

# UNIT 1

## BASIC ARITHMETIC

### What is arithmetic?

Arithmetic or arithmetics (from the Greek word arithmētikē which literally means the art of counting) is the oldest and most elementary branch of mathematics, used by almost everyone, for tasks ranging from simple daily counting to advanced science and business calculations. In common usage, the word refers to a branch of (or the forerunner of) mathematics which records elementary properties of certain operations on numbers. Professional mathematicians sometimes use the term higher arithmetic as a synonym for number theory, but this should not be confused with elementary arithmetic.

### What will be learned/reviewed in this unit?

- roman numerals
- decimal places
- rounding
- significant figures
- addition, subtraction, multiplication and division of decimals
- parts of a fraction
- addition, subtraction, multiplication and division of fractions
- percentages
- 24 hour clocks
- exponents
- scientific notation
- ratios
- proportions
- dimensional analysis
- 5 step problem solving method

*Math is usually taught as all scales and no music.*

*-- Persis Herold*



# CHAPTER 1

## NUMERAL SYSTEMS USED IN PHARMACY



There are two major number systems used in pharmacy :

- Arabic Numbers – these are the symbols we use every day for enumeration, such as 1, 16, and 1337.
- Roman Numerals – this is a numeral system originating in ancient Rome. Roman numerals are expressed by letters of the alphabet.

The following is a chart showing how to convert back and forth between Arabic numbers and Roman numerals:

i	1	xxi	21	xli	41	lxi	61	lxxxi	81
ii	2	xxii	22	xlII	42	lxii	62	lxxxii	82
iii	3	xxiii	23	xlIII	43	lxiii	63	lxxxiii	83
iv	4	xxiv	24	xliv	44	lxiv	64	lxxxiv	84
v	5	xxv	25	xlV	45	lxv	65	lxxxv	85
vi	6	xxvi	26	xlvi	46	lxvi	66	lxxxvi	86
vii	7	xxvii	27	xlvii	47	lxvii	67	lxxxvii	87
viii	8	xxviii	28	xlviii	48	lxviii	68	lxxxviii	88
ix	9	xxix	29	xlIX	49	lxix	69	lxxxix	89
x	10	xxx	30	l	50	lxx	70	xc	90
xi	11	xxxi	31	li	51	lxxi	71	xcI	91
xii	12	xxxii	32	lii	52	lxxii	72	xcii	92
xiii	13	xxxiii	33	liii	53	lxxiii	73	xciii	93
xiv	14	xxxiv	34	liv	54	lxxiv	74	xciv	94
xv	15	xxxv	35	lv	55	lxxv	75	xcv	95
xvi	16	xxxvi	36	lvi	56	lxxvi	76	xcvi	96
xvii	17	xxxvii	37	lvii	57	lxxvii	77	xcvii	97
xviii	18	xxxviii	38	lviii	58	lxxviii	78	xcviii	98
xix	19	xxxix	39	lix	59	lxxix	79	xcix	99
xx	20	xl	40	lx	60	lxxx	80	c	100
								d	500
								m	1000

Most people that have previously learned Roman numerals learned them using all capital letters; but in health care you will usually see them written in lower case letters (although either way is acceptable). Roman numerals consist of a basic set of seven symbols:

I or i	1	C or c	100
V or v	5	D or d	500
X or x	10	M or m	1000
L or l	50		

Here is how to count from 1 to 10 using Roman numerals:

I or i for one  
 II or ii for two  
 III or iii for three  
 IV or iv for four\*  
 V or v for five  
 VI or vi for six  
 VII or vii for seven  
 VIII or viii for eight  
 IX or ix for nine  
 X or x for ten

\* four strokes seemed like too many to the Romans, so they limited letter repetition to three

The principles for reading Roman numerals are:

- A letter repeated once or twice repeats its value that many times (XXX = 30, CC = 200, etc.).
- One or more letters that are placed after another letter of greater value increases the greater value by the amount of the smaller (VI = 6, LXX = 70, MCC = 1200, etc.).
- A letter placed before another letter of greater value decreases the greater value by the amount of the smaller (IV = 4, XC = 90, CM = 900, etc.).\*

\* Rules regarding Roman numerals often state that a symbol representing  $10^x$  may not precede any symbol larger than  $10^{x+1}$ . For example, C cannot be preceded by I or V, only by X (or, of course, by a symbol representing a value equal to or larger than C). Thus, one should represent the number "ninety-nine" as XCIX, not as the "shortcut" IC

Convert the following Roman numerals to Arabic numbers:

- 1) VII
- 2) xxii
- 3) XXVII
- 4) iv
- 5) XIX
- 6) xiv
- 7) XII
- 8) ii
- 9) XXIV
- 10) vi
- 11) IV
- 12) iii

Convert the following Arabic numbers to Roman numerals:

- 13) 28
- 14) 13
- 15) 17
- 16) 15
- 17) 9
- 18) 12
- 19) 50
- 20) 41
- 21) 89
- 22) 2007
- 23) 1776
- 24) 1337

1) 7 2) 22 3) 27 4) 4 5) 19 6) 14 7) 12 8) 2 9) 24 10) 6 11) 4 12) 3  
 13) xxxviii 14) xiii 15) xvii 16) xvi 17) ix 18) xii 19) i 20) xli 21) lxxxix  
 22) mmvii 23) mdcclxxvi 24) mcccxxxvii

## Worksheet 1-1

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

Date: \_\_\_\_\_

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Convert the following Arabic numerals to Roman numerals:

1) 1 = \_\_\_\_\_

11) 20 = \_\_\_\_\_

2) 2 = \_\_\_\_\_

12) 40 = \_\_\_\_\_

3) 3 = \_\_\_\_\_

13) 45 = \_\_\_\_\_

4) 4 = \_\_\_\_\_

14) 100 = \_\_\_\_\_

5) 5 = \_\_\_\_\_

15) 400 = \_\_\_\_\_

6) 6 = \_\_\_\_\_

16) 1,000 = \_\_\_\_\_

7) 7 = \_\_\_\_\_

17) 900 = \_\_\_\_\_

8) 8 = \_\_\_\_\_

18) 69 = \_\_\_\_\_

9) 9 = \_\_\_\_\_

19) 24 = \_\_\_\_\_

10) 10 = \_\_\_\_\_

20) 1,999 = \_\_\_\_\_

Convert the following Roman numerals to Arabic numerals:

21) ix = \_\_\_\_\_

29) mcxi = \_\_\_\_\_

22) xviii = \_\_\_\_\_

30) cmxcix = \_\_\_\_\_

23) xxiv = \_\_\_\_\_

31) iv = \_\_\_\_\_

24) xxxvi = \_\_\_\_\_

32) vii = \_\_\_\_\_

25) iii = \_\_\_\_\_

33) xii = \_\_\_\_\_

26) ccxl = \_\_\_\_\_

34) xvi = \_\_\_\_\_

27) lv = \_\_\_\_\_

35) xxii = \_\_\_\_\_

28) dlv = \_\_\_\_\_

36) xlii = \_\_\_\_\_

37) xxxi = \_\_\_\_\_

39) mmviii = \_\_\_\_\_

38) mcccxxxvii = \_\_\_\_\_

40) mdccclxxxiii = \_\_\_\_\_

## Worksheet 1-2

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

Date: \_\_\_\_\_

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Perform the indicated operations and record the results in Arabic numbers.

1) VII + XXII = \_\_\_\_\_

4) XII  $\times$  II = \_\_\_\_\_

2) xxvii – iv = \_\_\_\_\_

5) xxiv  $\div$  vi = \_\_\_\_\_

3) XIX – XIV = \_\_\_\_\_

6) IV  $\times$  III = \_\_\_\_\_

Perform the indicated operations and record the results in Roman numerals.

7) 5  $\times$  4 = \_\_\_\_\_

11) 625  $\div$  125 = \_\_\_\_\_

8) 18 + 12 = \_\_\_\_\_

12) 17 + 14 – 11 + 4 = \_\_\_\_\_

9) 16  $\div$  4 = \_\_\_\_\_

13) 6 + 3 = \_\_\_\_\_

10) 4  $\times$  3 = \_\_\_\_\_

14) 20 – 16 + 3 = \_\_\_\_\_

Fill in the following multiplication table using Roman numerals.

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





## XXIV

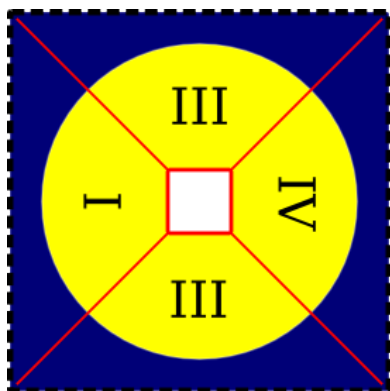
The following pages include a card game that can help students become more comfortable working rapidly with Roman numerals. If you've ever played *24 Game*®, the rules are very similar.

### How to play:

- 1) First someone will need to use a pair of scissors to cut out their XXIV cards.
- 2) Then, students will need to pair up in groups of three to six.
- 3) Then all the students in a group will look at the card on the top of the pile and try to solve it. In order to solve it you must use all four numbers on the card once and only once. You can use any combination of multiplying, dividing, adding, and subtracting to make the card total '24'.
- 4) After the card is solved, flip the card and work on the other side as a group. Once both sides of the card have been solved, discard it and work on the next card in the deck.

This game is not about who scores the most points, instead it is about working collaboratively to better everyone's understanding of Roman numerals.

### example card:



The Roman numerals on this card are III, IV, III, and I which translate into the Arabic numbers 3, 4, 3, and 1. I can solve this card any of the following ways:

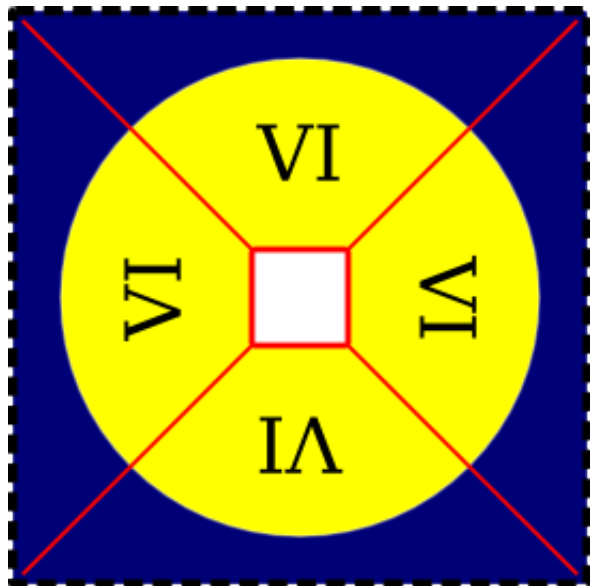
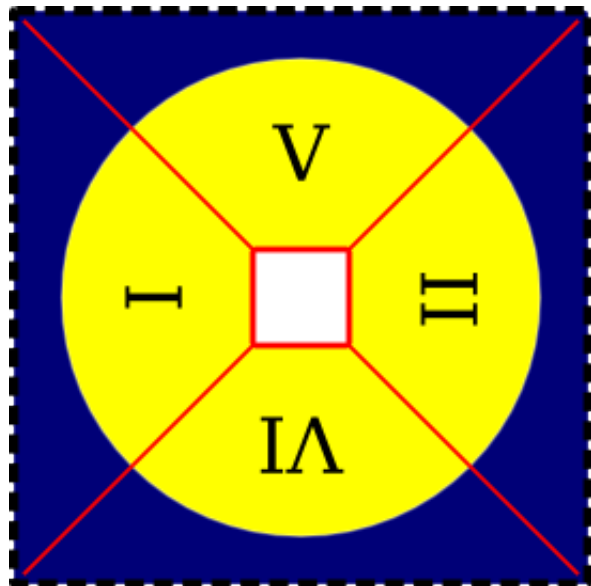
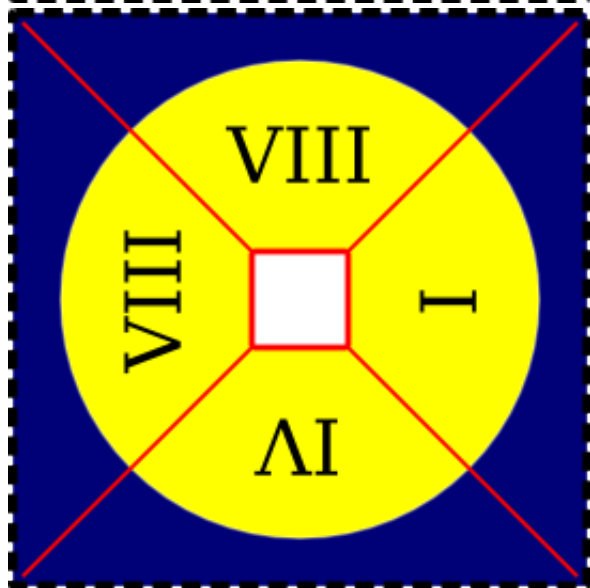
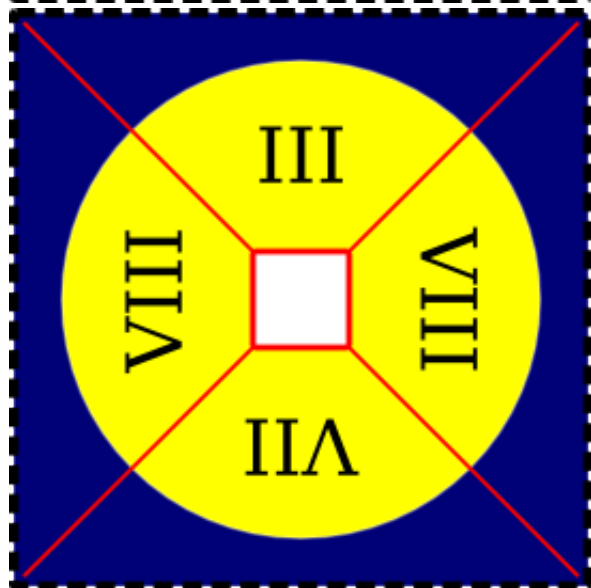
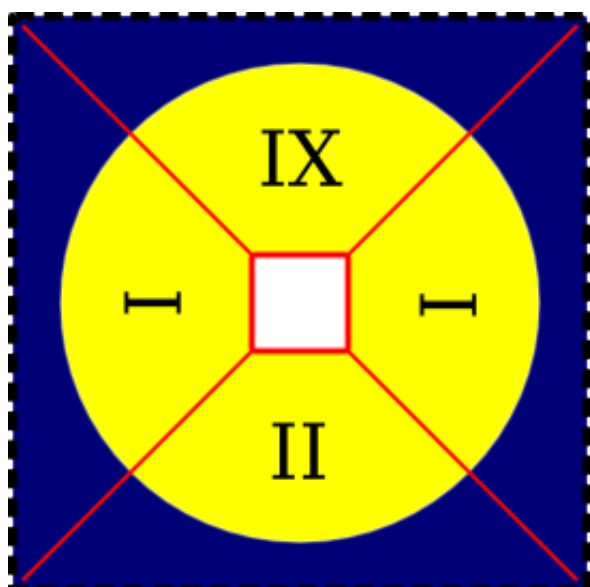
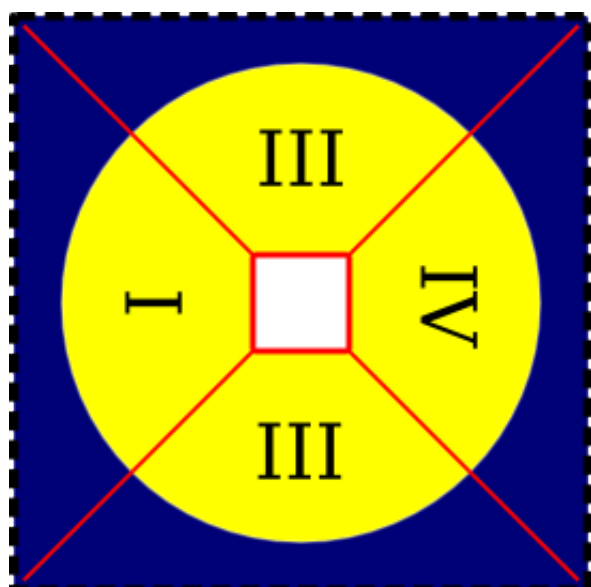
$$(3 \times 4) \times (3 - 1) = 24$$

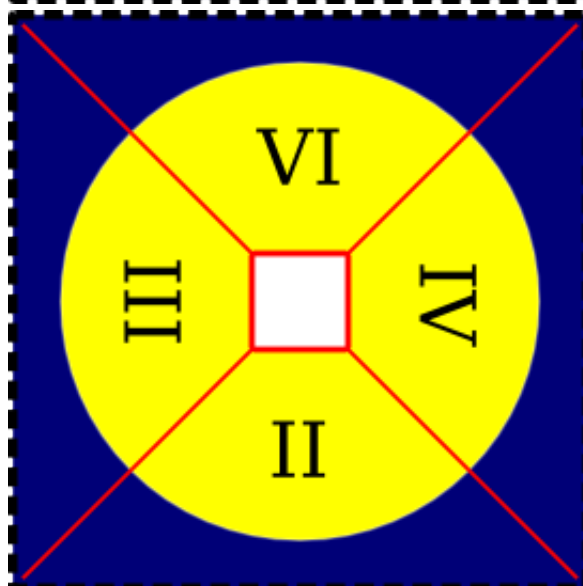
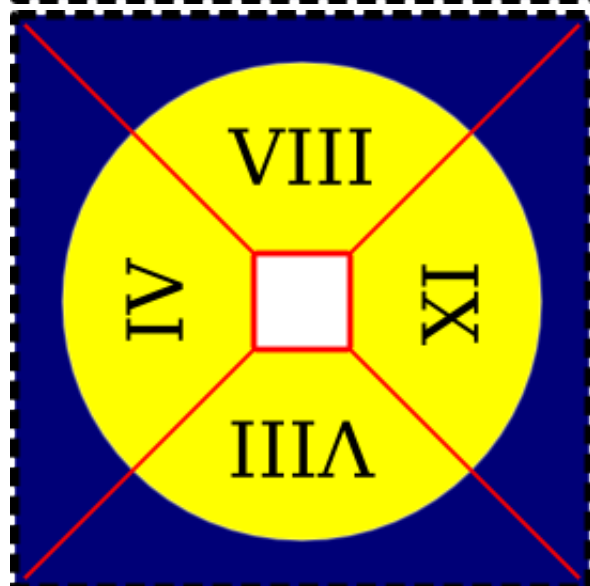
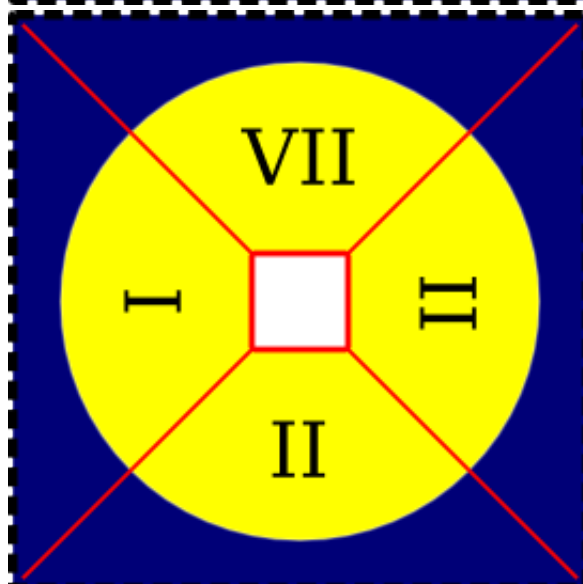
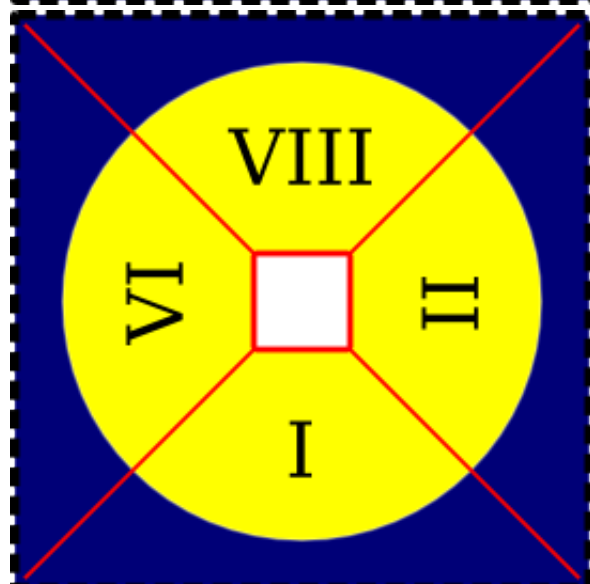
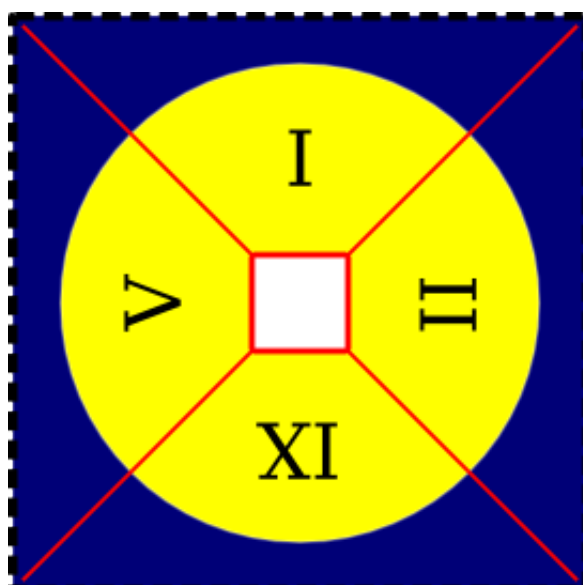
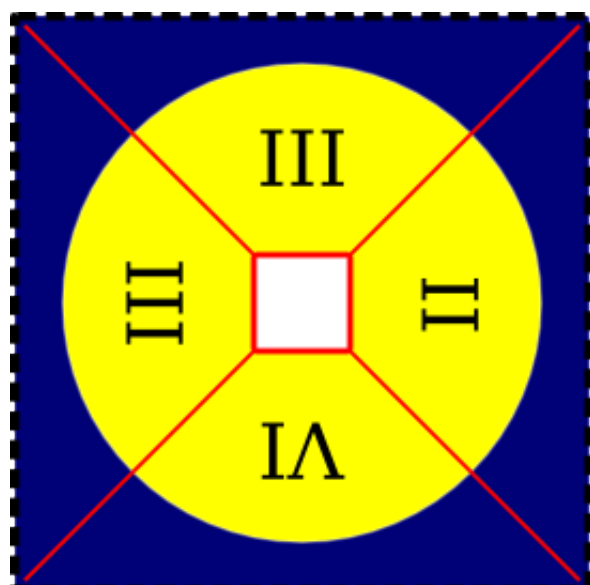
$$[(3 - 1) \times 4] \times 3 = 24$$

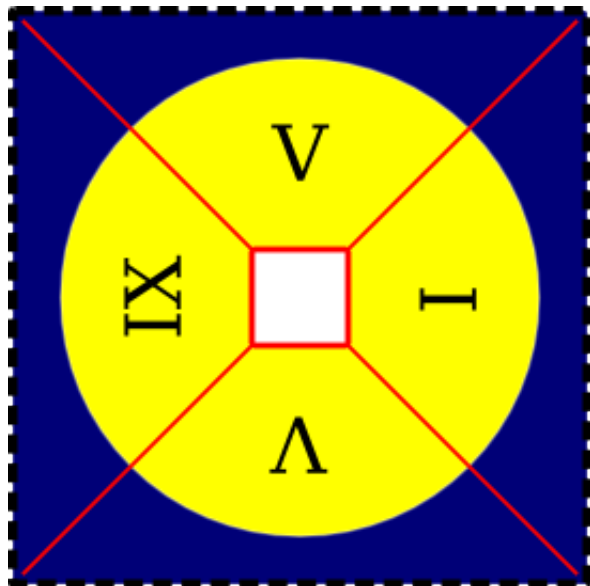
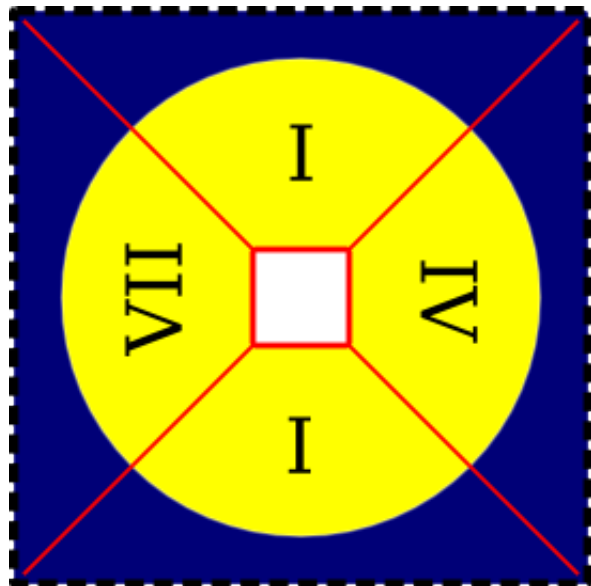
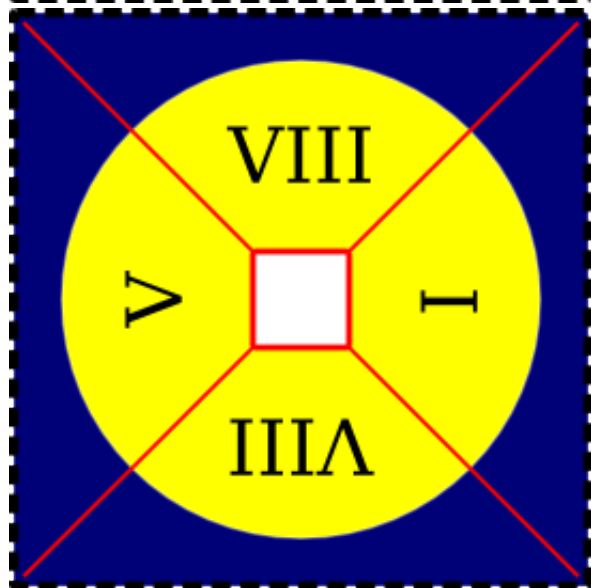
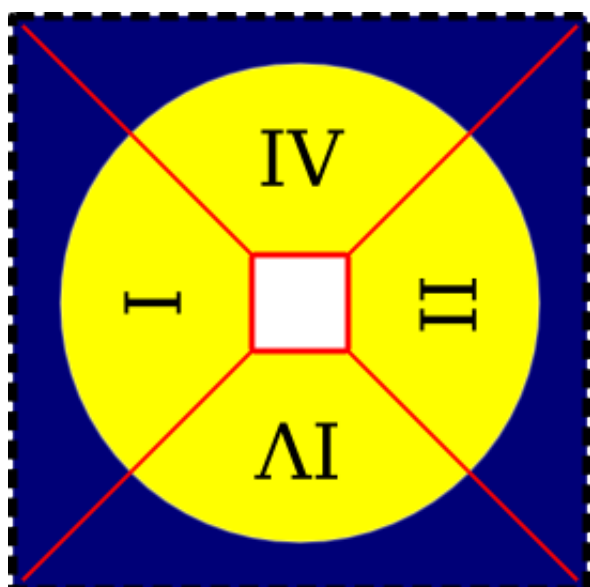
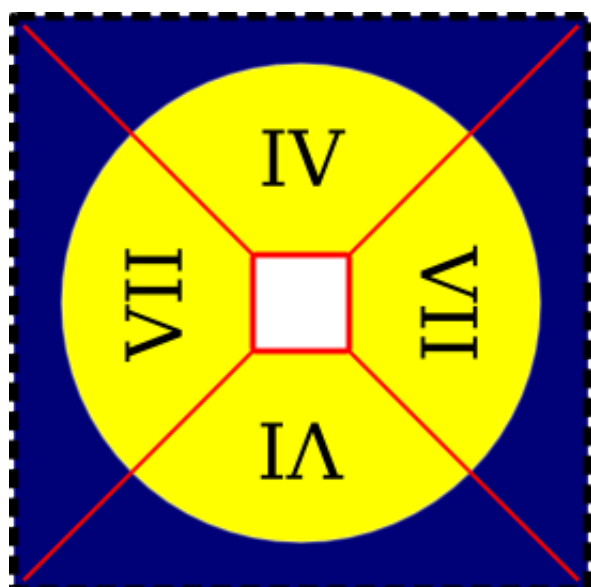
$$(3 + 3) \times 4 \times 1 = 24$$

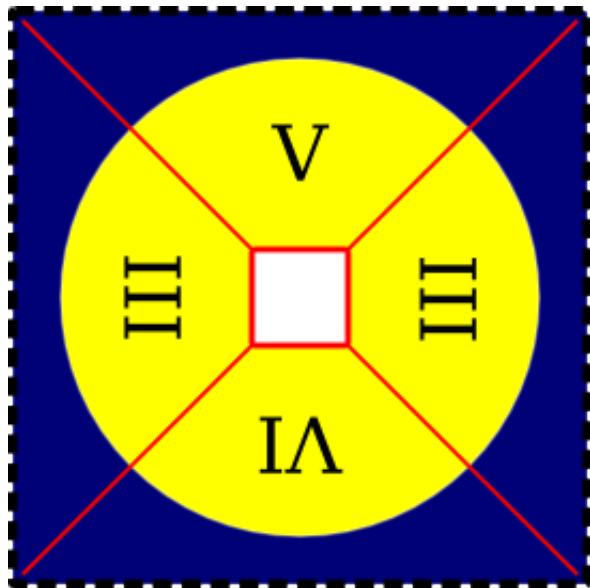
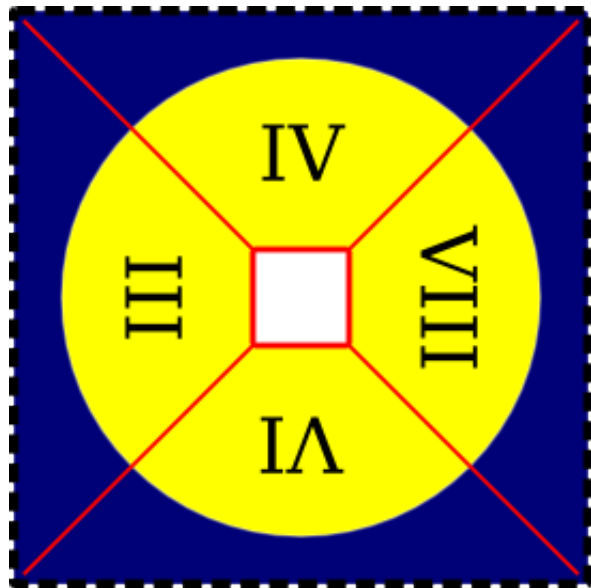
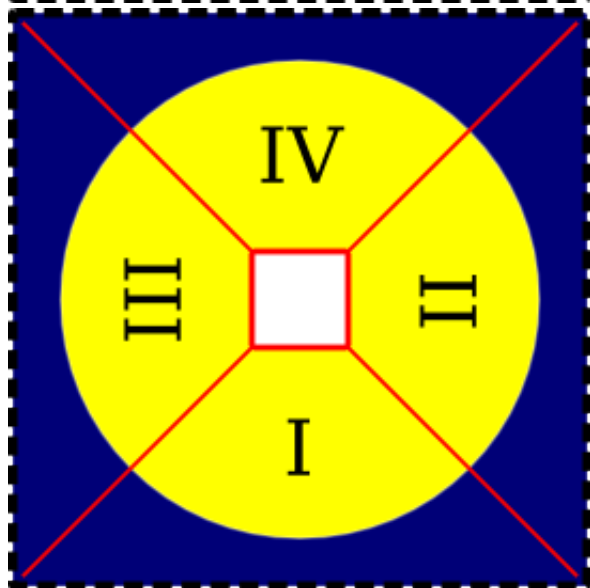
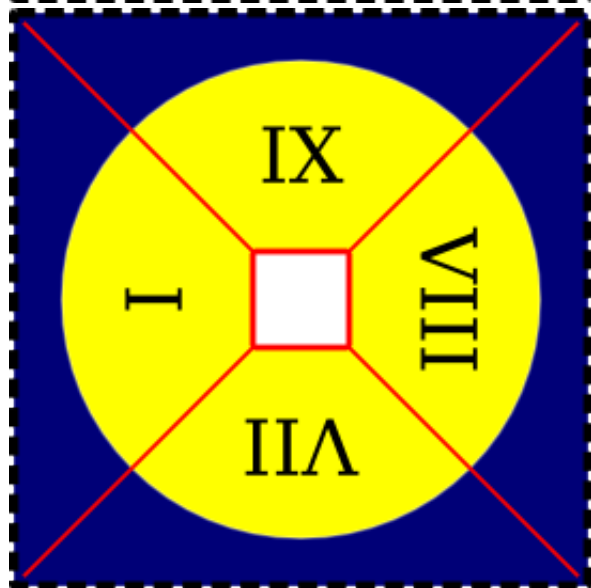
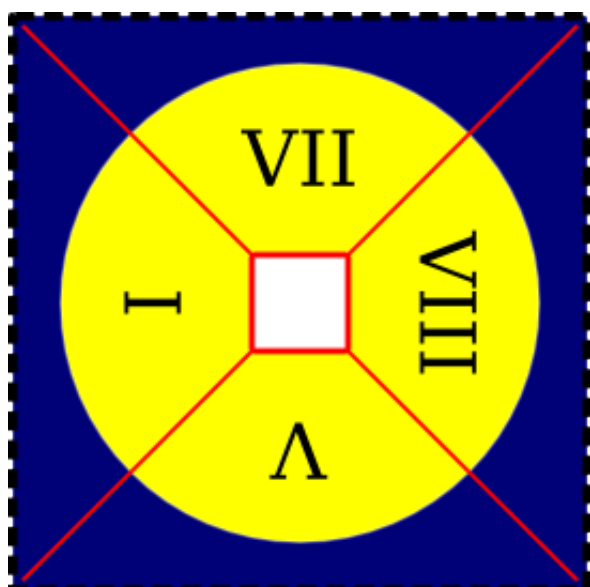
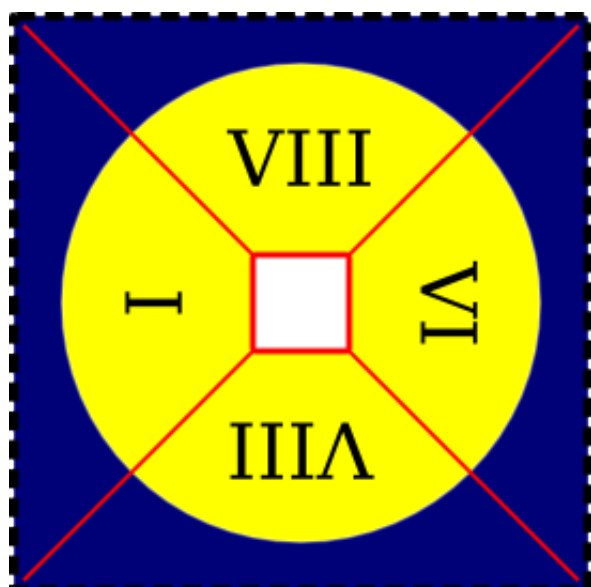
Despite the fact that each card can usually be solved numerous ways, it only needs to be solved once.

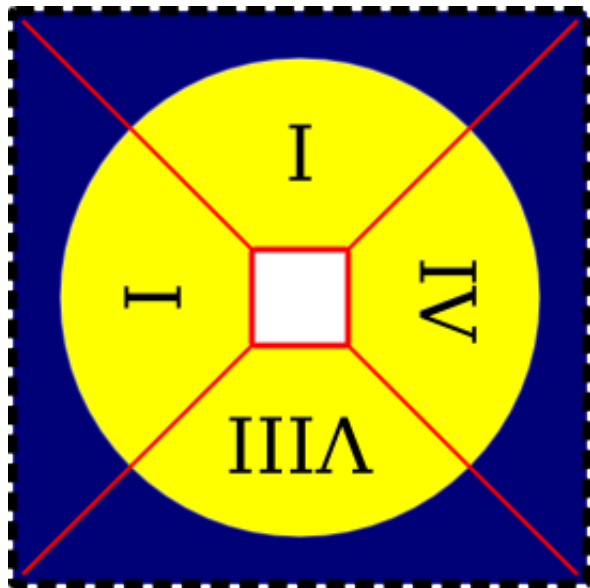
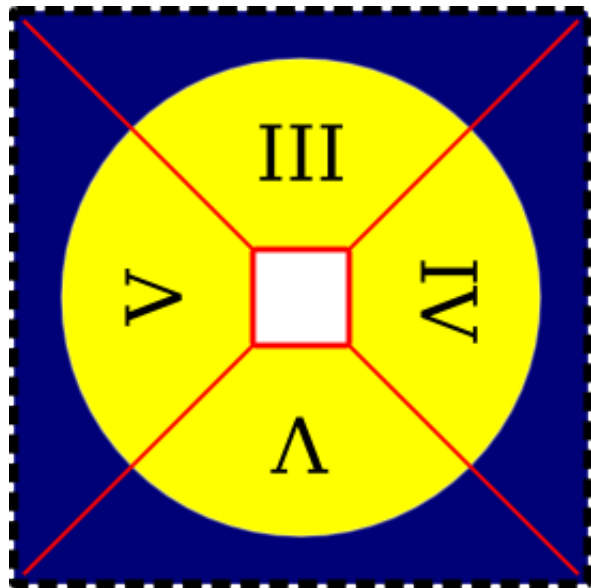
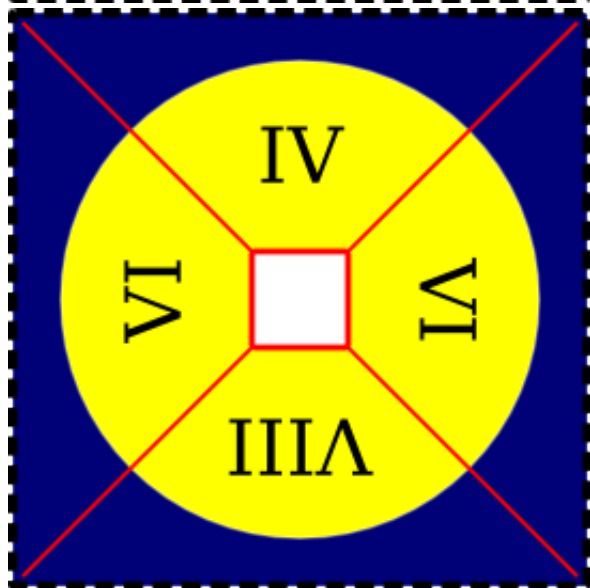
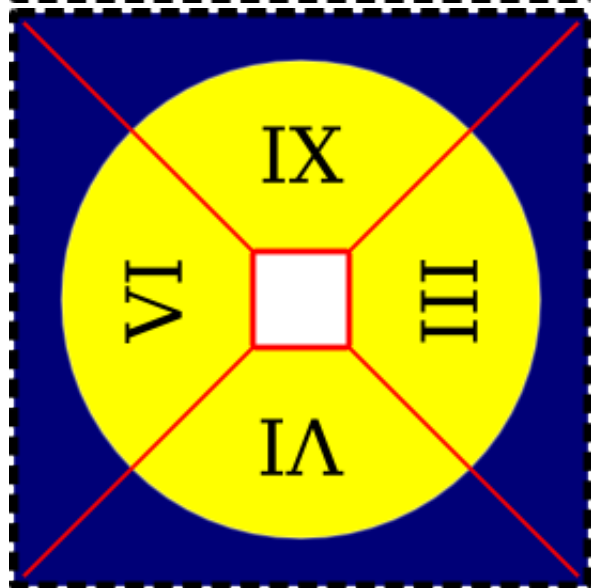
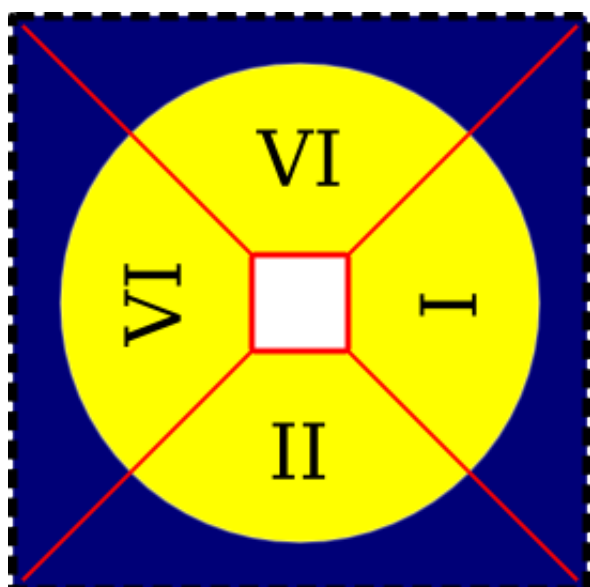
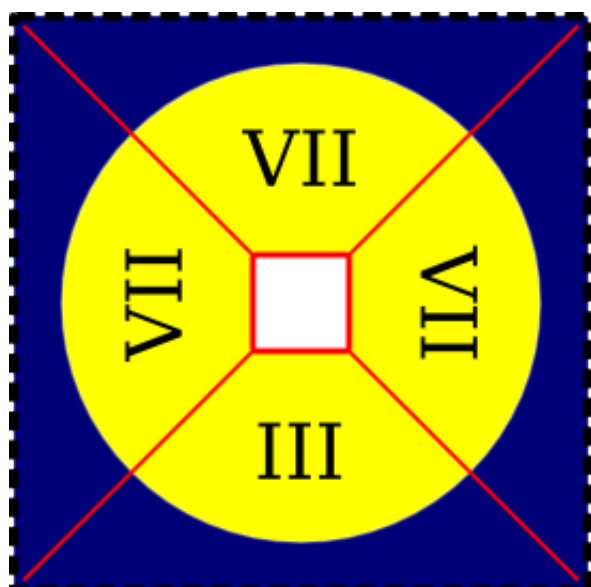


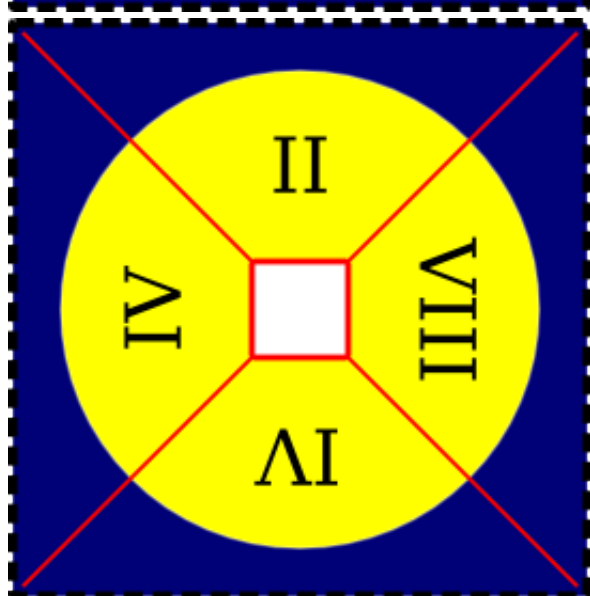
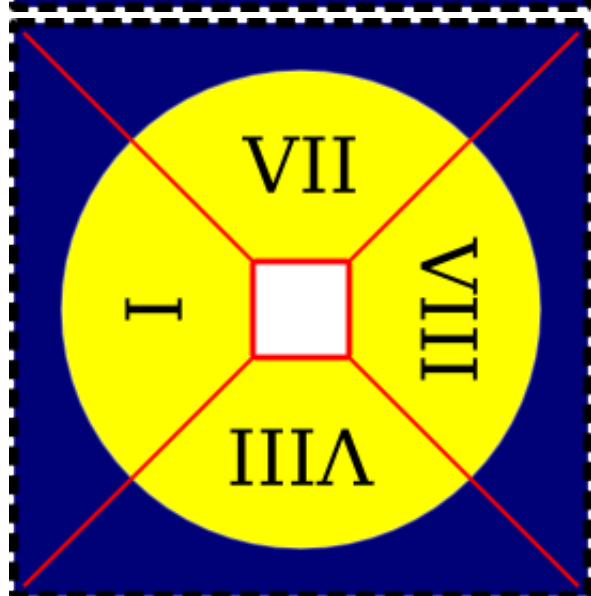
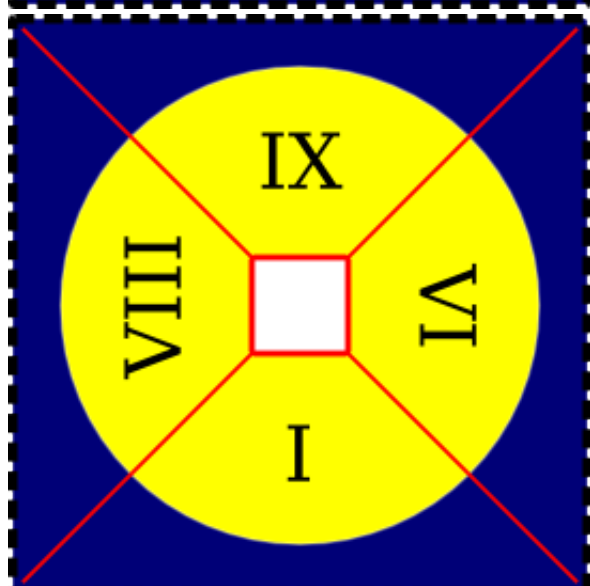
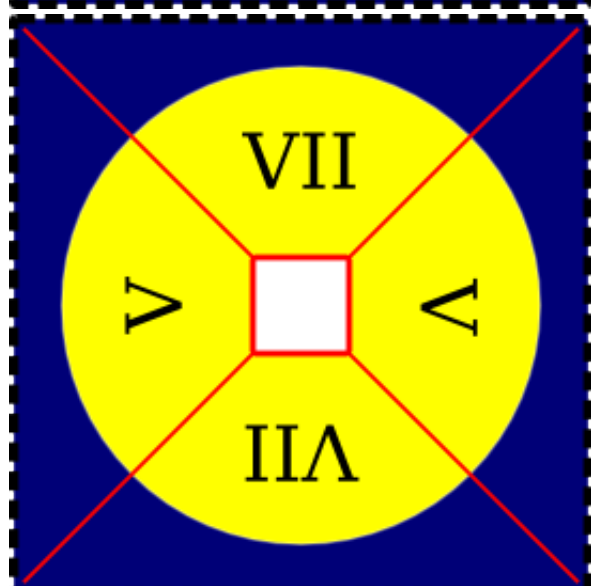
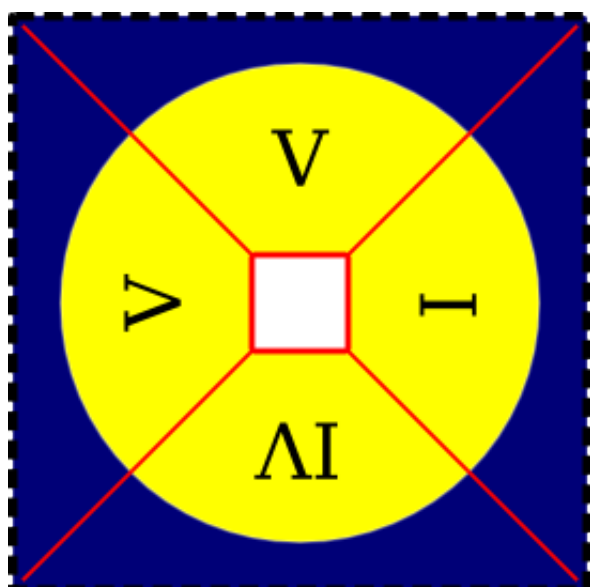
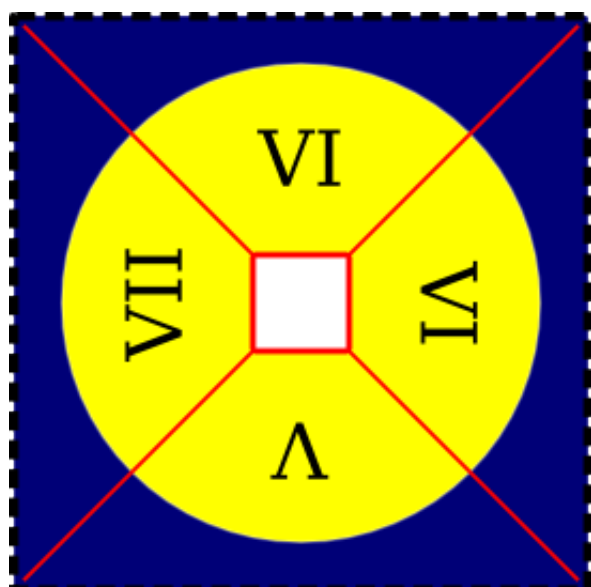




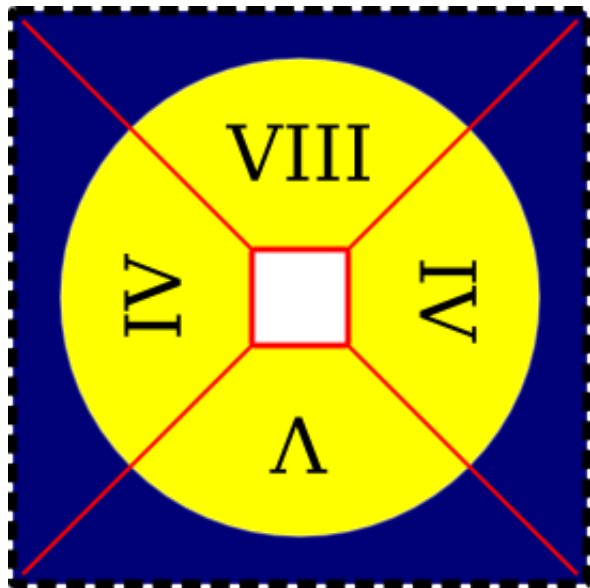
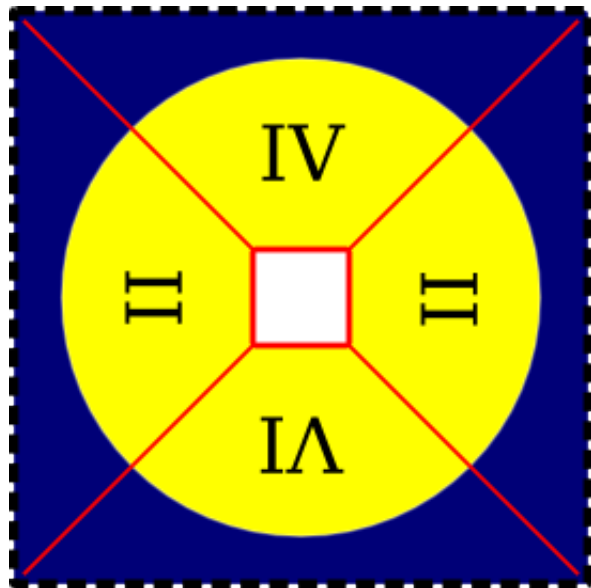
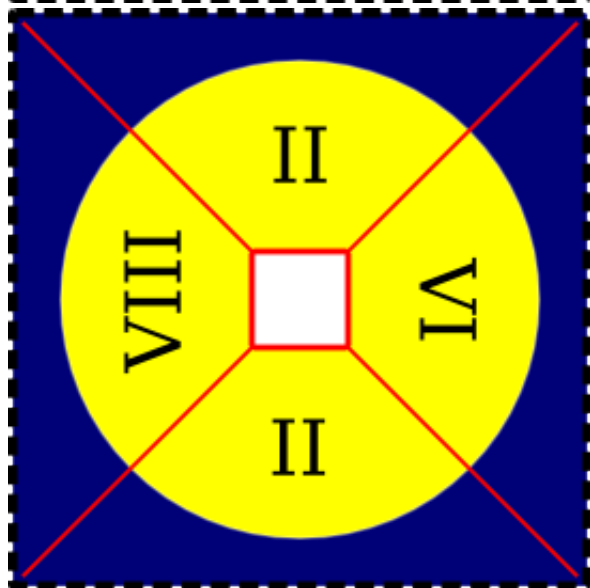
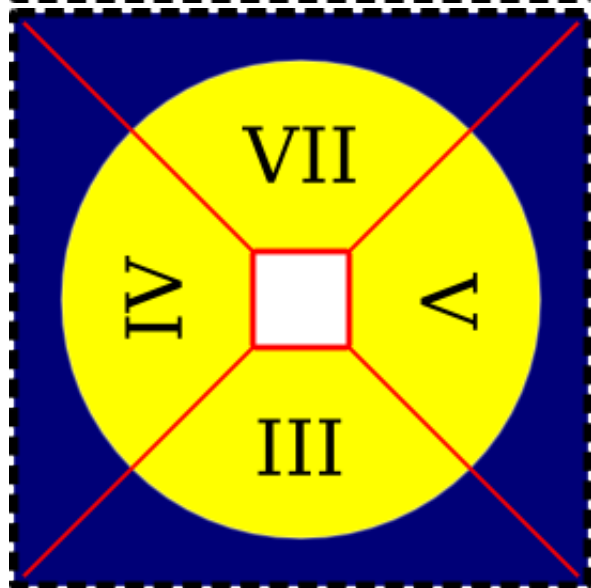
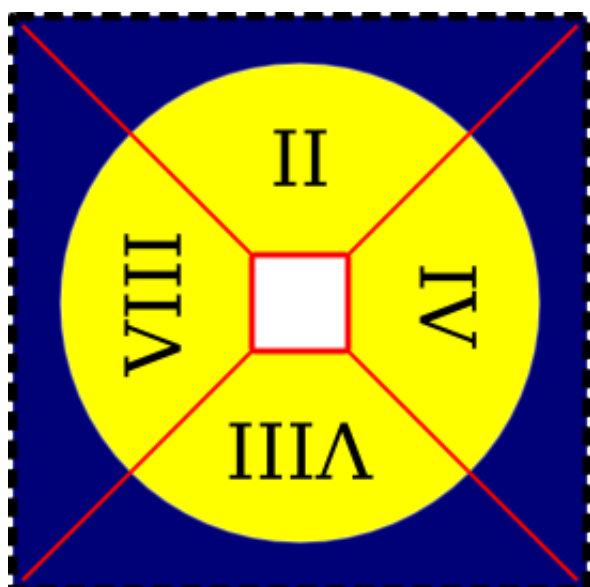
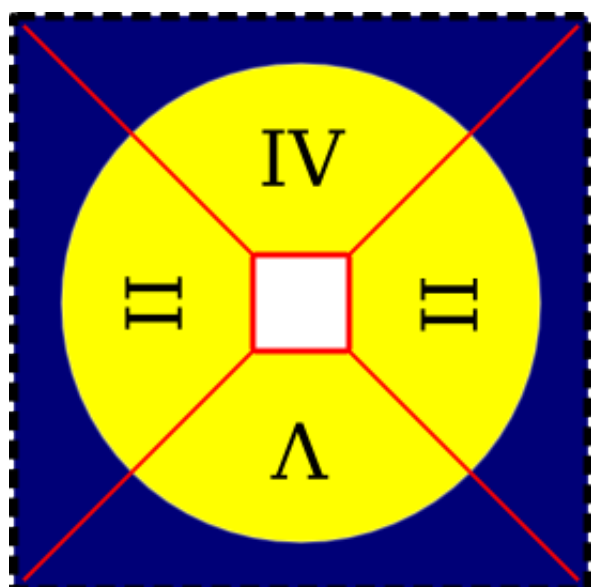


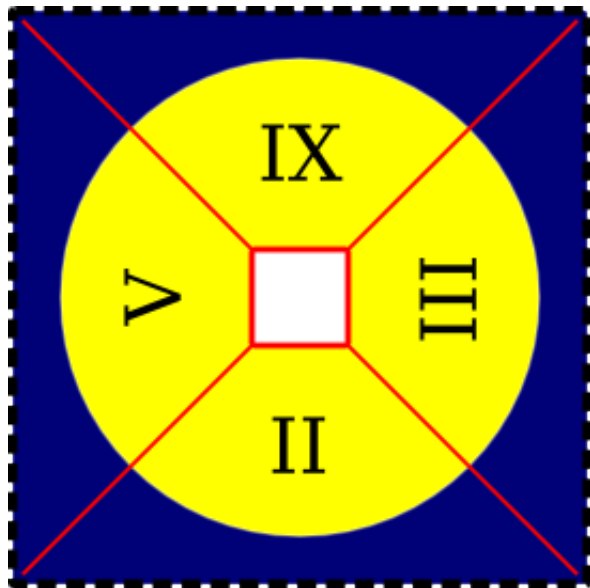
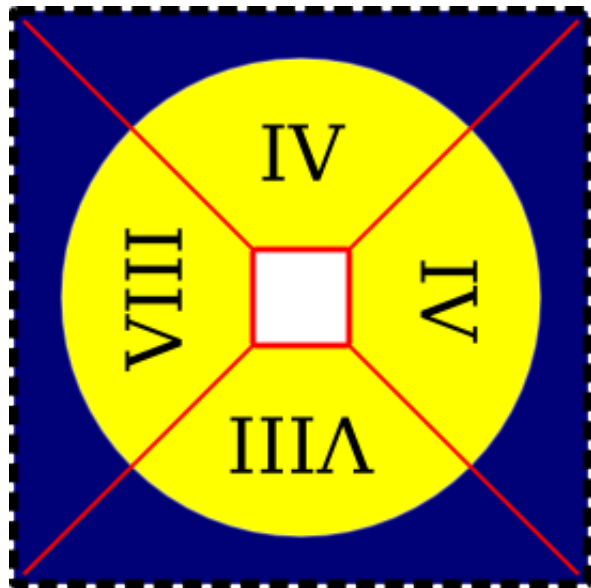
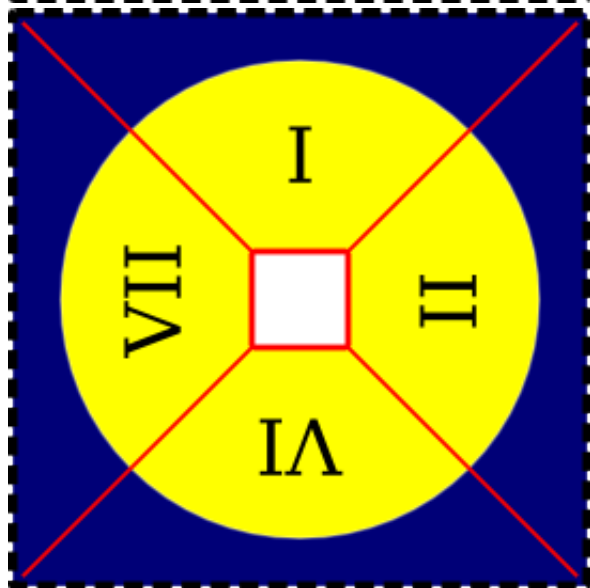
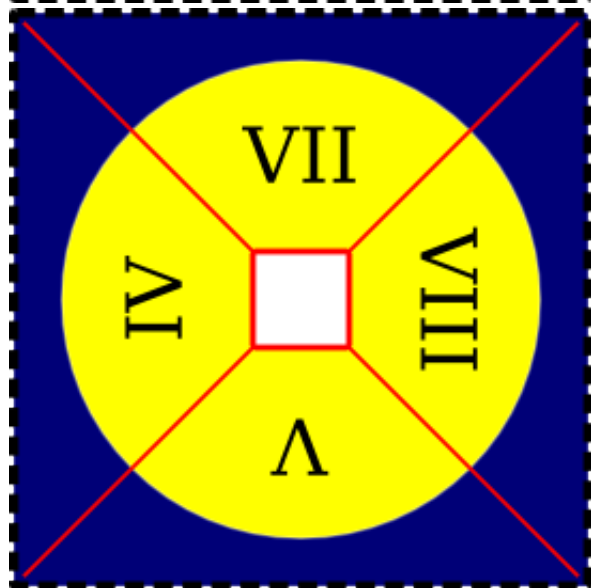
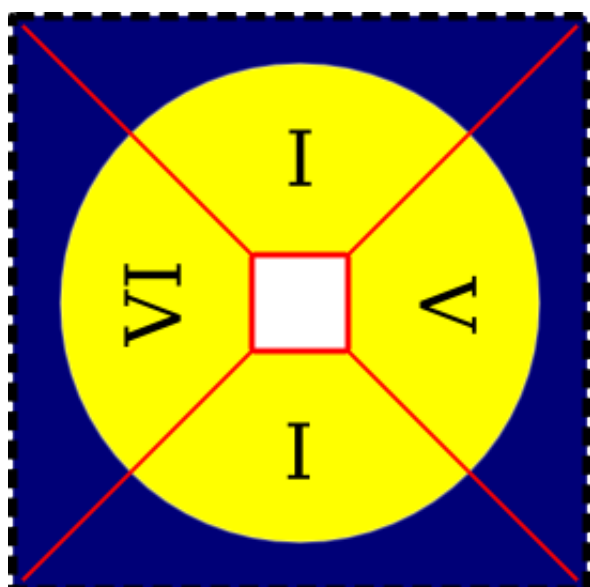
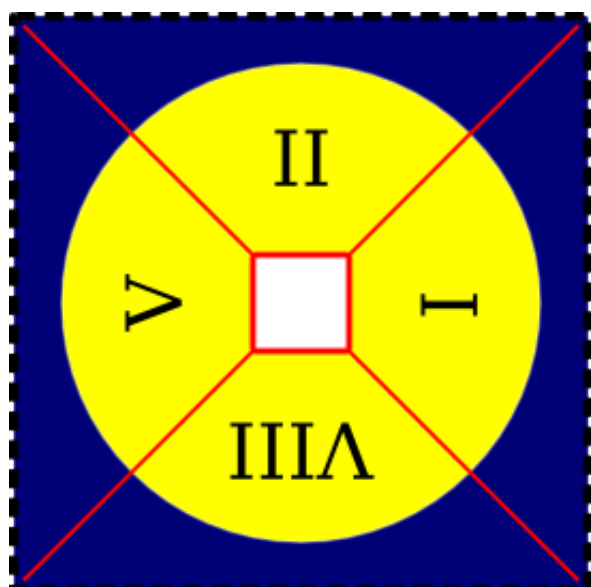


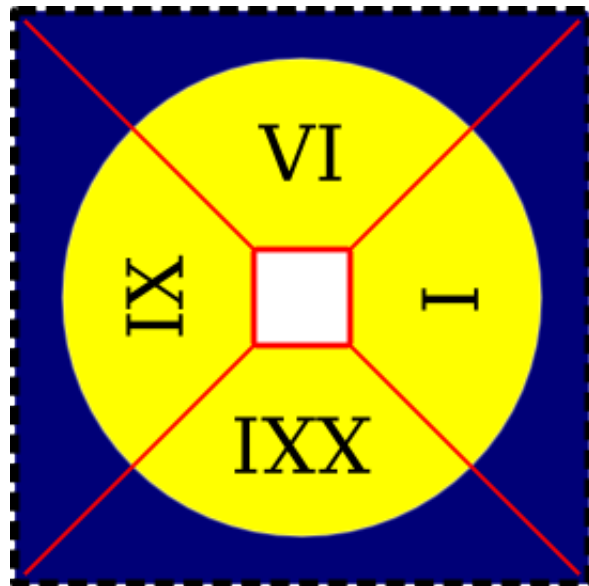
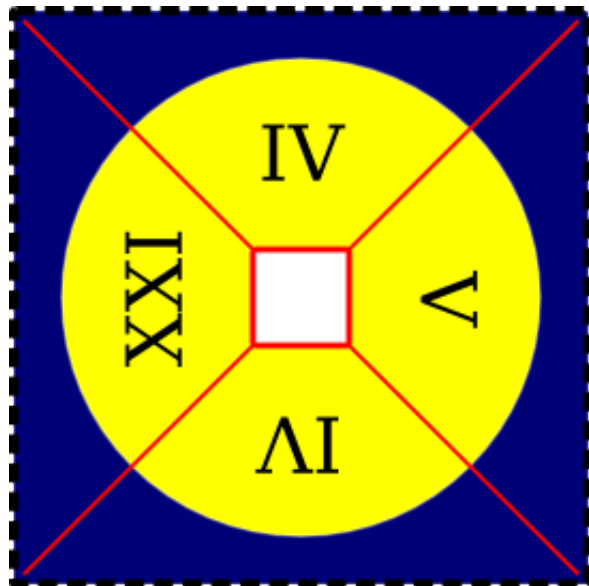
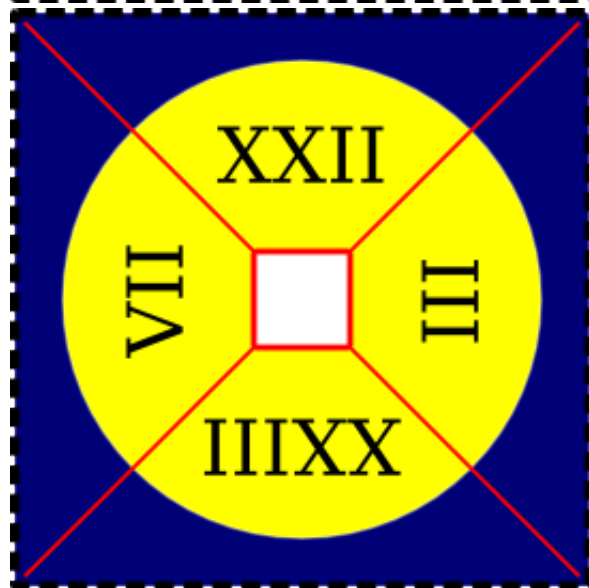
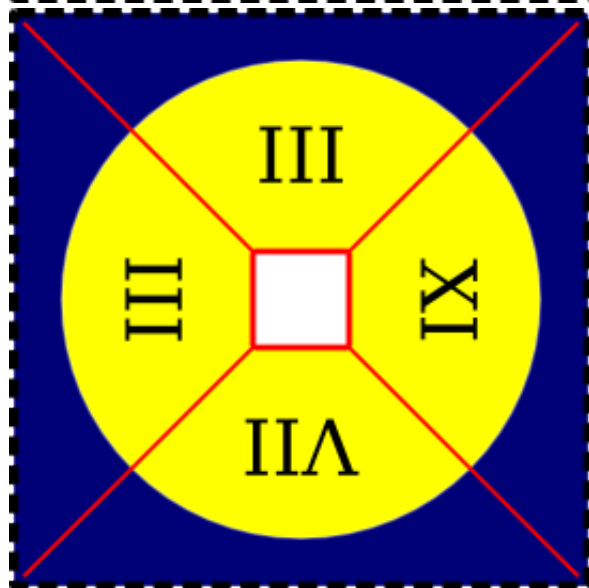
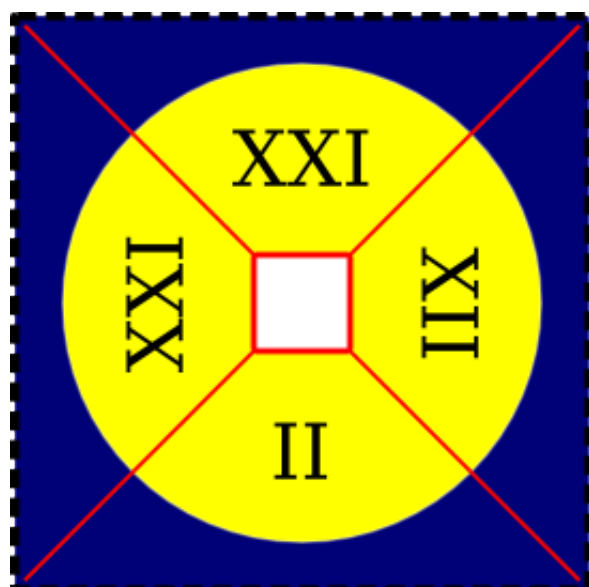
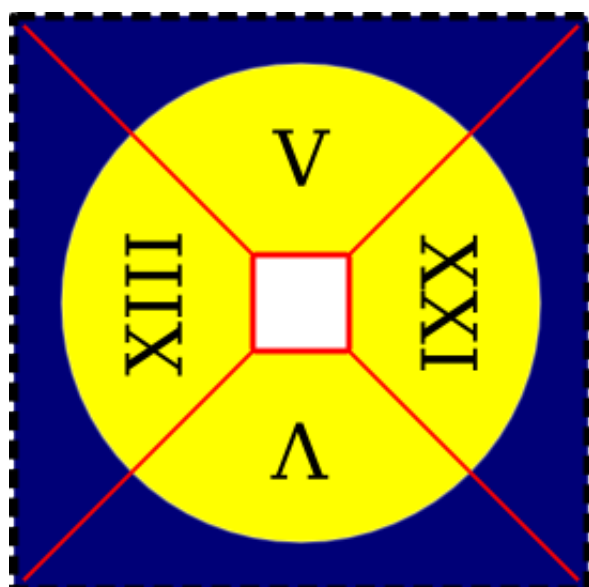


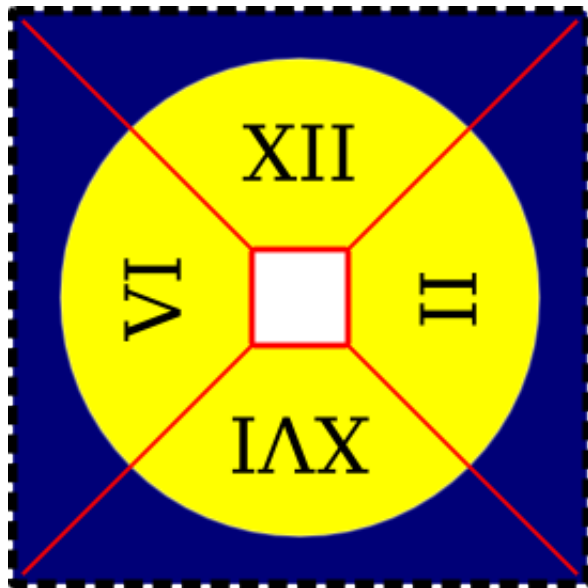
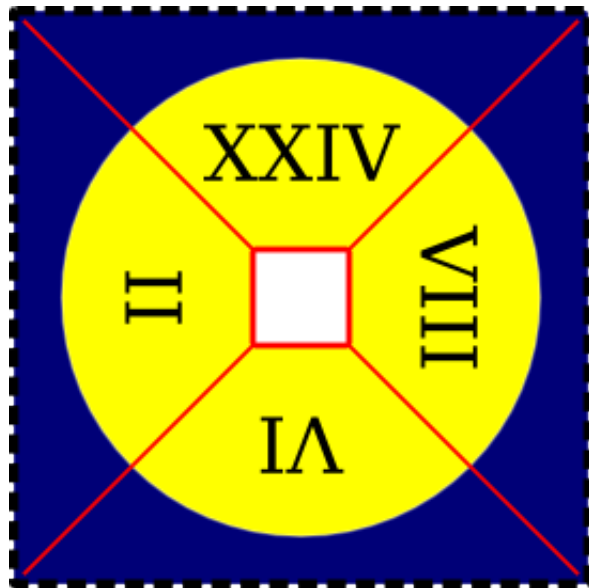
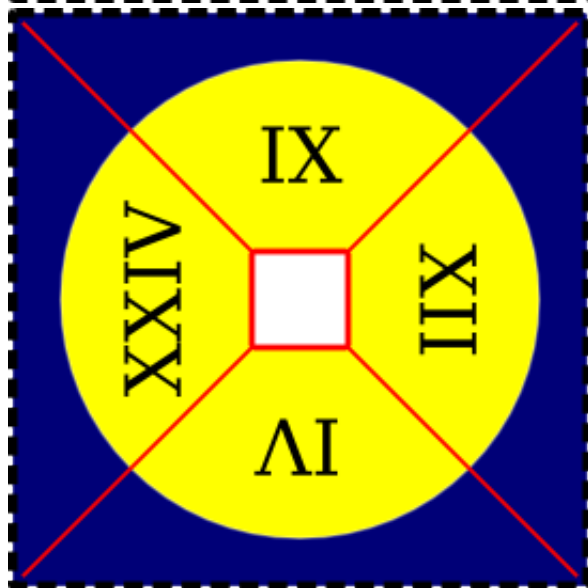
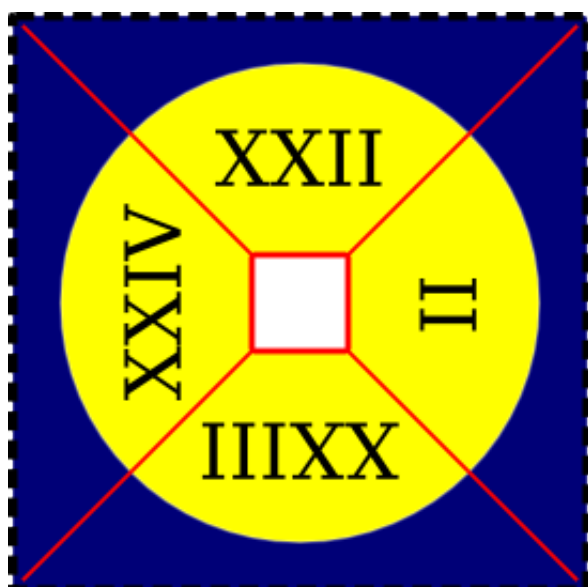
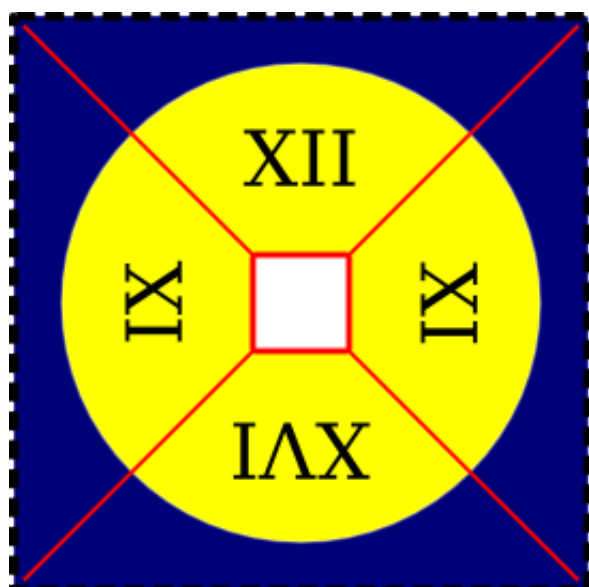


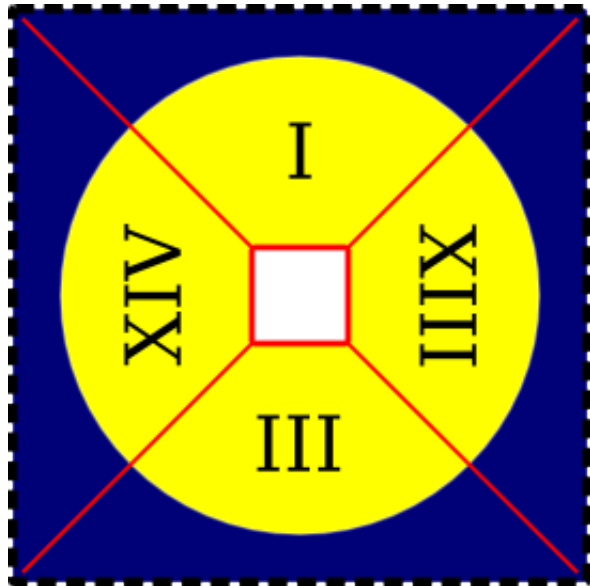
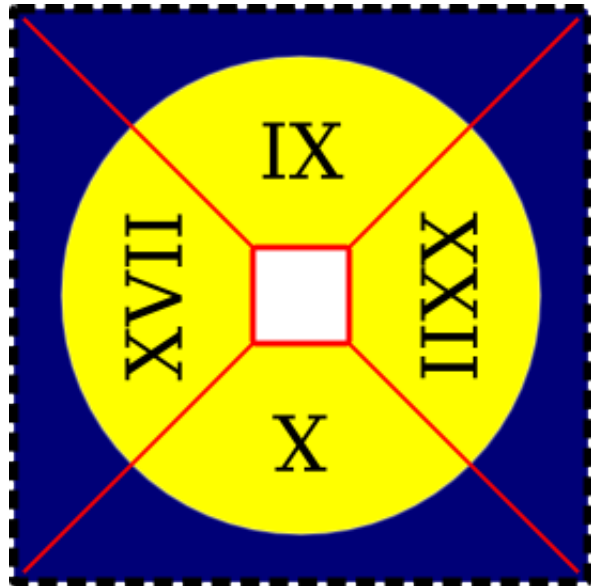
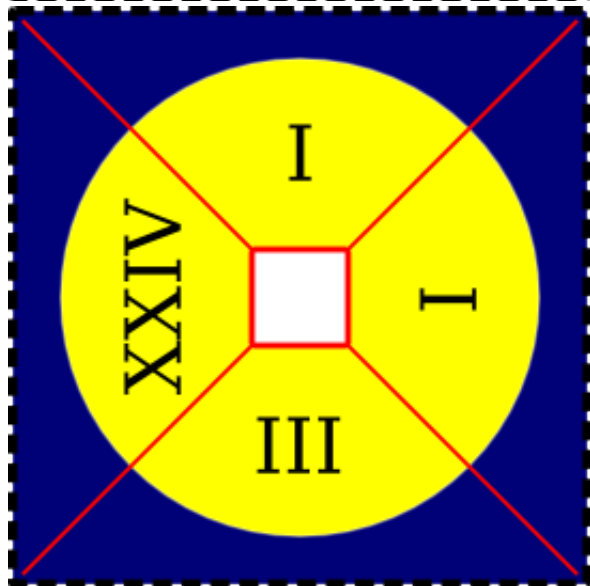
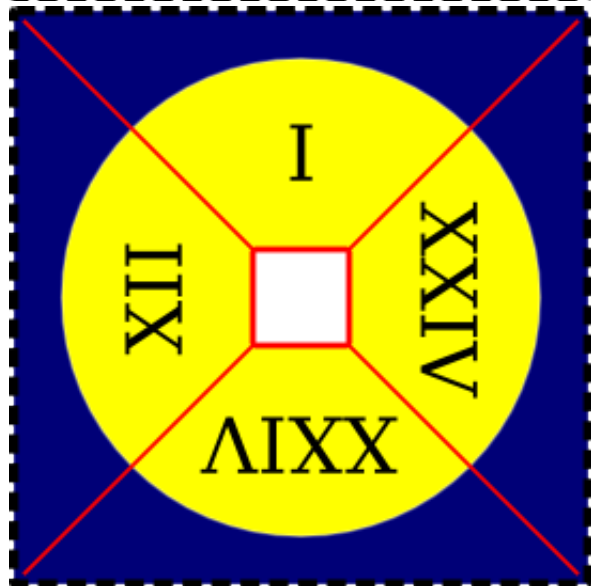
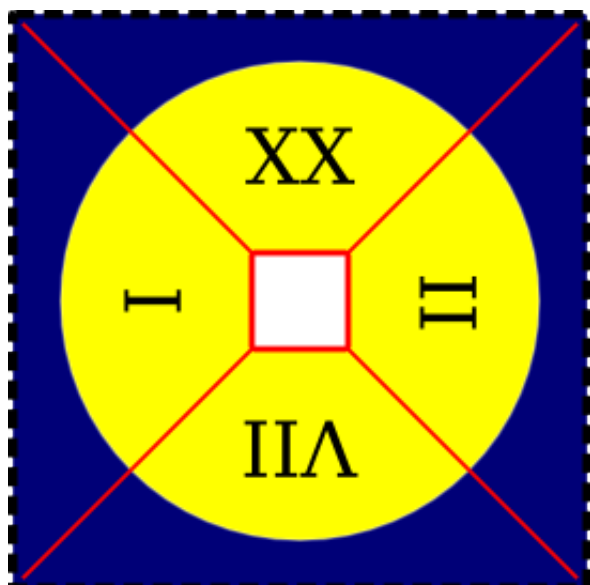
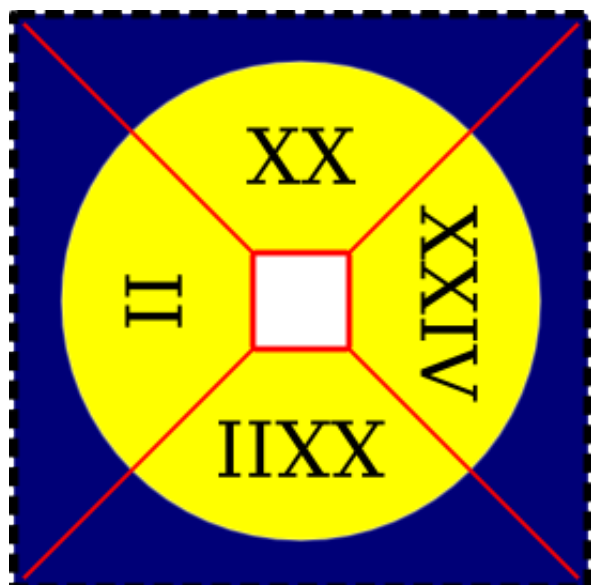


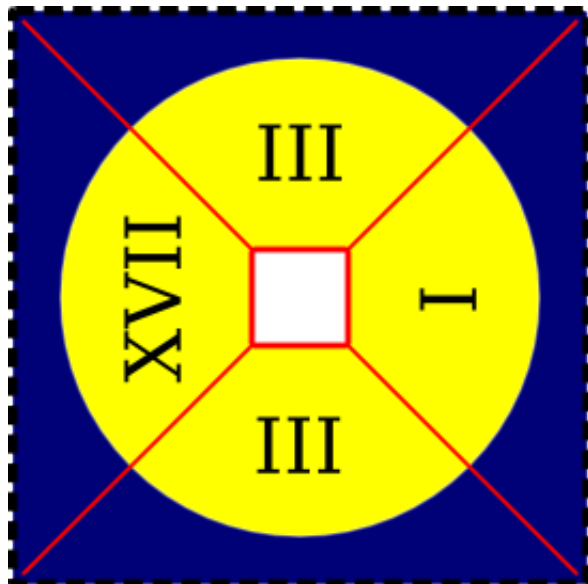
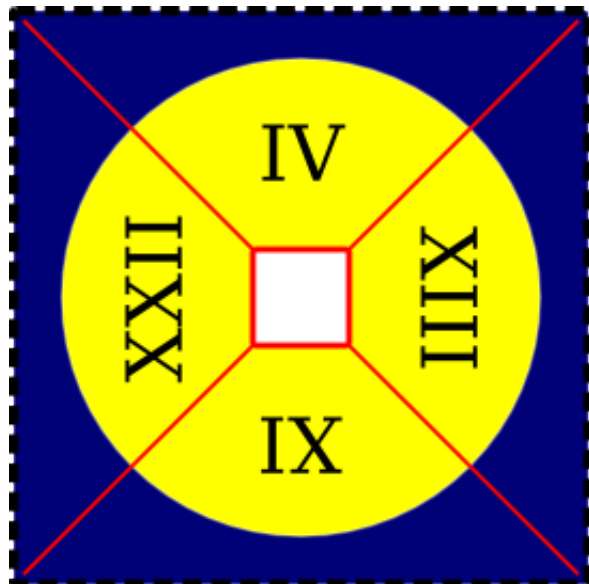
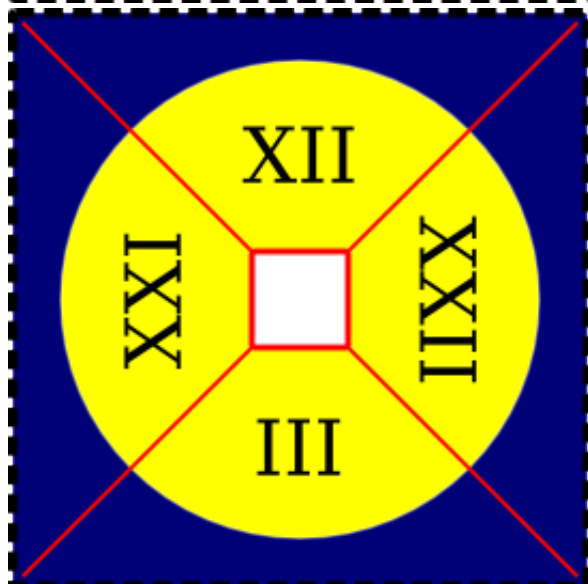
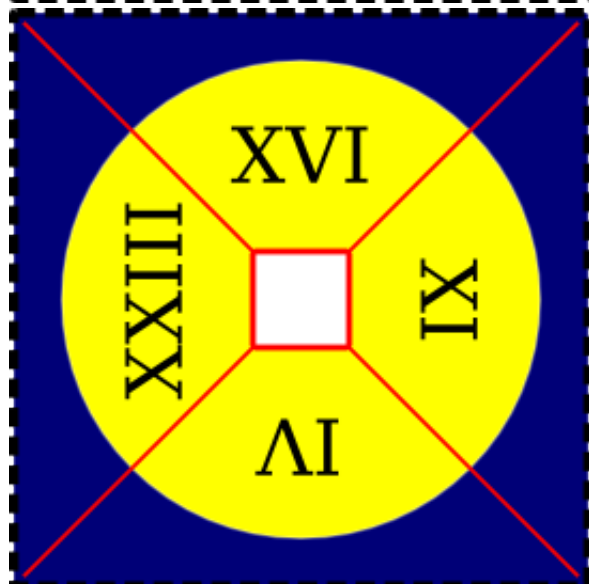
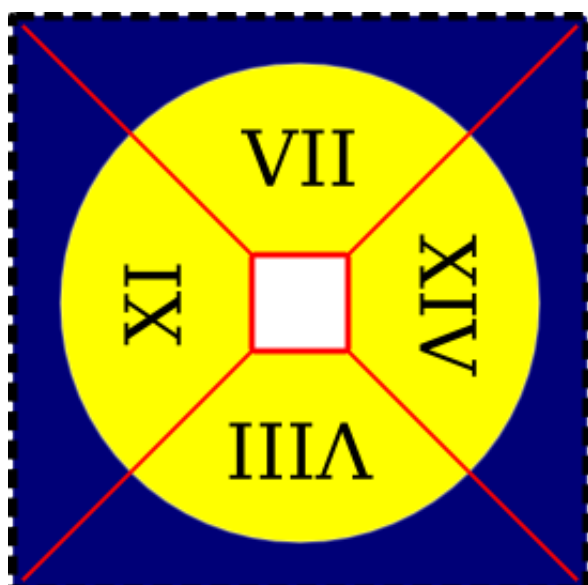
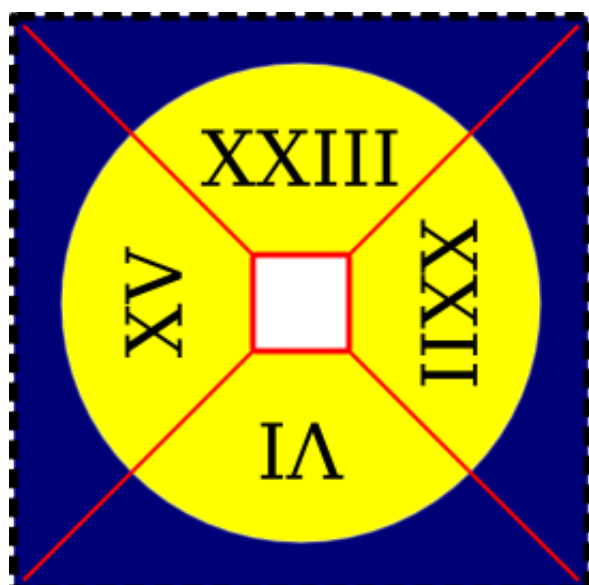


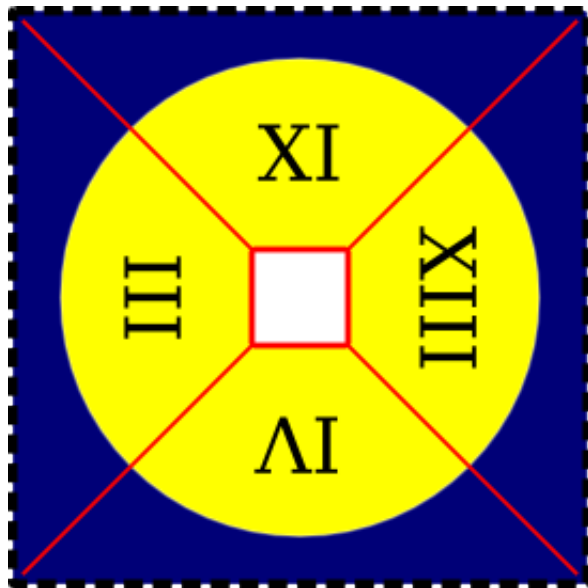
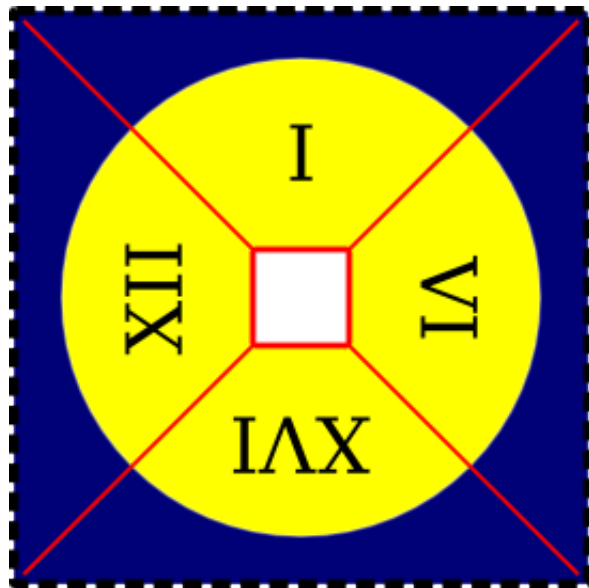
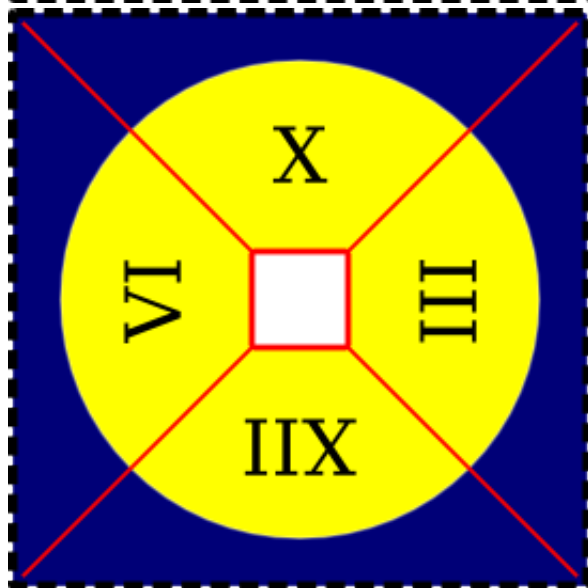
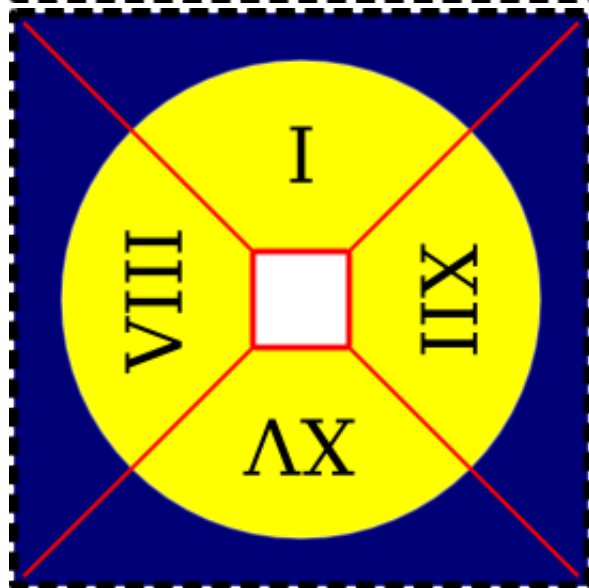
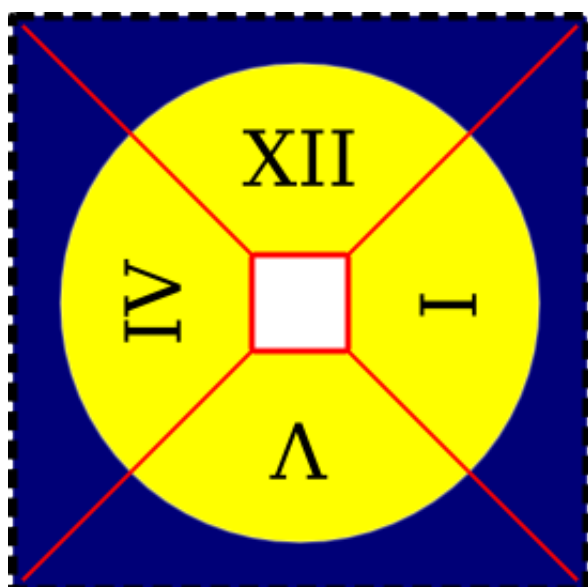
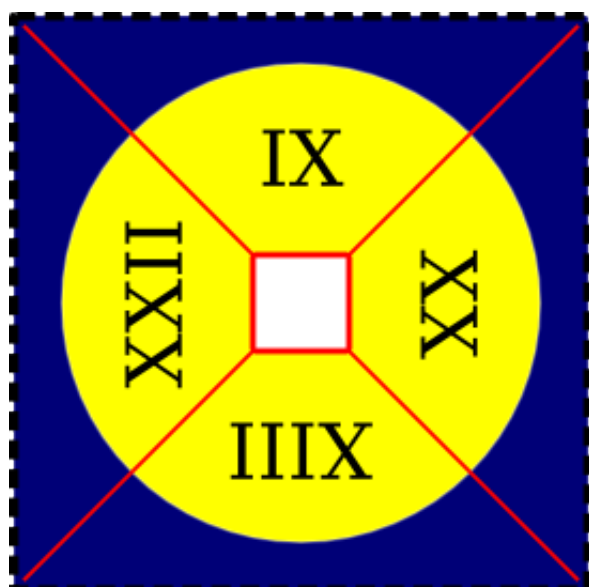


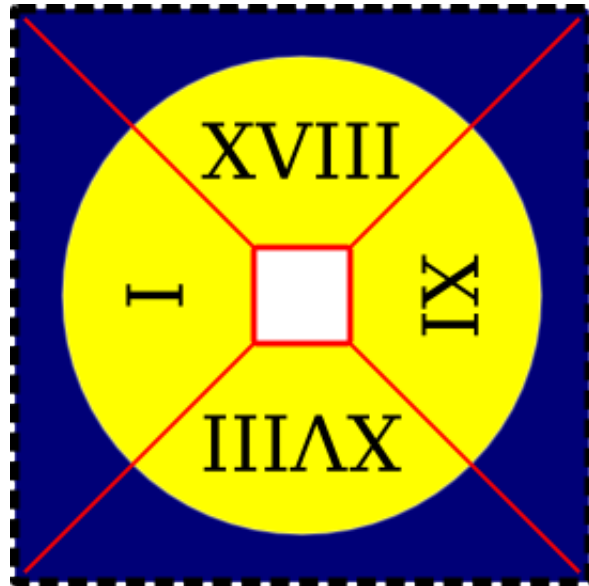
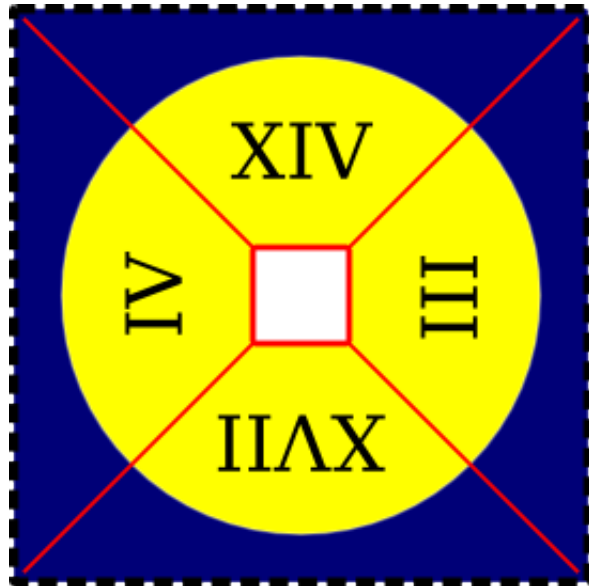
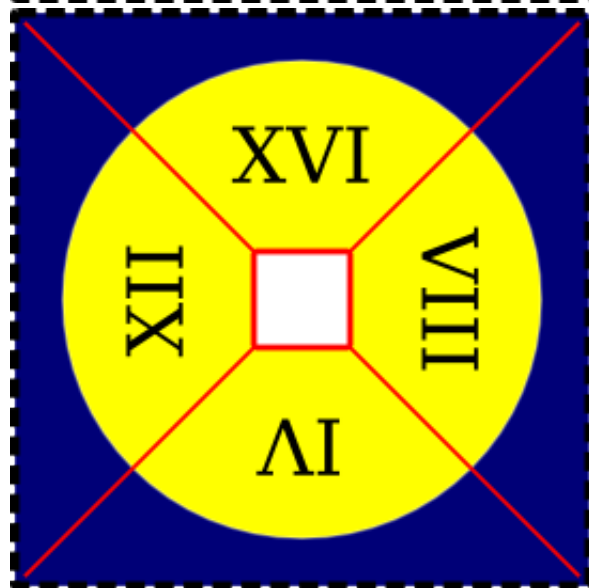
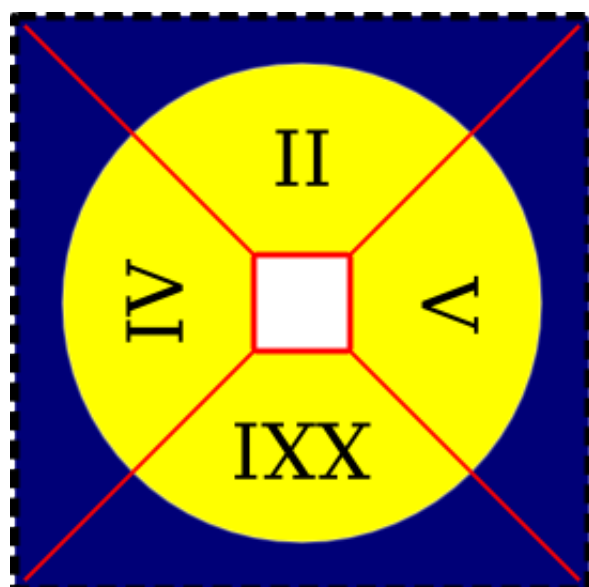
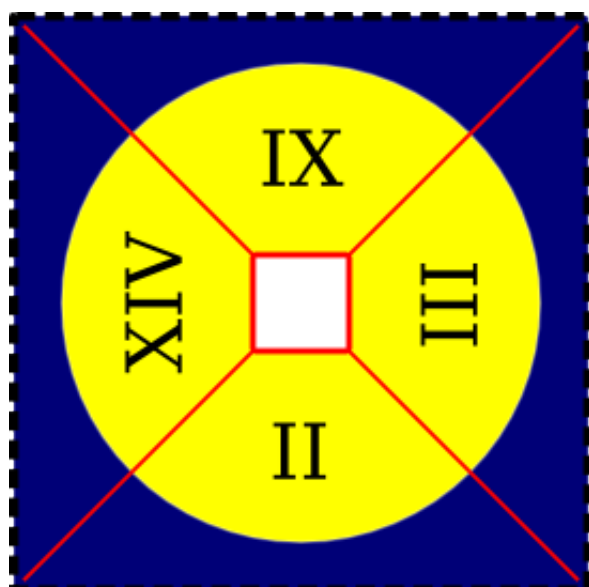




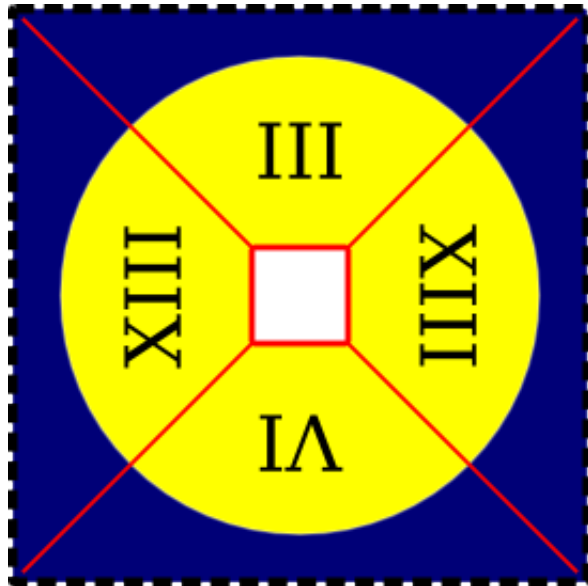
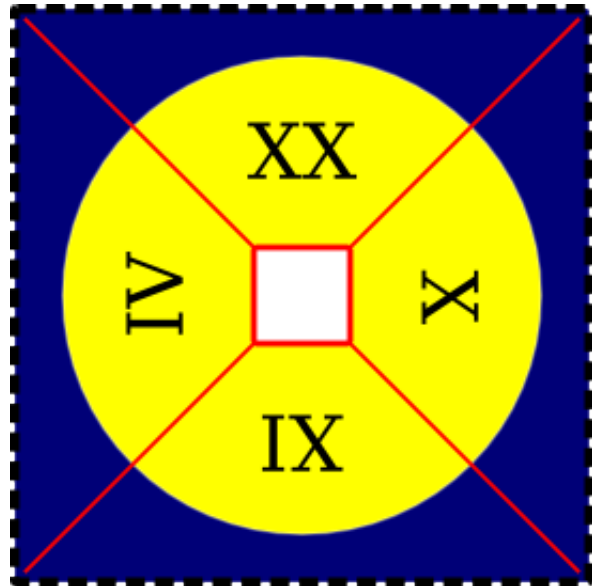
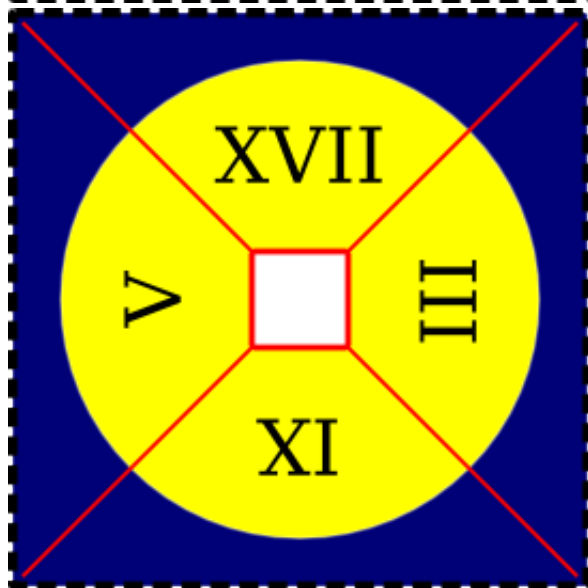
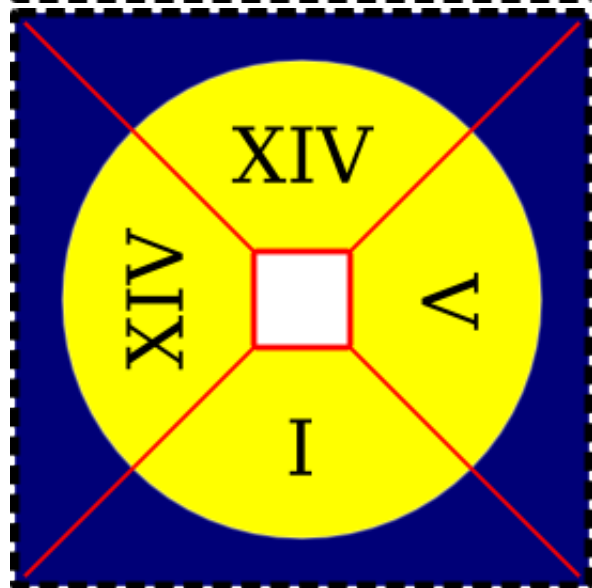
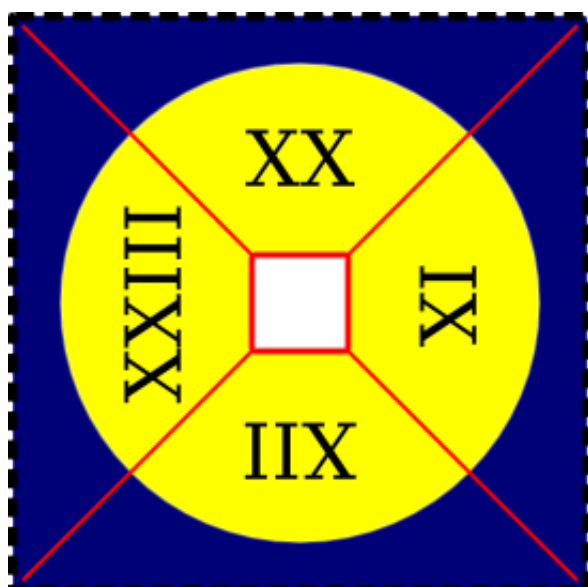
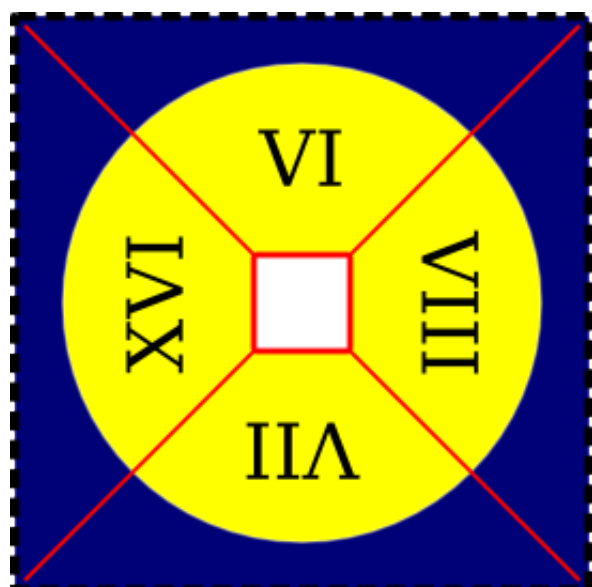


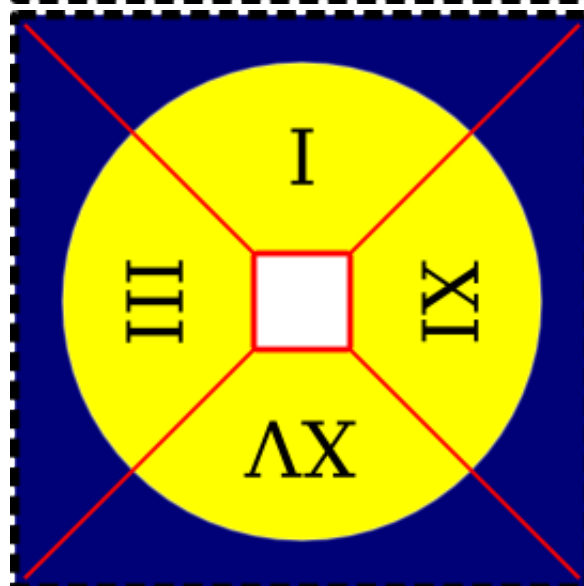
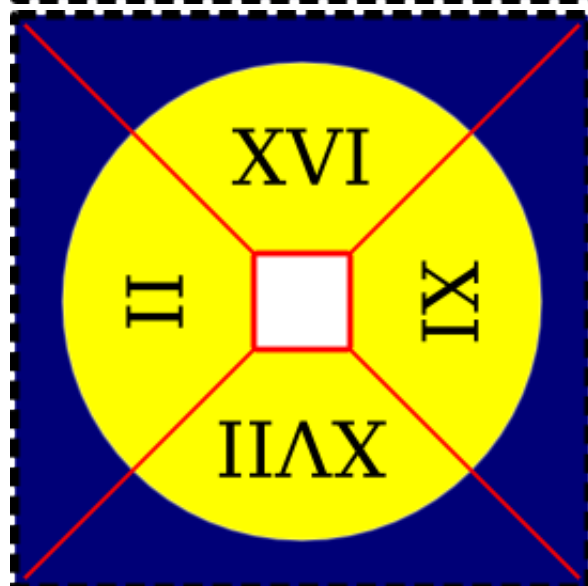
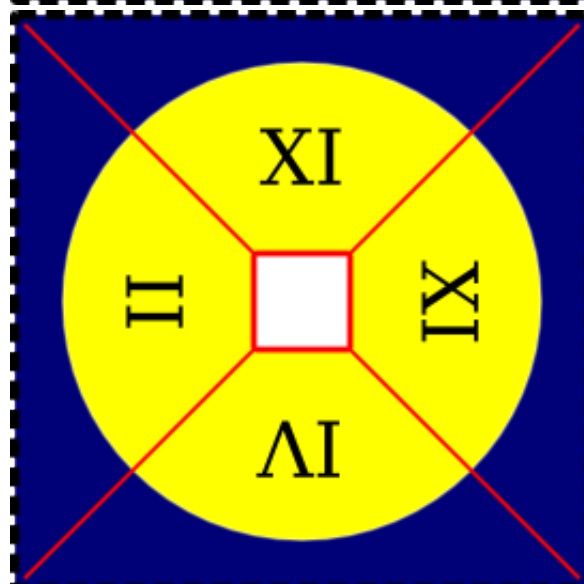
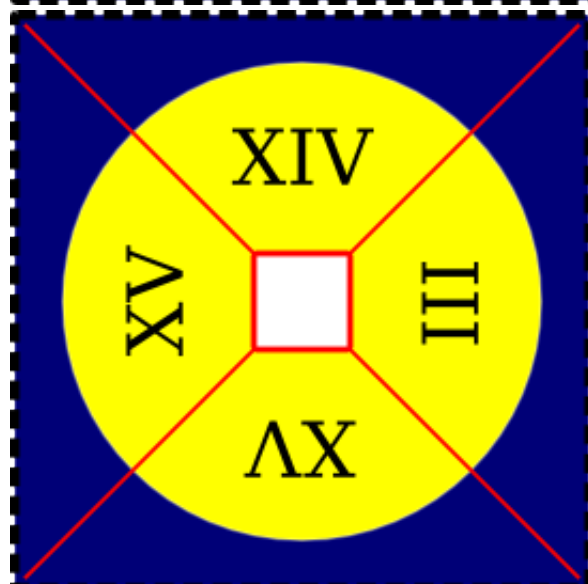
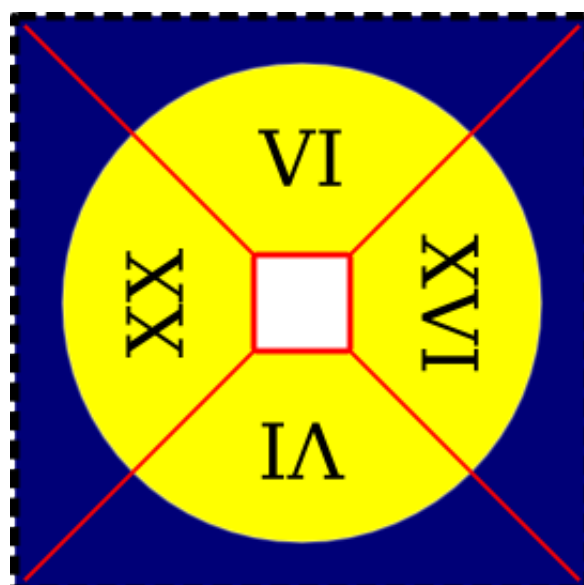
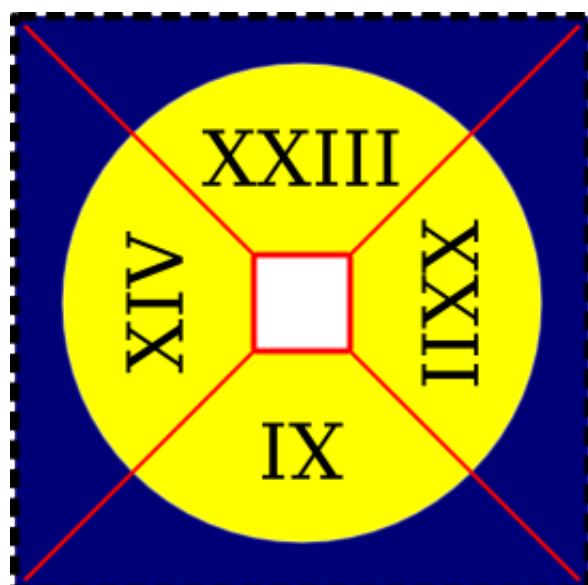












## Decimal Places

Now that we've spent some time reviewing Roman numerals, we are going to spend some time reviewing Arabic numbers. With respect to this, I would like to start with working on writing fractions in decimal form. The following two lists represent whole number places and decimal places.

### Whole Numbers

1 = one  
10 = ten  
100 = one hundred  
1,000 = one thousand  
10,000 = ten-thousand  
100,000 = one hundred-thousand  
1,000,000 = one million

### Decimal Numbers

$1/10 = 0.1$  = one *tenth*  
 $1/100 = 0.01$  = one *hundredth*  
 $1/1,000 = 0.001$  = one *thousandth*  
 $1/10,000 = 0.0001$  = one *ten-thousandth*  
 $1/100,000 = 0.00001$  = one *hundred-thousandth*  
 $1/1,000,000 = 0.000001$  = one *millionth*

So, based on the information above **9876.5432**

The **9** is in the thousands position  
The **8** is in the hundreds position  
The **7** is in the tens position  
The **6** is in the ones position  
The **5** is in the *tenths* position  
The **4** is in the *hundredths* position  
The **3** is in the *thousandths* position  
The **2** is in the *ten-thousandths* position

If you were to write it as a fraction, it would be:

$$9876 \frac{5432}{10000}$$

You could read it as **nine thousand eight hundred seventy six and five thousand four hundred thirty two ten-thousandths**

Let's look at a decimal number and decide which position each number is in.

**167.2543**

- a) 1 is in the \_\_\_\_\_ place.
- b) 2 is in the \_\_\_\_\_ place.
- c) 3 is in the \_\_\_\_\_ place.
- d) 4 is in the \_\_\_\_\_ place.
- e) 5 is in the \_\_\_\_\_ place.
- f) 6 is in the \_\_\_\_\_ place.
- g) 7 is in the \_\_\_\_\_ place.

ones (8) tens (7) hundreds (6) thousands (5) ten-thousands (4) hundred-thousands (3) millions (2) billions (1)

On the following page is a worksheet to practice writing fractions in decimal form.

### Worksheet 1-3

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

Date: \_\_\_\_\_

---

What is the place name of the 7 in each of these numbers?

1) 743

\_\_\_\_\_

3) 2,178,000,013

\_\_\_\_\_

5) 0.0007

\_\_\_\_\_

2) 5,763,482

\_\_\_\_\_

4) 26.74

\_\_\_\_\_

6) 17.054

\_\_\_\_\_

Write the following numbers in decimal format.

7) twelve million four thousand twenty-five

\_\_\_\_\_

8) thirty-one thousand three hundred thirty-seven

\_\_\_\_\_

9) five million three hundred eighteen thousand eight

\_\_\_\_\_

10) seven tenths

\_\_\_\_\_

11) thirty-nine hundredths

\_\_\_\_\_

12) fifteen and seven tenths

\_\_\_\_\_

13) six and seven hundredths

\_\_\_\_\_

14) seven hundred five and one hundred seven ten-thousandths

\_\_\_\_\_

Write the following fractions in decimal format.

15)  $\frac{7}{10}$

\_\_\_\_\_

18)  $\frac{19}{10,000}$

\_\_\_\_\_

16)  $95 \frac{7}{100}$

\_\_\_\_\_

19)  $406 \frac{214}{10,000}$

\_\_\_\_\_

17)  $\frac{57}{100}$

\_\_\_\_\_

20)  $507 \frac{112}{10,000}$

\_\_\_\_\_

Change the following decimals into fractions (but do not reduce your fractions).

21) 0.6

\_\_\_\_\_

22) 0.85

\_\_\_\_\_

$$23) 0.006 \quad \underline{\hspace{2cm}}$$

$$25) 13.000013 \quad \underline{\hspace{2cm}}$$

$$24) 0.0574 \quad \underline{\hspace{2cm}}$$

$$26) 80.08135 \quad \underline{\hspace{2cm}}$$

The following are the answers to the odd problems.

1) hundreds place

3) ten-millions place

5) ten-thousandths place

7) 12,004,025

9) 5,318,008

11) 0.39

13) 6.07

15) 0.7

17) 0.57

19) 406.0214

21)  $\frac{6}{10}$

23)  $\frac{6}{1,000}$

25)  $13 \frac{13}{1,000,000}$

## Rounding Decimals & Significant Figures

Sometimes when you are working with numbers, you will find them to large to be manageable. In these scenarios, you should round.

- Rounding makes numbers that are easier to work with in your head.
- Rounded numbers are only approximate.
- An exact answer generally can not be obtained using rounded numbers.
- Use rounding to get a answer that is close but that does not have to be exact.

### *How to round numbers*

For whole numbers:

- Make the numbers that end in 1 through 4 into the next lower number that ends in 0. For example 74 rounded to the nearest ten would be 70.
- Numbers that end in a digit of 5 or more should be rounded up to the next even ten. The number 88 rounded to the nearest ten would be 90.

For decimal numbers:

- When looking to round a significant figure that is proceeded by a 1 through 4, you may stop your decimal there. For example 0.74 rounded to the nearest tenth would be 0.7
- When looking to round a significant figure that is proceeded by a 5 or more should be rounded up. The number 0.88 rounded to the nearest tenth would be 0.9

### *Significant Figures*

A significant figure is one that is actually measured.

Rules for assigning significant figures:

- Digits other than zero are always significant. For example, 34.12 has four significant figures.
- Zeros used only to space the decimal are never significant. For example, 0.007 has one significant figure and 16,000 only has two significant figures.
- Final zeros after a decimal point are always significant. For example, 0.0070 has two significant figures.
- Zeros between two other significant digits are always significant. For example, 50.04 has four significant figures.

Determine the number of significant figures in 0.20 ml of Lantus insulin.

0.20 ml of Lantus insulin has two significant figures

On the following page is a worksheet to attain some practice with determining significant figures and rounding numbers.





## Worksheet 1-4

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

Date: \_\_\_\_\_

---

Round the following numbers to the nearest whole number.

1) 102.5

\_\_\_\_\_

3) 88.1

\_\_\_\_\_

5) 187.4999

\_\_\_\_\_

2) 1.0

\_\_\_\_\_

4) 99.7

\_\_\_\_\_

6) 29,001.501

\_\_\_\_\_

Round the following numbers to the nearest tenth.

7) 1.0

\_\_\_\_\_

9) 2.54

\_\_\_\_\_

11) 187.4999

\_\_\_\_\_

8) 99.7

\_\_\_\_\_

10) 29,001.501

\_\_\_\_\_

12) 12.99

\_\_\_\_\_

Round the following numbers to the nearest hundredth.

13) 187.4999

\_\_\_\_\_

15) 29,001.501

\_\_\_\_\_

17) 66.666667

\_\_\_\_\_

14) 12.99

\_\_\_\_\_

16) 1234567.8901

\_\_\_\_\_

18) 5,454.5454

\_\_\_\_\_

Determine the number of significant figures in each measurement.

19) 64.8 mg

\_\_\_\_\_ significant figures

21) 0.25 mL

\_\_\_\_\_ significant figures

23) 0.454 kg

\_\_\_\_\_ significant figures

20) 1.609 km

\_\_\_\_\_ significant figures

22) 4.06 mEq

\_\_\_\_\_ significant figures

24) 0.06 mL

\_\_\_\_\_ significant figures

25) 0.20 mcm

\_\_\_\_\_ significant figures

26) 220 lb

\_\_\_\_\_ significant figures

27) 0.001 kg

\_\_\_\_\_ significant figures

## Adding & Subtracting Decimal Numbers

Adding and subtracting decimals is the same as adding and subtracting whole numbers.

*To add decimal numbers:*

- Put the numbers in a vertical column, aligning the decimal points.
- Add each column of digits, starting on the right and working left.
- Place the decimal point in the answer directly below the decimal points in the terms.

$$\begin{array}{r} 9817.543 \\ + 0.123 \\ \hline 9817.666 \end{array}$$

Do the following practice problems:

$$\begin{array}{r} 1) \quad 324.5678 \\ + 2.3456 \\ \hline \end{array}$$

$$\begin{array}{r} 3) \quad 32.255 \\ + 1.0123 \\ \hline \end{array}$$

$$\begin{array}{r} 5) \quad 6.6663 \\ + 12.0007 \\ \hline \end{array}$$

$$\begin{array}{r} 2) \quad 0.6 \\ + 0.4 \\ + 1.5 \\ \hline \end{array}$$

$$\begin{array}{r} 4) \quad 4.0068 \\ + 0.06 \\ + 43.667 \\ \hline \end{array}$$

$$\begin{array}{r} 6) \quad 5.004 \\ + 17 \\ + 12.02 \\ \hline \end{array}$$

$$\begin{array}{r} 1) \quad 326.9134 \\ 2) \quad 2.5 \\ 3) \quad 33.2673 \\ 4) \quad 47.7338 \\ 5) \quad 18.6670 \\ 6) \quad 34.024 \end{array}$$

To subtract decimal numbers:

- Put the numbers in a vertical column, aligning the decimal points.
- Subtract each column, starting on the right and working left. If the digit being subtracted in a column is larger than the digit above it, “borrow” a digit from the next column to the left.
- Place the decimal point in the answer directly below the decimal points in the terms.

$$\begin{array}{r} 9817.544 \\ - \quad 5.123 \\ \hline 9812.421 \end{array}$$

Do the following practice problems:

$$\begin{array}{r} 1) \quad 324.5678 \\ - \quad 2.3456 \\ \hline \end{array}$$

$$\begin{array}{r} 3) \quad 32.255 \\ - \quad 1.0123 \\ \hline \end{array}$$

$$\begin{array}{r} 5) \quad 6.6663 \\ - \quad 2.0007 \\ \hline \end{array}$$

$$\begin{array}{r} 2) \quad 0.6 \\ - \quad 0.5 \\ \hline \end{array}$$

$$\begin{array}{r} 4) \quad 4.0068 \\ - \quad 0.06 \\ \hline \end{array}$$

$$\begin{array}{r} 6) \quad 5.004 \\ - \quad 2.02 \\ \hline \end{array}$$

$$\begin{array}{r} 1) \quad 322.2222 \\ 2) \quad 0.1 \\ 3) \quad 31.2427 \\ 4) \quad 3.9468 \\ 5) \quad 4.6656 \\ 6) \quad 2.984 \end{array}$$

## Worksheet 1-5

Name:

Date:

---

Perform the following addition problems.

$$\begin{array}{r} 1) \quad 28,291 \\ + 27,595 \\ \hline \end{array} \quad \begin{array}{r} 2) \quad 5.08 \\ + 0.17 \\ \hline \end{array} \quad \begin{array}{r} 3) \quad 25.09 \\ + 18.7 \\ \hline \end{array} \quad \begin{array}{r} 4) \quad 97.07 \\ + 0.09 \\ \hline \end{array} \quad \begin{array}{r} 5) \quad 31.05 \\ + 4.7 \\ \hline \end{array} \quad \begin{array}{r} 6) \quad 85.2 \\ + 1.764 \\ \hline \end{array}$$

$$7) \quad 31 + 24 + 18 =$$

\_\_\_\_\_

$$9) \quad 35.07 + 19.1 =$$

\_\_\_\_\_

$$11) \quad 1.28 + 31.05 + 4.7 =$$

\_\_\_\_\_

$$8) \quad 4951 + 3287 =$$

\_\_\_\_\_

$$10) \quad 88.08 + 0.02 =$$

\_\_\_\_\_

$$12) \quad 18 + 0.042 + 16.3 =$$

\_\_\_\_\_

Perform the following subtraction problems.

$$\begin{array}{r} 13) \quad 28,291 \\ - 27,595 \\ \hline \end{array} \quad \begin{array}{r} 14) \quad 5.08 \\ - 0.17 \\ \hline \end{array} \quad \begin{array}{r} 15) \quad 25.09 \\ - 18.7 \\ \hline \end{array} \quad \begin{array}{r} 16) \quad 97.07 \\ - 0.09 \\ \hline \end{array} \quad \begin{array}{r} 17) \quad 31.05 \\ - 4.7 \\ \hline \end{array} \quad \begin{array}{r} 18) \quad 85.2 \\ - 1.764 \\ \hline \end{array}$$

$$19) \quad 4951 - 3287 =$$

\_\_\_\_\_

$$21) \quad 88.08 - 0.02 =$$

\_\_\_\_\_

$$23) \quad 4.5 - 4.05 =$$

\_\_\_\_\_

$$20) \quad 35.07 - 19.1 =$$

\_\_\_\_\_

$$22) \quad 0.97 - 0.012 =$$

\_\_\_\_\_

$$24) \quad 0.951 - 0.112 =$$

\_\_\_\_\_

Perform the following applied problems.

25) A neonate initially weighed 4.03 kg at birth. Three days later, he weighed 3.944 kg. How many kg did the neonate lose?

26) Normal body temperature is 37.0° C. What temperature is 0.4° above normal?



## Multiplying Decimal Numbers

To multiply decimal numbers:

- Multiply the numbers just as if they were whole numbers.
- Line up the numbers on the right.
- Starting on the right, multiply each digit in the top number by each digit in the bottom number.
- Add the products.
- Place the decimal point in the answer by starting at the right and moving the point the number of places equal to the sum of the decimal places in both number that were multiplied.

$$\begin{array}{r}
 36.3 \leftarrow \text{one decimal place} \\
 \times 0.21 \leftarrow \text{+ two decimal places} \\
 \hline
 363 \\
 + 7260 \\
 \hline
 7.623 \leftarrow \text{three decimal places}
 \end{array}$$

Let's try a few practice problems.

$$\begin{array}{llllll}
 1) & 2020 & 2) & 5.08 & 3) & 25.09 \\
 & \times 1.1 & & \times 0.17 & & \times 18.7 \\
 \hline & & \hline & & \hline & \\
 \end{array}
 \quad
 \begin{array}{llllll}
 4) & 97.07 & 5) & 31.05 & 6) & 1.764 \\
 & \times 0.09 & & \times 4.7 & & \times 85.2 \\
 \hline & & \hline & & \hline & 
 \end{array}$$

$$\begin{array}{llllll}
 1) & 2222 & 2) & 0.8636 & 3) & 469.183 \\
 & & & & & \\
 \hline & & \hline & & \hline & \\
 \end{array}
 \quad
 \begin{array}{llllll}
 4) & 8.7363 & 5) & 145.935 & 6) & 150.2928 \\
 & & & & & \\
 \hline & & \hline & & \hline & 
 \end{array}$$





## Worksheet 1-6

Name:

Date:

---

Solve the following multiplication problems.

1) $\begin{array}{r} 28,291 \\ \times 27,595 \\ \hline \end{array}$	2) $\begin{array}{r} 4.06 \\ \times 0.25 \\ \hline \end{array}$	3) $\begin{array}{r} 22.33 \\ \times 16.4 \\ \hline \end{array}$	4) $\begin{array}{r} 69.09 \\ \times 0.06 \\ \hline \end{array}$	5) $\begin{array}{r} 50.13 \\ \times 7.4 \\ \hline \end{array}$	6) $\begin{array}{r} 1.337 \\ \times 31.3 \\ \hline \end{array}$
---	---	--	--	---	--

7)  $4951 \times 3287 =$

\_\_\_\_\_

9)  $88.08 \times 0.02 =$

\_\_\_\_\_

11)  $4.05 \times 4.5 =$

\_\_\_\_\_

8)  $35.07 \times 19.1 =$

\_\_\_\_\_

10)  $0.012 \times 0.97 =$

\_\_\_\_\_

12)  $0.951 \times 0.112 =$

\_\_\_\_\_

Perform the following applied problems.

13) Sal is to take 1.25 grains of aspirin every day. Each grain weighs 64.8 mg, so how many mg of aspirin is Sal to take every day?

14) Nauseous Nancy bought 12 vials of ondansetron at a cost of \$17.56 per vial. How much did she spend on ondansetron?

15) Theophylus Monk is to receive 81.6 mg of theophylline three times per day for the next three days. How many mg of theophylline should he receive in total?



## Dividing Decimal Numbers

The statement “4 divided by 2” can be written several ways:

$$2 \overline{) 4}$$

$$4 \div 2$$

$$\frac{4}{2}$$

Write the statement “48 divided by 6” three different ways (use the above example as a template if necessary):

The names of the numbers in a division problem are shown below:

$$\begin{array}{r} 8 \\ 6 \overline{) 48} \end{array}$$

- The **6** is called the **divisor**
- The **48** is called the **dividend**
- The **8** is called the **quotient**

The most common method of performing long division is called the long-division algorithm.

### **Example**

Solve the following problem:

$$6 \overline{) 3108}$$

The pattern in the long division algorithm is:

- Divide
- Multiply back
- Subtract
- Bring down the next number

*You can check how to solve the above example on the next two pages.*

Solution to example on previous page:

$$\begin{array}{r} 5 \\ 6 \overline{)3108} \end{array}$$

Divide

6 can not go into 3, but it can go into 31 a total of 5 times.

$$\begin{array}{r} 5 \\ 6 \overline{)3108} \\ 30 \end{array}$$

Multiply back

5 times 6 is 30.

$$\begin{array}{r} 5 \\ 6 \overline{)3108} \\ - 30 \\ \hline 1 \end{array}$$

Subtract

31 minus 30 equals 1

$$\begin{array}{r} 5 \\ 6 \overline{)3108} \\ - 30 \\ \hline 10 \end{array}$$

Bring down the next number

$$\begin{array}{r} 51 \\ 6 \overline{)3108} \\ - 30 \\ \hline 10 \end{array}$$

Divide

6 can go into 10 a total of 1 time.

$$\begin{array}{r} 51 \\ 6 \overline{)3108} \\ - 30 \\ \hline 10 \\ 6 \end{array}$$

Multiply back

1 times 6 is 6.

$$\begin{array}{r} 51 \\ 6 \overline{)3108} \\ - 30 \\ \hline 10 \\ - 6 \\ \hline 4 \end{array}$$

Subtract

10 minus 6 equals 4

$$\begin{array}{r} 51 \\ 6 \overline{)3108} \\ - 30 \\ \hline 10 \\ - 6 \\ \hline 48 \end{array}$$

Bring down the next number

$$\begin{array}{r}
 518 \\
 6 \overline{)3108} \\
 \underline{-30} \phantom{0} \\
 10 \phantom{0} \\
 \underline{-6} \phantom{0} \\
 48
 \end{array}$$

Divide

6 can go into 48 a total of 8 times.

$$\begin{array}{r}
 518 \\
 6 \overline{)3108} \\
 \underline{-30} \phantom{0} \\
 10 \phantom{0} \\
 \underline{-6} \phantom{0} \\
 48 \\
 48
 \end{array}$$

Multiply back

8 times 6 is 48.

$$\begin{array}{r}
 518 \\
 6 \overline{)3108} \\
 \underline{-30} \phantom{0} \\
 10 \phantom{0} \\
 \underline{-6} \phantom{0} \\
 48 \\
 \underline{-48} \\
 0
 \end{array}$$

Subtract

48 minus 48 equals 0.

There is nothing else to bring down; therefore, the final answer to “3,108 divided by 6” is 518.

Division of decimal numbers also use long division.

- If the problem does not have a whole-number divisor, it is necessary to change the problem to an equivalent division with a whole number divisor.
- This is done by shifting the decimal point to the right in both the divisor and the dividend.
- The decimal point is shifted as many places as needed to make the divisor a whole number.
- The new place that the decimal is at in the dividend is directly below where the decimal point in the quotient should be.
- Now you may use the long division algorithm like you normally would.

**Example**

$$8.2 \overline{) 73.8}$$

Our initial problem is “73.8 divided by 8.2”.

The **divisor** is **8.2**

The **dividend** is **73.8**

$$8.2 \overline{) 73.8}$$

The divisor must be a whole-number. To achieve this, shift the decimal one spot to the right.

Since you shifted the decimal in the divisor one spot, you should shift the decimal the same number of spots in the dividend.

Now move the decimal straight up from the dividend to where it will be in the quotient.

$$\begin{array}{r} 9. \\ 82 \overline{) 738} \\ - 738 \\ \hline 0 \end{array}$$

Now, use the long division algorithm like you would normally to solve the problem.

Try the following practice problems.

1)  $9 \overline{) 7.2}$

2)  $0.18 \overline{) 36}$

3)  $0.06 \overline{) 5.85}$

1) 0.8 (1  
2) 200 (3  
3) 97.5 (5

## Worksheet 1-7

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

Date: \_\_\_\_\_

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Solve the following problems and round answers to the thousandths position when necessary.

1)  $27 \overline{)2,835}$     2)  $0.25 \overline{)4.06}$     3)  $16.4 \overline{)22.33}$     4)  $0.06 \overline{)69.09}$     5)  $7.4 \overline{)50.13}$     6)  $31.3 \overline{)1,337}$

7)  $49.51 \div 3287 =$

\_\_\_\_\_

9)  $88.08 \div 0.2 =$

\_\_\_\_\_

11)  $4.05 \div 4.5 =$

\_\_\_\_\_

8)  $35.07 \div 19.1 =$

\_\_\_\_\_

10)  $0.97 \div 0.012 =$

\_\_\_\_\_

12)  $0.951 \div 0.112 =$

\_\_\_\_\_

Perform the following applied problems.

13) A dispensary has 256 ounces of rubbing alcohol on hand; how many 8 oz bottles can be filled with alcohol?

14) The average dose of a drug is 7.5 mg daily. If a vial contains 1,500 mg, how many days' supply are in the vial?

15) You receive a prescription for 6.25 mg capsules of metoprolol tartrate that you will have to compound. If you have 750 mg of metoprolol tartrate on hand, how many capsules will you be able to compound?

16) Four capsules of ampicillin are to be administered daily. How many days' supply would 32 capsules be?





## Worksheet 1-8

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

Date: \_\_\_\_\_

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Write the following Arabic numerals as Roman numerals.

1) 38

\_\_\_\_\_

2) 551

\_\_\_\_\_

3) 24

\_\_\_\_\_

Write the following Roman numerals as Arabic numerals.

4) xxi

\_\_\_\_\_

5) cd

\_\_\_\_\_

6) xlviii

\_\_\_\_\_

What is the place name of the 3 in each of these numbers.

7) 2,432,484

\_\_\_\_\_

8) 24.032

\_\_\_\_\_

9) 107.3

\_\_\_\_\_

Write the following numbers.

10) Two million fifteen thousand six hundred

\_\_\_\_\_

11) Four thousand four ten-thousandths

\_\_\_\_\_

12) Nine thousand eight hundred seventy six and five thousand four hundred thirty two ten-thousandths

\_\_\_\_\_

Perform the following additions.

13) 
$$\begin{array}{r} 19,867 \\ + 12,482 \\ \hline \end{array}$$

14) 
$$\begin{array}{r} 82.07 \\ + 0.18 \\ \hline \end{array}$$

15) 
$$\begin{array}{r} 23 \\ + 0.7 \\ \hline \end{array}$$

16) 
$$\begin{array}{r} 38 \\ 0.042 \\ + 2.8 \\ \hline \end{array}$$

17) 
$$\begin{array}{r} 107.3 \\ + 4.65 \\ \hline \end{array}$$

18) 
$$\begin{array}{r} 81.9 \\ + 52.89 \\ \hline \end{array}$$

Perform the following subtractions.

$$\begin{array}{r} 19) \quad 19,867 \\ - 12,482 \\ \hline \end{array} \quad \begin{array}{r} 20) \quad 82.07 \\ - 0.18 \\ \hline \end{array} \quad \begin{array}{r} 21) \quad 23 \\ - 0.7 \\ \hline \end{array} \quad \begin{array}{r} 22) \quad 93.8 \\ - 0.9 \\ \hline \end{array} \quad \begin{array}{r} 23) \quad 107.3 \\ - 4.65 \\ \hline \end{array} \quad \begin{array}{r} 24) \quad 81.9 \\ - 52.89 \\ \hline \end{array}$$

Perform the following multiplications.

$$\begin{array}{r} 25) \quad 48 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 26) \quad 9.3 \\ \times 8 \\ \hline \end{array} \quad \begin{array}{r} 27) \quad 0.41 \\ \times 0.27 \\ \hline \end{array} \quad \begin{array}{r} 28) \quad 3.94 \\ \times 2.64 \\ \hline \end{array} \quad \begin{array}{r} 29) \quad 2.8 \\ \times 0.042 \\ \hline \end{array} \quad \begin{array}{r} 30) \quad 31.337 \\ \times 0.67 \\ \hline \end{array}$$

Perform the following division and round your answers to the hundredths place.

$$\begin{array}{r} 31) \quad 369 \div 6 \\ \hline \end{array} \quad \begin{array}{r} 32) \quad 1.5 \overline{)156.5} \\ \hline \end{array} \quad \begin{array}{r} 33) \quad 16.4 \overline{)22.33} \\ \hline \end{array} \quad \begin{array}{r} 34) \quad 2.04 \overline{)84} \\ \hline \end{array} \quad \begin{array}{r} 35) \quad 33 \overline{)6.6} \\ \hline \end{array} \quad \begin{array}{r} 36) \quad 12.3 \div 100 \\ \hline \end{array}$$

Solve the following word problems.

37) Find the total weight of two objects if one weighs 255.4 grams and the other weighs 198.6 grams.

38) If a patient weighs 75 kg one month and 72.7 kg the next month, how much weight did the patient lose?

39) What is the total cost of a dozen items at \$2.49 each?

40) A patient is given 210 mL of medication to take. They are to take 15 mL of the medication daily till all of it is used. How many days should the medication last?