

Roman numerals use letters to represent values. Arabic numerals are the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 that we use today.

Students need to memorize the following chart of Roman numerals and the values they translate to in Arabic numerals.

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

To convert Roman numerals to Arabic numerals, students should learn the following rules:

1. If a Roman symbol is followed by a symbol that is equal or less than it, add the value of the two symbols together. For example, in the Roman numeral XV, the symbol X for 10 is followed by the symbol V for 5. Since 5 is less than 10, you add  $10 + 5 = 15$ . So,  $XV = 15$ .
2. If a Roman symbol is followed by a symbol that is greater than it, subtract the value of the larger one minus the smaller one. For example, in the Roman numeral IX, the symbol I for 1 is followed by the symbol X for 10. Since 10 is greater than 1, subtract  $10 - 1 = 9$ . So,  $IX = 9$ . *(Please note that you can only use the subtraction rule when dealing with the next place value only. For example, to write 45, you cannot write VL. You should correctly write XLV. The exception to this rule deals with nines: IX = 9, XC = 90, and CM = 900.)*
3. Always start on the left side of the numbers and work to the right.
4. There is only one correct way to write each part of a Roman numeral.
5. Never use more than three of the same Roman symbols in succession. If you think you need to use a fourth symbol, you probably need to use the subtraction rule.

Examples:

Ex [1] 17 = \_\_\_\_\_ (roman numerals)

- a)  $17 = 10 + 5 + 2$
- b)  $17 = X + V + II$
- c)  $17 = XVII$  in Roman numerals.

Ex [2] 19 = \_\_\_\_\_ (roman numerals)

If you use only addition on this number, you could get XVIII. However, you cannot use more than three of the same symbols in succession. The number XVIII has four I's, so we cannot write this number. We should use the subtraction method.

- a)  $19 = 10 + 9$
- b)  $19 = 10 + (10 - 1)$
- c)  $19 = X + X - I$
- d)  $19 = XIX$  \*Switch the last I and X to show subtraction

Ex [3] 273 = \_\_\_\_\_ (roman numerals)

- a)  $273 = 200 + 70 + 3$
- b)  $273 = (100 + 100) + (50 + 10 + 10) + (1 + 1 + 1)$
- c)  $273 = C C L X X I I I$
- d)  $273 = CCLXXIII$

Ex [4] XII = \_\_\_\_\_

Start from the left and break down the symbols. (Remember, if the first symbol is less than the next symbol, you need to subtract the values.)

- a)  $XII = X + I + I$
- b)  $XII = 10 + 1 + 1$
- c)  $XII = 12$

Ex [5] XXIX = \_\_\_\_\_

Working from the left to the right, we get XXIX = X + X + IX. Since I appears before an X, we subtract: X - I. So...

- a) XXIX = X + X + IX
- b) XXIX = X + X + (X - I)
- c) XXIX = 10 + 10 + (10 - 1)
- d) XXIX = 10 + 10 + 9
- e) XXIX = 29

Ex [6] CCCXLIV = \_\_\_\_\_

There are two subtraction parts to this problem: XL = L - X = 50 - 10 = 40 and IV = V - I = 5 - 1 = 4.

- a) CCCXLIV = CCC + XL + IV
- b) CCCXLIV = 300 + 40 + 4
- c) CCCXLIV = 344