n$ , and then put another  $n$  behind it (i.e. IV instead of IIII, XC instead of LXXXX, CD instead of CCCC).

Also keep in mind that Roman numerals are constructed one place value at a time (i.e. 1000s, then 100s, then 10s, then 1s) and therefore a translatable value can be constructed that is not in proper form. For example, it is not proper to write 95 as VC (=100-5) because you are subtracting a 1s place value from a 100s. Instead you must first subtract a 10s value before adding on the required 1s place value. To return to the example, you start with C=100. Then, you can only subtract the 10s place value so you choose to subtract a single 10s place value (XC), and then you have 90. Now that you have properly represented the 10s value, you can add the necessary single 1s place value by adding 5 (CXV). Similarly, 1996 cannot be written as MIVM, but should instead be written MCMXCVI. To illustrate this a bit more, think of the place values in rows--

I, V ---1s  
 X, L---10s  
 C, D---100s  
 M---1000s

--and you can only subtract values from a number if they are in the row right before it. So if you have M (1000s), you can only subtract D or C (100s) before moving on to X or L (10s), or I or V (1s). But of course there are no restrictions of this kind for adding: You may write 1,016 as MXVI or 102 as CII. We mention this only so that you will be aware of it, and that you may choose which numbers you use as examples to get around this. It is doubtful you will have time or your class will have the capacity to understand this

concept given the short time period. You may try to teach it if you think you have time and if you think they can handle it.

## Procedure:

Advanced Preparation: In the beginning, you will be explaining to them how to read Roman numerals; for this you need to be familiar with what you are going to say and the examples that you are going to use. Other than that, you will only be passing out worksheets, having the kids participate as numbers in some exercises, and handing out pixy stix to them.

### Procedure:

1. Ask the kids this question: Is it possible to do math using letters instead of numbers? Let them try to answer.
2. Tell the kids that today they are going to learn math without numbers; they will learn how to write a "secret code" of math used in ancient times.
3. Ask them if they have seen Roman numerals on everyday items they encounter. [Possible answers:] grandfather clock, book chapter or volume numbers, in titles of movies (Superman II, Rocky IV) or cars (Lincoln Mark VIII) or video games (Contra III), etc....
4. Put the transparency with the symbols:  $>$ ,  $<$ ,  $=$ , I, V, X, L, C, on the overhead or write these symbols on the board, and leave it there throughout class as a reference for the kids or you could have a poster with these symbols available.
5. Go over slowly which number each one stands for. At this time, it is probably best to write the Roman numerals on the board (if you have one) next to their corresponding values. To be sure that they know the material well, you should take away any answers you have written down and quiz them on what each Roman numeral means before continuing.
6. When explaining to them how to read Roman numerals, tell them to always read left to right, like a book. Start at the left and scan all the way through the Roman numeral. If you see a bigger number after a smaller number anywhere, tell them that means *subtraction* (emphasize this with inflection so it sticks), and tell them when they see this they must for the very first step subtract these two

numbers. If not, then you are ready to go on to the next step. Next, add up all of the numbers going from left to right including the result of any subtraction that you did.

7. Then do some examples to solidify the concepts. Here are a few:

Example 1: III.  $I=1$ . In 1, 1, 1 -- there are no smaller numbers after bigger numbers. So  $1+1+1=3$ .

Example 2: VII.  $V=5$  and  $I=1$ . In 5, 1, 1 -- there are no smaller numbers after bigger numbers. So,  $5+1+1=7$ .

Example 3: IV.  $I=1$  and  $V=5$ . In 1, 5 -- 5 is after 1 and it is also bigger, so  $5-1=4$ .

Example 4: IX.  $I=1$  and  $X=10$ . In 1, 10 -- 10 is after 1 and is also bigger, so  $10-1=9$ .

Example 5: XIV.  $X=10$ ,  $I=1$ , and  $V=5$ . In 10, 1, 5 -- 5 is after 1 and it is also bigger, so  $5-1=4$ . Then 10, 4 -- In 10, 4 there are no longer any bigger numbers after smaller numbers so  $10+4=14$ .

Example 6: XXVII.  $X=10$ ,  $V=5$ , and  $I=1$ . In 10, 10, 5, 1, 1-- there are no smaller numbers after bigger numbers, so  $10+10+5+1+1=27$ .

### **Activity 1:**

**Purpose:** to review Roman numerals

**Suggested time:** 10-15 min.

**Materials:** Worksheets

**Procedure:** Hand out the worksheet to all the kids, and go over the problems one at a time. Give at least 15-20 seconds for each problem so all the kids can have a chance to figure it out by themselves before you go over it.

Then, ask one of them to give the answer and then reiterate the explanation for that particular problem or have the kid who answered explain it. The answers are:

1) 24

- 2) 79
- 3) 49
- 4) 29
- 5) 92
- 6) 83
- 7) 32
- 8) 48
- 9) 54
- 10) 57

**Expected results:** The kids should be able to translate the Roman numerals into Arabic numbers.

### **Activity 2:**

**Purpose:** To have kids use Arabic and Roman numerals in an equation.

**Suggested time:** 20-25 min.

### **Materials:**

- Arabic number cards
- Roman numeral cards
- Card with < and = on each side

**Procedure:** You have laminated cards of all of the Arabic numbers and of the Roman numerals you chose (some cards are included with this project), and also a card with an = sign on the back and a > (that can be turned upside-down for <) sign on the front.

A) [Realize that some classes probably already know < and >, and some probably do not. So figure out whether they know this already, and if they do not, then be prepared to do a short little spiel before Activity 2 about how the mouth (the < or >) always wants to eat the bigger number—"If the sign were your mouth, would you rather eat 10 cookies or 2 cookies?" might be a good question to ask if introducing this.]

Start with Arabic numbers. Have the kids volunteer to "be" a number, and then arrange them so that they make 2 different numbers. Then have a volunteer hold the equation card in the center, and have him (with the help of the rest of the class) determine what the equation card should read (<, >,

or =). Repeat this part of the activity with a few different numbers, and then move on to B. They probably already know how to use these symbols fairly well, so this part shouldn't take too long.

**B)** Now repeat the same activity with Roman numerals on one side and Arabic numbers on the other.

**C)** Now repeat the activity again using only Roman numerals. Again, use the size of the numbers at your discretion according to how fast your class is picking up the concepts.

**D)** If time permits, try instead using 2 signs (< and < or > and >), this time holding the signs stationary first, and then forming groups of kids into Roman numerals, and getting the groups of kids (instead of changing the < or > like the last activities) to arrange themselves (who represent entire numbers) in ascending or descending order using both signs.

**Expected results:** Kids should be able to use the (<, >, =) not only with Arabic numbers but with Roman numerals as well, combining two previous math concepts that have been introduced.

### **Activity 3:**

**Purpose:** to translate Arabic numbers to Roman numerals.

**Suggested time:** 10-15 min.

**Materials:** pixy stix

**Procedure:** Divide the class up in to groups of 3 or 4 depending on class size. Hand out 10 pixy stix to each group. You are going to call a number and help each group to see if they can construct the Roman numeral corresponding to the Arabic number.

The suggested pattern is:

9 (IX)

4 (IV)

17 (XVII)

19 (XIX)

24 (XXIV)

76 (LXXVI)

46 (XLVI)

etc. [be sure any other number you call can be formed using 10 pixy stix or fewer]

**Safety Consideration:** This candy contains pure sugar so be careful. For complete information look at the ingredients section on the bag.

**Expected results:** The kids should be able to translate Roman numerals into Arabic numbers.

## Extended Activities:

Ask them what these symbols mean: >, <, =, I, V, X, L, C, D, M.

(probably one student should be able to handle telling you what each one means—present it as a challenge to see if any *one* person can tell you what *all* the symbols mean)

Be sure that you have introduced D and M before this one. Pass out a dollar bill to each of the kids (or to each group of kids depending on how many dollar bills you have), and ask them if they can find where this common everyday item has Roman numeral on it. [It is on the back on the bottom of the pyramid.] Once they have found it, ask if they can translate it, going through the process at a rate of your discretion. After that, you might want to ask them if anyone knows the significance of that number—why is it on the United States dollar bill? They should make the 1776=Declaration of Independence connection, so give them a chance to guess, but go ahead and tell them if no one knows.

Ask for one bold volunteer to see if he can write all the Roman numerals from 1-20 (or whatever you think best fits how your class is doing—1-50 would be excellent if possible), and let the class help him if he needs it. This

is important so that they can all see how Roman numerals sequence, which they may not have picked up on indirectly by now.

Tell them that at the end of every movie, at the very end of the credits, the year the movie was made is represented in Roman numerals. So, suggest that the next time they watch a movie in a theater or rent a movie, they wait until the very end of the credits, and notice the Roman numeral, and try to translate it before it scrolls by.

### **Sources:**

<http://www.col-ed.org/cur/math/math41.txt>

<http://www.is.kiruna.se/~pma/roman.html>

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### **Prepared by:**

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Month Year



Name: \_\_\_\_\_

Group names: \_\_\_\_\_

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## Roman Numerals Worksheet

1. XXIV = \_\_\_\_\_

2. LXXIX = \_\_\_\_\_

3. XLIX = \_\_\_\_\_

4. XXIX = \_\_\_\_\_

5. XCII = \_\_\_\_\_

6. LXXXIII = \_\_\_\_\_

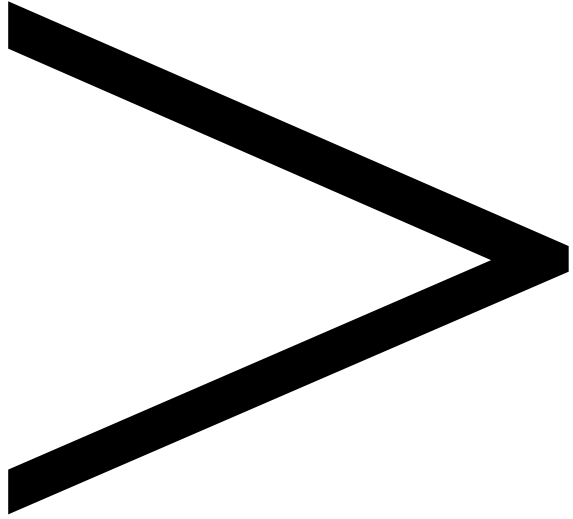
7. XXXII = \_\_\_\_\_

8. XLVIII = \_\_\_\_\_

9. LIV = \_\_\_\_\_

10. LVII = \_\_\_\_\_





\_\_\_\_\_

\_\_\_\_\_

**XLI**

XVI

LI

VIII



**XXI**

LXXI

XCI

C

L

**X**

**V**

**XV**



**XXV**

LXIII

LXVI

XCLX

XIV

**XXX**

**XLII**

lv



**LX**

LXXX

VIII

XCV

41

16

52

8

21



71

91

100

50

10

5

15

25



63

66



99

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14

30

42

55

60



88

94