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The correct

”values”

for a circle (π)

The correct value and its subordinated values
”3.125” > 0.78125, 1.28, 0.64, 0.21875
Please, look at formulae p29 & pages 34-38 all in grupp two only.

&

Other approximated values and their subordinated values
For example: in grupp three only:
3.141592653... > 0.785398163..., 1.273239545..., 0.6366197724..., 0.2146018367

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Find out and get to know:

The correct ”values” for a circle & π

The correct value and its subordinated values

&

Other values and their subordinated values

This information is very important to know, study the book carefully and find out why I have presented the value of the 3.125 and why I did not decide the value of the 3.141592653...

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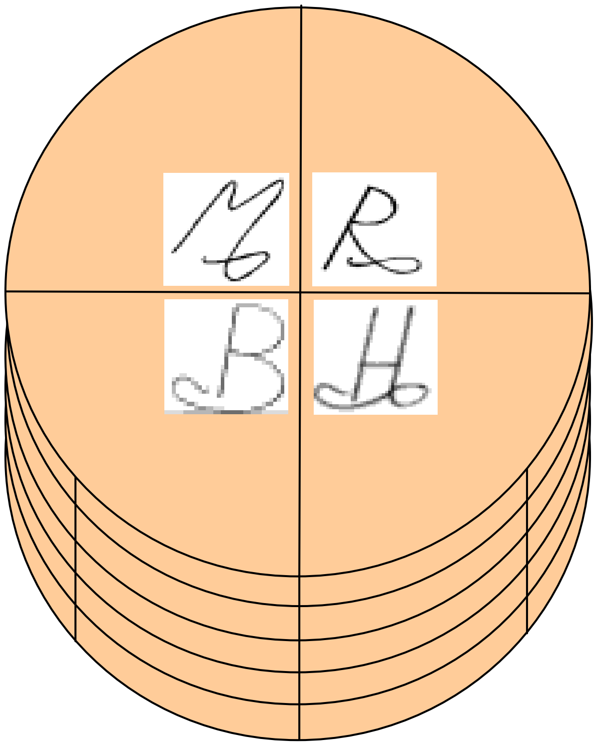
The correct values for a circle

by

Mohammadreza Mehdinia



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The Correct Values for a circle (π)

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This book does not take up the methods that have been used so far to arrive at the value of.

Neither is the history of π treated in this book.

The book describes new ways of thinking and thus new formulae. In order to achieve a clear understanding of the new formulae it is necessary to study the book thoroughly.

The author, Mohammadreza Mehdinia
10 October 2006

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Preface

I arrived in Sweden in 1987 and immediately started to work intensively on this book. In 1995 I finally discovered the value that is presented in the book. The result was published in *Hallandsposten*, a local newspaper in the south of Sweden, on 19 January 1996. This publicity led to an interview on TV *Channel 4 Halland*, which was broadcast on 23 and 24 January 1996.

Important sections of the book were sent to Chalmers University of Technology in Gothenburg 1996 and the University of Lund.

The first edition was published in Swedish on 1 March 2000. The Swedish Royal Library and seven universities in Sweden each received a copy of the book.

This English edition is more thorough and has been provided with more details than the third, Swedish, edition.

The aim of this edition is to provide the reader with a more detailed and thorough solutions.

The key to the whole document is the *squaring form*. To clarify this form I have described the relationships between squares, circles and cylinders.

It is of great importance that the reader should first study the three illustrations and their characteristics of grading systems in chapters 1 and chapter 2 part 3 to get to understand the cylinders in chapter 3. For illustrations see chapter 4.
Once you have understood these chapters you can study how to measure a chord.
This will enable the reader to systematically follow the text.
The book concludes with more illustrations and formulae for calculations involving other geometric figures.

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Contents………………………………………………..09-12

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Index for all values

These green are not included here in the book but you, see them on the part two(2).

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ABBREVIATIONS

Units of length = u.l.

Units of area = u.a.

Units of circumference = u. o.

Units of other…

SYMBOLS USED IN TEXT

+ = Addition - = subtraction * = multiplication / = division

S = square-squaring side s = side of a square

S = 4

d = diameter

D = diagonal

Length units = u.l.

Area units = u.a.

Logarithm of e^n

ln of logarithm e^n

The new logarithm introduces:

cyks = cylinder-squaring side

cyks = square side of the cylinder-squaring form with a side of 3.125

cy = the variable exponent of cyks

c = circle k = square

Oc = circumference of circle Ok = perimeter of square

Standard circle, = diameter = side, = inner circle

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CONCEPTIONS OF π

One conception of π is the value 3.141… that is used for calculations, involving geometrical figures containing circles.

Another conception is that the number 3.141… is only an approximation.

I interpret π in this book as the relationship between a circle and its diameter, and not as the irrational number 3.141…

I have attempted to find a value that will result in exact calculations of circles.

SQUARING

The word "squaring" is used for the following:

A. The square with side of 4 u.l. so-called square squaring form

B. A circle with the diameter of 4 u.l., the circle squaring form

C. The only cylinder that has been produced by a square and two circles, from which come the cylinder squaring form

I identify the characteristics found in figures that I call *square squaring*, *circle squaring* and *cylinder squaring* and the principles behind these figures. I refer to three figures:

1. Square
2. Circle
3. Cylinder

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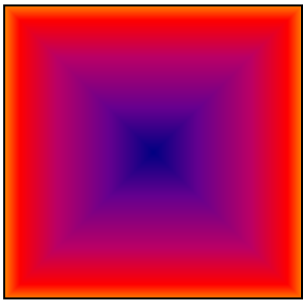
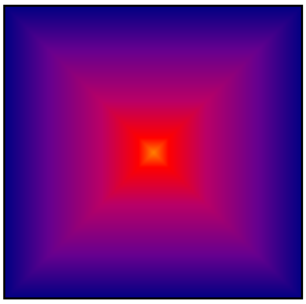
Chapter 1

SQUARES

AND

THE SQUARE SQUARING FORM





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Grading systems

The grading system is a work of nature, is not possible to change it. Here I have presented three kinds of grading system; they are “squares grading-system, circles grading-system & cylinders grading-system”. It is very important to remember the grading systems in your mind when you are reading this text. Take copies of the grading systems and look at them while you are reading, it will help you to along the reading process.

When you choose a value look for it in the grading systems to see where the value is placed in each grading system.

We have three cases to solve.
These points below are important to understand:

1. Squares and their properties in the Grading-system I.
2. Circles and their properties in the Grading-system II.
3. Cylinders and their properties in the Grading-system III.
4. There are three forms of squaring-forms I have called them, 1. Square squaring-form, 2. Circle squaring-form, 3. Cylinder squaring-form and their relationship.

4.1 Each squaring form is special and unique in its own.

4.2 There is only one square, one circle and one cylinder that form the squaring form.

- We must first understand what a squaring form is.
- If you want to change or use other values, carefully verify it with the three grading systems.
- Be aware of the size of square which gives you the value.
- When you get a value try to locate its position in each grading system.
- Q always presents a per cent of a circle.
- Each square gives five different numbers and each of them illustrates Q, $4Q$, R, $2R$, B and H.

To understand this book you have to understand the above mentioned points.

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SQUARES

I have divided squares into three groups according to their perimeter and area.

As shown above, I have graded the squares belonging to the interval 1-10. The numbers represent the sides of the squares. Squares that are created using this system have different perimeters and areas, of course. Taking into consideration the sides, perimeters and areas, one can categorise these squares into three groups:

Grading system 1

	5-6-7-8-9-10	
Area larger than perimeter	6-7-8-9-10	Area > perimeter
	7-8-9-10	
	5-6-7	
	5-8	
	5	
A = O A = 1	⇇ 4 ⇉	O = A O = 1
	3	
	1-2	
Perimeter larger than area	1-2-3	Perimeter > Area
	3-2-1-2	
	2-3-1-3-2	
	3-2-1-2-1-3-2	

Note: The grading system can not be changed.

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Group 1

Group 1 contains squares that have a side larger than 0 u.l. and smaller than 4 u.l. The squares that belong to group 1 have perimeters larger than their areas. By this is meant that if one only regards the numbers, irrespective of the unit for perimeter or area, the number for the perimeter is larger than the number for the area.

The examples below illustrate the above statement:

A square that has a side of 3 u.l. has a perimeter of 12 u.l. and an area of 9 u.a. I mean here that 12 is larger than 9, i.e. the perimeter is "larger" than the area.

Perimeter = 3* 4= 12 Ares = $3^2 = 9$

Perimeter > Area $\Rightarrow$ 12 > 9.

Group 1 squares whose sides are smaller than 4 u.l. have a perimeter that is larger than the area.

Group 2

In this group there is only one square with the side 4 u.l.

In the all squares there is only one square that is the side 4.

This square has a perimeter "equal to" the area.

The perimeter 4 * 4 = 16 u.l. Area 4^2 =16 u.a.

Perimeter = Area 16 = 16

<u>This square is unique due to these characteristics.</u>

Group 3

Group 3 consists of squares whose sides are larger than 4 u.l.

The squares’ perimeter in this group is "smaller" than the squares’ areas.

Example:

A square with the side 10 u.l. has the perimeter:

10 * 4= 40 u.l. But has the area 10^2 = 100 u.a.

Perimeter < Are $\Rightarrow$ 40 < 100

Group 3 squares whose sides are bigger than 4 u.l. have a perimeter that is smaller than the area.

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All squares are divided into these groups according to the above system.

Group 1, the perimeter is larger than the area	Perimeter > Area
Group 2, the perimeter is equal to the area	Perimeter = Area
Group 3, the perimeter is smaller than the area	Perimeter < Area

Grading system 1:1

Squares

500-1000-10000- …
8.5-9.5-10.5-100
Group three 7.5-8.0-9.0-10 Area > Perimeter
6.5-6.7-7.0
5.55-6.0
4.5-5.0
4.1
Group two Only 4. O = A ← 4 → O = 1 & A = 1
3.999
3.9750
3.950000
3.928105767
Group one 3.70-3.75-380 Perimeter > Area
3. 4-3.5-3.6-3.65
3.20-3.30-1.45-1.5
3.141592653589793…
2.3-2.5-3.0-3.1-3.15-3.125
0.5-0.8-0.9-1.4-1.5-1.6-1.8-2.0

Note: The grading system can not be changed.

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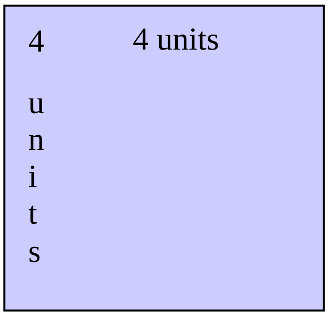
The unique square:

SQUARE SQUARING FORM

The square in group 2 is only one square. To distinguish this square from others, the side of square is designated capital ”S”. It is called the ”square squaring-form”, from which comes the squaring rule and the squaring formulae.

Square squaring-form



N.B.
Squares with sides of 4 u.l. have a perimeter of 16 u.l. and an area of 16 u.a. Perimeter = 16 u.l. and area = 16 u.a. What I immediately observed was the common number for the perimeter and the area.

You can find a description and a short view of circles in chapter two, part one. Cylinders in chapter three, part one. The aim of these descriptions are that one easier gets a more structured view of circles and cylinders and also preparing ones mind about the new theory.

You can find a more detailed description regarding circles in chapter 2, part two.

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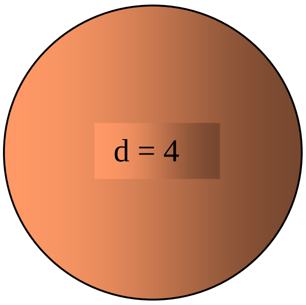
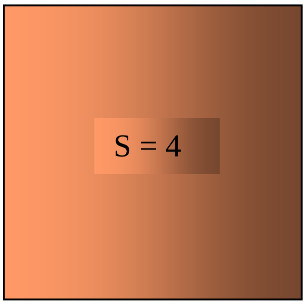
Chapter 2

PART ONE

CIRCLES

Description and a short review of the circles properties.





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CIRCLES

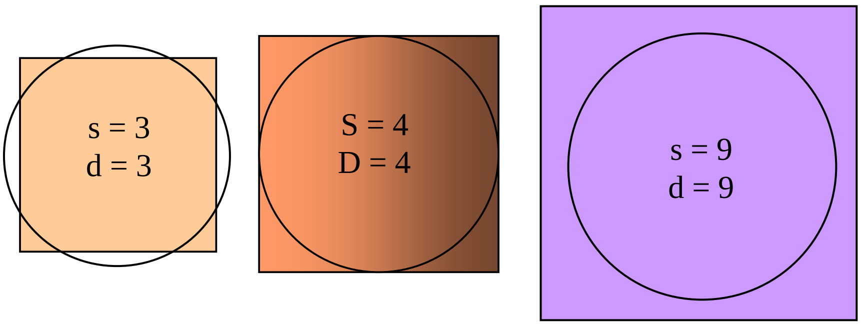
1. A circle has drawn inside a square; they have tangents on four points. This means that the circles diameter is equal to the squares side.

2. When you choose a circle you have to identify the square with its side equal to the circles diameter.

3. In this way the circle is depended of the square.

4. According to the squares grading-system we are looking for grading system for circles.

It is most important that one realise that circles are depended of squares. This law does not imply for rectangles or triangles.



Circles can be divided into three groups on the same principle as that used for squares:

In Group 1, the circumferences are larger than the areas
Circumference > Area and diameter > side

In Group 2, the circumference is equal to the area
Circumference = Area and diameter = side

In Group 3, the circumferences are smaller than the areas
Circumference < Area and diameter < side

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As above, I divided the circles into three groups with diameters 1-10. In order to divide the circles into three groups I must first be able to calculate the circles’ characteristics. I used the number 3.141… and calculated the characteristics of the circles to make exact measurements. When π was used for calculating values of the circle with the diameter 4 u.l. the circumference was larger than the area.
There must be another number that can group circles in the above way.
To arrive at this number I have constructed formulae that are discussed later in the book in chapter 2, part two.

Clarification:
Now we know that the square with 4.u.l is unique and solitary. And we also recognize the unique circle with a diameter 4.u.l, which is placed inside the square. The question is which constant or value is useable for calculation of a circle.

By now we know that the squares grading-system is a law of nature. If in every square there is a circle with its diameter equal as the side of the square there must be a grading system for circles as well. The circle grading-system is also a law of nature.

The grading system of circles should have the same properties as the squares grading-system. Circles are depended of squares mainly the squares grading-system, as it is also validated for other grading systems.

I have constructed the circles grading-system according to the squares but we still do not know what number will be in both groups!

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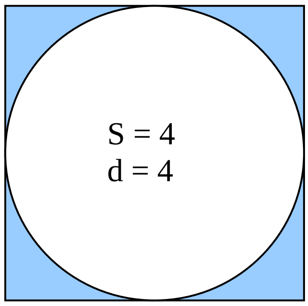
THE CIRCLE SQUARING-FORM

In order to solve the problem with the circle, first select a square in the following way:

We draw a circle within a square with the squaring form that touches the sides of the square. In this way we obtain a circle whose diameter is equal to that of the square's side. "This circle is dependent on the square". An explanation of this statement will be made later in the document.



We draw a circle 4 u.l. in diameter, i.e. the same length as the side of square. In the square with the squaring form, which has an area and perimeter of 16 units, there is a circle within the squaring form - see illustration above. The circumference and area of the circle and those of the square have a common number.

We try to discover a reasonable explanation for this case. To explain the method of approach, the squaring form rules are used.

The circle that lies within the square and has the same diameter as the side of square is called the inner circle. Once again, note that the diameter of the inner circle is equal to that of the side of the square.

If a square lies within a circle and the square's diagonal has the same length as that of the diameter of the circle, the circle is called the outer circle. See illustrations below.

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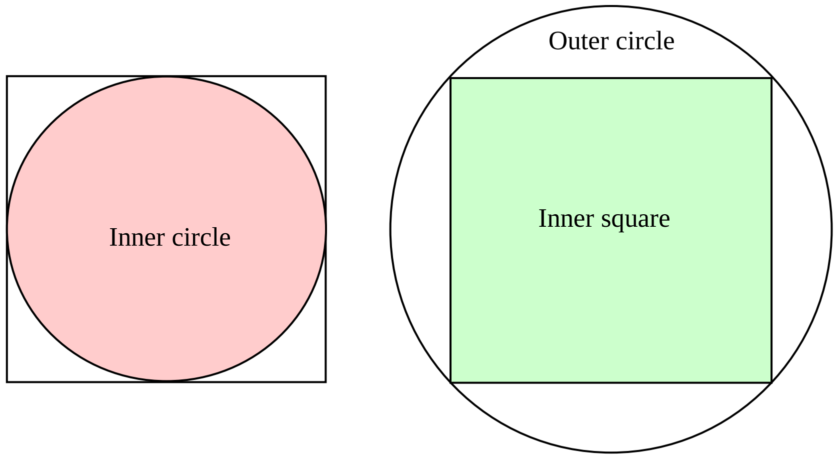

If there is a square, which has the same area and perimeter, there must also be a circle with the same characteristic as the square squaring-form. Such a circle is called the circle squaring-form and is defined in the same way as the square squaring-form, i.e. perimeter = area.

I have chosen a few numbers for squares and put them into parentheses. I do not know which of the number/numbers are in group two, when I discover the number/numbers it will be the value I looking for.

There are squares sides into parentheses every number will produce a value. When I give the values will construct the Grading system II for circles.

Which of the numbers is in group two?
-we will know later

Group three = Area > circumference
Group two = Circumference = area
Group one = Area < circumference

(
10?
9?
8?
6?
5?
4.5?
4.1?
4?
3.999?
3.99?
3.9?
3.5
3.0?
2.75?
2.5?
2?
1.5?
1.4?
)

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The method that I use to analyse and produce a circle with the squaring form can be followed in Chapter 2, part two.

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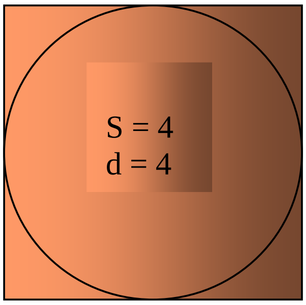
Chapter 2

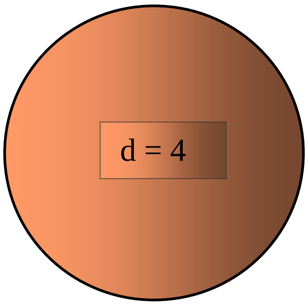
PART TWO

CIRCLES

&

THE CIRCLE SQUARING-FORM





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ln
of
the logarithm e

The first formulae is constructed and it with using into that ln of logarithm e, which the formula are based on that.

Key to symbols used

+ = addition - = subtraction * = multiplication / = division

S = square squaring-form side

s = side of any square

d = diameter

D = diagonal

Length units = u.l.

Area units = u.a.

Circumference = co

Perimeter = ko

Standard circle, = diameter = side, = inner circle

Logarithm e = log e

Logarithm ln of e = log ln

The side of the square, the diagonal, and the diameters of the inner and outer circles are the values needed to construct a formula, see below.

Above all, the following four units are essential:

4 u.l. - that is, the side's of the square and the inner diameter of the circle.

Firstly I will clarify the relationship between the three different groups of circles that I defined above.

The basis I started with is logarithm $e^{\wedge}$ since I chose the ln of logarithm $e^{\wedge}$. The squares side is put into the formulae which one give some values for each square.

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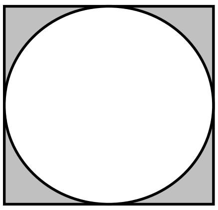
From this starting point I will investigate the relationship between the square squaring-form and the circle squaring-form and later chapter the cylinder squaring-form.

If we compare a square with its inner circle we can see that the circle has a smaller circumference and area than the square.
The square that results in the square squaring-form has a side of 4 .u.l. This square is inner circle, that also has a diameter of 4, will have the same characteristics as the square, i.e. the area = the circumference.
Note though that the area of the circle and its circumference are smaller than those of the square. As I mentioned earlier, I call this circle the circle squaring-form.

As explained above, the side of the square is equal to the diameter of the circle.



The area, perimeter and side of the square and diameter of the circle are known but the following is unknown:

1. The area and circumference of the circle.
2. The shaded area and perimeter in the figure.

Now I need to calculate the two unknown areas, the perimeter and the circumference with the help of the formulae.
I will define the formulae that will calculate the area, the circumference and the perimeter of the above picture.

Once again, note that the circle has been placed in the square and that it touches the sides of the square at four points, i.e. the square and the circle have four common points.

The square with 4 .u.l. is the most important square of all squares.

As mentioned above, I have divided the figures into three categories:

1. Squares
2. Circles
3. Cylinders

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Squares have been defined in earlier chapters (chapter 1).

The definition of circles will be supplemented earlier in the text, and cylinders later.
It is important to point out for the calculation of the circle's characteristics, as with the diameter 4 circle squaring-form, that it is dependent on the square having a side of 4 .u.l. "the square squaring-form". The relationship between this circle's characteristics are the same as for the square, but proportionally smaller.

I need to construct a formula that will produce values that in turn will aid the calculation of the geometric characteristics of a circle.
For this formula I require an inner circle and an outer circle that have been drawn inside and outside a square with side's 4 .u.l. See below for further explanation.

The formulae will define a circle that shows relation to;

1. Its diameter to its circumference and area.
2. Circles relation to its square.
3. Its relation of the shaded area that is not covered by the circle.
4. Finally, how many per cent a circle cover its square's area and perimeter.
5. Also relations to the cylinder.

Inner circle:

An inner circle is a circle that has been drawn inside a square with the same diameter as the side of the square.
I emphasis that I only use a square with side of 4 .u.l.

Outer circle:

An outer circle is a circle drawn outside a square, in this case the square's Diagonal being the same as the diameter of the circle.
Only a square with side of 4 .u.l is used.

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Each square has a circle within itself. Its diameter is the same as the side of the square. The square has a side and a diagonal, the inner circle's diameter is equal to the side and the diagonal is equal to the diameter of the outer circle. The outer circle is always twice bigger then the inner circle.

With help of the logarithm e I build the formulae.
I use the diagonal of the square and the side as the diameter and put them in the formulae.
Note: Each square gives five values or constants when using the formulae. These values are substitutes and complements for each other when calculating a circle.

The side of the square, the diagonal and the diameters of the inner and outer circles in the each group (1, 2, 3) are needed to construct a formula. The most important is group 2, see below.

Above all, the following three units are essential:

1. 4 .u.l. - that is, the side's of the square and the inner diameter of the circle.

2. $\sqrt{32}$ - that is, the Diagonal of the square or the outer diameter of the circle.

I shall construct formulae from the above logarithms.

With the help of the formulae below it is possible to calculate the proportion of the inner circle area and the area of the square with the squaring form.

The formulae are the basis of logarithm e, "ln of logarithm e" is used.

<u>Squares formulae</u>

$$Q = (\ln\sqrt{(e^{\ln s})^2 * 2} / \ln e^{\ln s})^2 / 2.$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 / 2 = Q$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 * 2 = 4Q$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 = r$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 * 2 = 2r$$

$$1 - (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2 = b$$

$$1 - (\ln s / \ln\sqrt{s^2 * 2})^2 = h$$

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Squares formulae

$$Q = (\ln\sqrt{(e^{\ln s})^2 * 2} / \ln e^{\ln s})^2 / 2.$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 / 2 = Q$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 * 2 = 4Q$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 = r$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 * 2 = 2r$$

$$1 - (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2 = b$$

$$1 - (\ln s / \ln\sqrt{s^2 * 2})^2 = h$$

Squares formulae

$$Q = (\ln\sqrt{(e^{\ln s})^2 * 2} / \ln e^{\ln s})^2 / 2.$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 / 2 = Q$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 / 4 = \frac{Q}{2}$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 / 10 = \frac{Q}{5}$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 * 2 = 4Q$$

$$(\ln\sqrt{s^2 * 2} / \ln s)^2 * 4 = 8Q$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 = r$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 / 2 = \frac{r}{2}$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 / 10 = \frac{r}{10}$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 * 2 = 2r$$

$$(\ln s / \ln\sqrt{s^2 * 2})^2 * 10 = 10r$$

$$1 - (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2 = b$$

$$(1 - (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2) / 4 = \frac{b}{4}$$

$$1 - (\ln s / \ln\sqrt{s^2 * 2})^2 = h$$

$$(1 - (\ln s / \ln\sqrt{s^2 * 2})^2) / 9 = \frac{h}{9}$$

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Description : **General formulae**

$4Q = (\ln\sqrt{(e^{\ln s})^2 * 2} / \ln e^{\ln s})^2 * 2$

Relevant formula :$\Rightarrow$ $4Q = (\ln\sqrt{s^2 * 2} / \ln s)^2 * 2$
Relationship between area, circumference and diameter of a circle.

Percentage formula :$\Rightarrow$ $Q = (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2$
The formula produces value that shows how many per cent a circle area, circumference and diameter covers the square, when its side is put in the formula.

Executive formula :$\Rightarrow$ $R = (\ln s / \ln\sqrt{s^2 * 2})^2$
Relation between the side of a square and diameter of a circle when square's perimeter is equal to the circle's circumference.

Inclusive formula :$\Rightarrow$ $2R = (\ln s / \ln\sqrt{s^2 * 2})^2 * 2$
Relation between the side of a square and circle's diameter when the perimeter is equal to circumference. Relation between areas and perimeters of a square and its innercircle and outercircle.

Shadow formula :$\Rightarrow$ $B = 1 - ((\ln\sqrt{s^2 * 2} / \ln s)^2 / 2)$
The area between a square and its innercircle; $B + Q =$ square.

$H = 1 - (\ln s / \ln\sqrt{s^2 * 2})^2$

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The formulae's above give me values that are illustrated on pages 34-38. For example you can see on every line that each value belongs to a square. The squares which I have used are chosen from squares grading-system 1. Further I will construct a structure for circles grading-system that will originate from the squares grading-system 1.

Values of the various squares put into the formulae with different results. Note that I wish to show the correct numbers with decimals. See the notes after values, numbered 1, 2, 3 etc and they in groups.

When a circles diameter is the same as a square's side, the circle is called an inner circle for the square. The inner circle will be depended of the square. Now you are be able to calculate the circle through the side of the square.

I divided circle in three groups according to the squares and this grading system form.

Circles can be divided into three groups on the same principle as that used for squares:

In Group 1, the circumference is larger than the area
Circumference > Area

In Group 2, the circumference is equal to the area
Circumference = Area and diameter = side

In Group 3, the circumference is smaller than the area
Circumference < Area

As above, I divided the circles into three groups with diameters 1-10. In order to divide the circles into three groups I must first be able to calculate the circles' characteristics. I used the number 3.141… and calculated the characteristics of the circles to make exact measurements. When π (3.141) was used for calculating values of the circle with the diameter 4 .u.l. the circumference was larger than the area. See grading system one, two and three and "ANALYSIS IN PRACTICE & APPLICATION, VALUES AND DIAGRAMS" page 93-127.

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Constructions 1-5 on pages 34-38, we can see squares sides and each side in its own group and with its own values.

The formulae give some long list of numbers. I could find five different values which with you can calculate a correct circle in different ways.

The correct value and it's subordinated values

1. Relevant formulae
2. Percentage formulae, subordinate value one
3. Inclusive formulae, subordinate value two
4. Executive formulae, subordinate value three
5. Shadows formulae, subordinate value four

See pages 34-38

Note that each square's properties are very important. When a square is put in the formulae you have to think about:

1. Square properties used in formulae, (side, area and perimeter).
2. Find out which subgroup of the squares grading-system the square belongs to.
3. Locate the obtained value in the circles grading-system.
4. With the above or selected value calculate the circle properties.
5. Find out the correct properties for the above circle. Se application on pages 95-98. .

For details and further information for the above points se pages 34-38, 39, 45-48, 51, 52, 53-55, 61, 83-84,88 & analyses and diagrams pages 93-98, 99-127, 111-112 and 115-117.

Observe: Index for all values

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No.	$M = (\ln\sqrt{(e^{\ln S})^2 * 2}/\ln e^{\ln S})^2 * 2.$ Relationship between diameter, circumference & area	
1	$(\ln\sqrt{10^2 * 2}/\ln 10)^2 * 2 = 2.6473695... = 4Q < 4M$	Relevant formulae
2	$(\ln\sqrt{9^2 * 2}/\ln 9)^2 * 2 = 2.68068879... = 4Q < 4M$	
3	$(\ln\sqrt{8^2 * 2}/\ln 8)^2 * 2 = 2.7222... = 4Q < 4M$	
4	$(\ln\sqrt{7^2 * 2}/\ln 7)^2 * 2 = 2.77585615... = 4Q < 4M$	Group three
5	$(\ln\sqrt{6^2 * 2}/\ln 6)^2 * 2 = 2.84853316... = 4Q < 4M$	
6	$(\ln\sqrt{5^2 * 2}/\ln 5)^2 * 2 = 2.95409426... = 4Q < 4M$	
7	$(\ln\sqrt{4.5^2 * 2}/\ln 4.5)^2 * 2 = 3.027880092... = 4Q < 4M$	
8	$(\ln\sqrt{4.1^2 * 2}/\ln 4.1)^2 * 2 = 3.103162981... = 4Q < 4M$	
9	$(\ln\sqrt{4^2 * 2}/\ln 4)^2 * 2 = 3.125 = 4M$	Group two only
10	$(\ln\sqrt{3.999^2 * 2}/\ln 3.999)^2 * 2 = 3.125225493... = 4Q > 4M$	
11	$(\ln\sqrt{3.99^2 * 2}/\ln 3.99)^2 * 2 = 3.127261525... = 4Q > 4M$	
12	$(\ln\sqrt{3.98^2 * 2}/\ln 3.98)^2 * 2 = 3.129537779... = 4Q > 4M$	
13	$(\ln\sqrt{3.97^2 * 2}/\ln 3.97)^2 * 2 = 3.131828911... = 4Q > 4M$	
14	$(\ln\sqrt{3.96^2 * 2}/\ln 3.96)^2 * 2 = 3.134135076... = 4Q > 4M$	
15	$(\ln\sqrt{3.95^2 * 2}/\ln 3.95)^2 * 2 = 3.136456429... = 4Q > 4M$	
16	$(\ln\sqrt{3.94^2 * 2}/\ln 3.94)^2 * 2 = 3.138793128... = 4Q > 4M$	
17	$(\ln\sqrt{3.93^2 * 2}/\ln 3.93)^2 * 2 = 3.141145331... = 4Q > 4M$	Group one
18	$(\ln\sqrt{3.929^2 * 2}/\ln 3.929)^2 * 2 = 3.141381410... = 4Q > 4M$	
19	$(\ln\sqrt{3.928105767^2 * 2}/\ln 3.928105767)^2 * 2 = 3.141592653... = (\pi) = 4Q > 4M$	
20	$(\ln\sqrt{3.92^2 * 2}/\ln 3.92)^2 * 2 = 3.143513202... = 4Q > 4M$	
21	$(\ln\sqrt{3.9^2 * 2}/\ln 3.9)^2 * 2 = 3.1482966603... = 4Q > 4M$	
22	$(\ln\sqrt{3.5^2 * 2}/\ln 3.5)^2 * 2 = 3.259657005... = 4Q > 4M$	
23	$(\ln\sqrt{3^2 * 2}/\ln 3)^2 * 2 = 3.46089568... = 4Q > 4M$	
24	$(\ln\sqrt{2.5^2 * 2}/\ln 2.5)^2 * 2 = 3.799065628... = 4Q > 4M$	
25	$(\ln\sqrt{2^2 * 2}/\ln 2)^2 * 2 = 4.5 = 4Q > 4M$	
26	$(\ln\sqrt{1.5^2 * 2}/\ln 1.5)^2 * 2 = 6.8802370... = 4Q > 4M$	
27	$(\ln\sqrt{1.4^2 * 2}/\ln 1.4)^2 * 2 = 8.24197343... = 4Q > 4M$	

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No.	$M = (\ln\sqrt{(e^{\ln S})^2 * 2} / \ln e^{\ln S})^2 / 2.$	Percentage relationship between square & circle
1	$(\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.6618423801...Q < M$	Percentage formulae Subordinate value one
2	$(\ln\sqrt{9^2 * 2} / \ln 9)^2 / 2 = 0.6701721995...Q < M$	
3	$(\ln\sqrt{8^2 * 2} / \ln 8)^2 / 2 = 0.6805555556...Q < M$	
4	$(\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.6939640386...Q < M$	
5	$(\ln\sqrt{6^2 * 2} / \ln 6)^2 / 2 = 0.712133332904...Q < M$	**Group three**
6	$(\ln\sqrt{5^2 * 2} / \ln 5)^2 / 2 = 0.73852355662..Q < M$	
7	$(\ln\sqrt{4.5^2 * 2} / \ln 4.5)^2 / 2 = 0.756970023...Q < M$	
8	$(\ln\sqrt{4.1^2 * 2} / \ln 4.1)^2 / 2 = 0.7757907452...Q < M$	
9	$(\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.78125 = M$	**Group two only**
10	$(\ln\sqrt{3.999^2 * 2} / \ln 3.999)^2 / 2 = 0.7813062735...Q > M$	
11	$(\ln\sqrt{3.99^2 * 2} / \ln 3.99)^2 / 2 = 0.7818153813...Q > M$	
12	$(\ln\sqrt{3.98^2 * 2} / \ln 3.98)^2 / 2 = 0.7823844446...Q > M$	
13	$(\ln\sqrt{3.97^2 * 2} / \ln 3.97)^2 / 2 = 0.7829572278...Q > M$	
14	$(\ln\sqrt{3.96^2 * 2} / \ln 3.96)^2 / 2 = 0.7835337691...Q > M$	
15	$(\ln\sqrt{3.95^2 * 2} / \ln 3.95)^2 / 2 = 0.7841141073...Q > M$	
16	$(\ln\sqrt{3.94^2 * 2} / \ln 3.94)^2 / 2 = 0.7846982819...Q > M$	
17	$(\ln\sqrt{3.93^2 * 2} / \ln 3.93)^2 / 2 = 0.7852863328...Q > M$	**Group one**
18	$(\ln\sqrt{3.929^2 * 2} / \ln 3.929)^2 / 2 = 0.7853453526...Q > M$	
19	$(\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.785398163... = (\pi / 4) = Q > M$	
20	$(\ln\sqrt{3.92^2 * 2} / \ln 3.92)^2 / 2 = 0.7858783005...Q > M$	
21	$(\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 / 2 = 0.7870741511...Q > M$	
22	$(\ln\sqrt{3.5^2 * 2} / \ln 3.5)^2 / 2 = 0.8149142637...Q > M$	
23	$(\ln\sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.865223921...Q > M$	
24	$(\ln\sqrt{2.5^2 * 2} / \ln 2.5)^2 / 2 = 0.9497664071...Q > M$	
25	$(\ln\sqrt{2^2 * 2} / \ln 2)^2 / 2 = 1.125Q > M$	
26	$(\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 / 2 = 1.720059253...Q > M$	
27	$(\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 / 2 = 2.060493358...Q > M$	

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$$M = (\ln e^{\ln S} / \ln\sqrt{(e^{\ln S})^2 * 2})^2 * 2.$$

Relationship between diameter, circumference and area

No.	Formula	
1	$(\ln 10 / \ln\sqrt{10^2 * 2}\ )^2 * 2 = 1.510933766... = 2r > 2R$	Inclusive formulae Subordinate value two
2	$(\ln 9 / \ln\sqrt{9^2 * 2}\ )^2 * 2 = 1.492153809... = 2r > 2R$	
3	$(\ln 8 / \ln\sqrt{8^2 * 2}\ )^2 * 2 = 1.469387755... = 2r > 2R$	
4	$(\ln 7 / \ln\sqrt{7^2 * 2}\ )^2 * 2 = 1.440996859... = 2r > 2R$	**Group three**
5	$(\ln 6 / \ln\sqrt{6^2 * 2}\ )^2 * 2 = 1.404231502... = 2r > 2R$	
6	$(\ln 5 / \ln\sqrt{5^2 * 2}\ )^2 * 2 = 1.354052932... = 2r > 2R$	
7	$(\ln 4.5 / \ln\sqrt{4.5^2 * 2}\ )^2 * 2 = 1.321056276... = 2r > 2R$	
8	$(\ln 4.1 / \ln\sqrt{4.1^2 * 2}\ )^2 * 2 = 1.289007385... = 2r > 2R$	
9	$(\ln 4 / \ln\sqrt{4^2 * 2}\ )^2 * 2 = 1.28 = 2R$	**Group two only**
10	$(\ln 3.999 / \ln\sqrt{3.999^2 * 2}\ )^2 * 2 = 1.2799076... = 2r < 2R$	
11	$(\ln 3.99 / \ln\sqrt{3.99^2 * 2}\ )^2 * 2 = 1.279074349... = 2r < 2R$	
12	$(\ln 3.98 / \ln\sqrt{3.98^2 * 2}\ )^2 * 2 = 1.278144021... = 2r < 2R$	
13	$(\ln 3.97 / \ln\sqrt{3.97^2 * 2}\ )^2 * 2 = 1.277208977... = 2r < 2R$	
14	$(\ln 3.96 / \ln\sqrt{3.96^2 * 2}\ )^2 * 2 = 1.276269179... = 2r < 2R$	
15	$(\ln 3.95 / \ln\sqrt{3.95^2 * 2}\ )^2 * 2 = 1.275324587... = 2r < 2R$	
16	$(\ln 3.94 / \ln\sqrt{3.94^2 * 2}\ )^2 * 2 = 1.274375162... = 2r < 2R$	
17	$(\ln 3.93 / \ln\sqrt{3.93^2 * 2}\ )^2 * 2 = 1.273420863... = 2r < 2R$	**Group one**
18	$(\ln 3.929 / \ln\sqrt{3.929^2 * 2}\ )^2 * 2 = 1.273325164... = 2r < 2R$	
19	$(\ln 3.928105767 / \ln\sqrt{3.928105767^2 * 2}\ )^2 * 2 = 1.273239545...(2r \text{ of } \pi) < 2R$	
20	$(\ln 3.92 / \ln\sqrt{3.92^2 * 2}\ )^2 * 2 = 1.272461651... = 2r < 2R$	
21	$(\ln 3.9 / \ln\sqrt{3.9^2 * 2}\ )^2 * 2 = 1.270528321... = 2r < 2R$	
22	$(\ln 3.5 / \ln\sqrt{3.5^2 * 2}\ )^2 * 2 = 1.227122956... = 2r < 2R$	
23	$(\ln 3 / \ln\sqrt{3^2 * 2}\ )^2 * 2 = 1.155770172... = 2r < 2R$	
24	$(\ln 2.5 / \ln\sqrt{2.5^2 * 2}\ )^2 * 2 = 1.052890471... = 2r < 2R$	
25	$(\ln 2 / \ln\sqrt{2^2 * 2}\ )^2 * 2 = 0.88888888888... = 2r < 2R$	
26	$(\ln 1.5 / \ln\sqrt{1.5^2 * 2}\ )^2 * 2 = 0.5813753209... = 2r < 2R$	
27	$(\ln 1.4 / \ln\sqrt{1.4^2 * 2}\ )^2 * 2 = 0.4853206617... = 2r < 2R$	

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No.	$R = (\ln e^{\ln S} / \ln\sqrt{(e^{\ln S})^2 * 2})^2$ Relationship between radius and side	
1	$(\ln 10 / \ln\sqrt{10^2 * 2}\ )^2 = 0.7554668831... = r > R$	
2	$(\ln 9 / \ln\sqrt{9^2 * 2}\ )^2 = 0.7460769044... = r > R$	Executive formulae
3	$(\ln 8 / \ln\sqrt{8^2 * 2}\ )^2 = 0.7346938776... = r > R$	Subordinate value three
4	$(\ln 7 / \ln\sqrt{7^2 * 2}\ )^2 = 0.7204984296... = r > R$	
5	$(\ln 6 / \ln\sqrt{6^2 * 2}\ )^2 = 0.702115751... = r > R$	**Group three**
6	$(\ln 5 / \ln\sqrt{5^2 * 2}\ )^2 = 0.6770264658... = r > R$	
7	$(\ln 4.5 / \ln\sqrt{4.5^2 * 2}\ )^2 = 0.6605281382... = r > R$	
8	$(\ln 4.1 / \ln\sqrt{4.1^2 * 2}\ )^2 = 0.6445036927... = r > R$	
9	$(\ln 4 / \ln\sqrt{4^2 * 2}\ )^2 = 0.64 = R$	**Group two only**
10	$(\ln 3.999 / \ln\sqrt{3.999^2 * 2}\ )^2 = 0.6399538222... = r < R$	
11	$(\ln 3.99 / \ln\sqrt{3.99^2 * 2}\ )^2 = 0.6395371746... = r < R$	
12	$(\ln 3.98 / \ln\sqrt{3.98^2 * 2}\ )^2 = 0.6390720105... = r < R$	
13	$(\ln 3.97 / \ln\sqrt{3.97^2 * 2}\ )^2 = 0.6386044885... = r < R$	
14	$(\ln 3.96 / \ln\sqrt{3.96^2 * 2}\ )^2 = 0.6381345894... = r < R$	
15	$(\ln 3.95 / \ln\sqrt{3.95^2 * 2}\ )^2 = 0.6376622935... = r < R$	
16	$(\ln 3.94 / \ln\sqrt{3.94^2 * 2}\ )^2 = 0.6371875809... = r < R$	
17	$(\ln 3.93 / \ln\sqrt{3.93^2 * 2}\ )^2 = 0.6367104317... = r < R$	**Group one**
18	$(\ln 3.929 / \ln\sqrt{3.929^2 * 2}\ )^2 = 0.636662582... = r < R$	
19	$(\ln 3.928105767 / \ln\sqrt{3.928105767^2 * 2}\ )^2 = 0.6366197724...(r \text{ of } \pi) < R$	
20	$(\ln 3.92 / \ln\sqrt{3.92^2 * 2}\ )^2 = 0.6362308257... = r < R$	
21	$(\ln 3.9 / \ln\sqrt{3.9^2 * 2}\ )^2 = 0.6352641607... = r < R$	
22	$(\ln 3.5 / \ln\sqrt{3.5^2 * 2}\ )^2 = 0.6135614779... = r < R$	
23	$(\ln 3 / \ln\sqrt{3^2 * 2}\ )^2 = 0.577885086... = r < R$	
24	$(\ln 2.5 / \ln\sqrt{2.5^2 * 2}\ )^2 = 0.5264452357... = r < R$	
25	$(\ln 2 / \ln\sqrt{2^2 * 2}\ )^2 = 0.4444444444... = r < R$	
26	$(\ln 1.5 / \ln\sqrt{1.5^2 * 2}\ )^2 = 0.2906876605... = r < R$	
27	$(\ln 1.4 / \ln\sqrt{1.4^2 * 2}\ )^2 = 0.2526603309... = r < R$	

No.	$M = (\ln\sqrt{(e^{\ln S})^2 * 2 / \ln e^{\ln S}})^2 / 2$ Value for shaded area and shaded circumference	
1	$1-(\ln\sqrt{10^2 * 2 / \ln 10})^2 / 2 = 0.3381576199...$ b of $10 > B$ of 4	
2	$1-(\ln\sqrt{9^2 * 2 / \ln 9})^2 / 2 = 0.3298278005...$ b of $9 > B$	Shadow formulae Subordinate value four
3	$1-(\ln\sqrt{8^2 * 2 / \ln 8})^2 / 2 = 0.3194444444...$ b of $8 > B$	
4	$1-(\ln\sqrt{7^2 * 2 / \ln 7})^2 / 2 = 0.3060359614...$ b of $7 > B$	**Group three**
5	$1-(\ln\sqrt{6^2 * 2 / \ln 6})^2 / 2 = 0.2878667096...$ b of $6 > B$	
6	$1-(\ln\sqrt{5^2 * 2 / \ln 5})^2 / 2 = 0.2614764338...$ b of $5 > B$	
7	$1-(\ln\sqrt{4.5^2 * 2 / \ln 4.5})^2 / 2 = 0.243029977...$ b of $4.5 > B$	
8	$1-(\ln\sqrt{4.1^2 * 2 / \ln 4.1})^2 / 2 = 0.2242092548...$ b of $4.1 > B$	
9	$1-(\ln\sqrt{4^2 * 2 / \ln 4})^2 / 2 = 0.21875 = B$ B of 4	**Group two only**
10	$1-(\ln\sqrt{3.999^2 * 2 / \ln 3.999})^2 / 2 = 0.2186936265...$ b of $3.999 < B$ of 4	
11	$1-(\ln\sqrt{3.99^2 * 2 / \ln 3.99})^2 / 2 = 0.2181846187...$ b of $3.99 < B$	
12	$1-(\ln\sqrt{3.98^2 * 2 / \ln 3.98})^2 / 2 = 0.2176155554...$ b of $3.98 < B$	
13	$1-(\ln\sqrt{3.97^2 * 2 / \ln 3.97})^2 / 2 = 0.2170427722...$ b of $3.97 < B$	
14	$1-(\ln\sqrt{3.96^2 * 2 / \ln 3.96})^2 / 2 = 0.2164662309...$ b of $3.96 < B$	
15	$1-(\ln\sqrt{3.95^2 * 2 / \ln 3.95})^2 / 2 = 0.2158858927...$ b of $3.95 < B$	
16	$1-(\ln\sqrt{3.94^2 * 2 / \ln 3.94})^2 / 2 = 0.2153017181...$ b of $3.94 < B$	
17	$1-(\ln\sqrt{3.93^2 * 2 / \ln 3.93})^2 / 2 = 0.2147136672...$ b of $3.93 < B$	**Group one**
18	$1-(\ln\sqrt{3.929^2 * 2 / \ln 3.929})^2 / 2 = 0.2146546474...$ b of $3.929 < B$	
19	$1-(\ln\sqrt{3.928...^2 * 2 / \ln 3.928...})^2 / 2 = 0.2146018367$ b of 3.928105767 of $\pi < B$	
20	$1-(\ln\sqrt{3.92^2 * 2 / \ln 3.92})^2 / 2 = 0.2141216995...$ b of $3.92 < B$	
21	$1-(\ln\sqrt{3.9^2 * 2 / \ln 3.9})^2 / 2 = 0.2129258489...$ b of $3.9 < B$	
22	$1-(\ln\sqrt{3.5^2 * 2 / \ln 3.5})^2 / 2 = 0.1850857363...$ b of $3.5 < B$	
23	$1-(\ln\sqrt{3^2 * 2 / \ln 3})^2 / 2 = 0.134776079...$ b of $3 < B$	
24	$1-(\ln\sqrt{2.5^2 * 2 / \ln 2.5})^2 / 2 = 0.1850857363...$ b of $2.5 < B$	
25	$1-(\ln\sqrt{2^2 * 2 / \ln 2})^2 / 2 = -0.125$ b of $2 < B$	
26	$1-(\ln\sqrt{1.5^2 * 2 / \ln 1.5})^2 / 2 = -0.7200592526...$ b of $1.5 < B$	
27	$1-(\ln\sqrt{1.4^2 * 2 / \ln 1.4})^2 / 2 = -1.060493358$ b of $1.4 < B$	

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Squaring formulae

$M = (\ln\sqrt{(e^{\ln S})^2 * 2} / \ln e^{\ln S})^2 / 2.$

$(\ln\sqrt{\mathrm{S}^2 * 2} / \ln \mathrm{S})^2 * 2 = 4M$
Relation between diameter, circumference and area of a circle.

$(\ln\sqrt{\mathrm{S}^2 * 2} / \ln \mathrm{S})^2 / 2 = M$
Percentage of a square to its inner circle.
M and $2R$ are substitutes for each other; side, diameter, perimeter, circumference and area.

$(\ln \mathrm{S} / \ln\sqrt{\mathrm{S}^2 * 2})^2 = R$
Relation between side of a square and a circle's radius in a case where the squares perimeter is equal the circles circumference.

$(\ln \mathrm{S} / \ln\sqrt{\mathrm{S}^2 * 2})^2 * 2 = 2R$
Relation between side of a square and a circle's diameter where perimeter is equal to circumference. Relation between area and primeter of a square and its inner and outer circle. M and $2R$ are substitutes for each other.

$1 - (\ln\sqrt{\mathrm{S}^2 * 2} / \ln \mathrm{S})^2 / 2 = B$ The value is used for the calculation of areas and perimeters of the squares where it is not covered by its inner circle.

$1 - (\ln \mathrm{S} / \ln\sqrt{\mathrm{S}^2 * 2})^2 = H$ is a supplementary formula

I refer to treatments 1,2,3,4 and 5. The formulae below are designed specially for group two. I will call it “S”. When we use “S” we will always remember the system of squaring form where the circumference is equal to the area.

The correct value and it’s subordinated values

The correct value is 3.125 and its subordinated values are 0.78125, 1.28, 0.64, 0.21875.
In the formulae below compare the gained values with correct values above!
See Index 155-169

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Here we get to see how we are using Q and $4Q$, M and $4M$, R and $2R$.

The formula for M will be used instead of 3.125 since $4M$ = 3.125. This also facilitates other calculations.

+ = addition   - = subtraction   * = multiplication   / = division

S = square squaring-form, with a side of 4 u.l.

s = side of a square, general

$\sqrt{\mathrm{S}^2 * 2} = \sqrt{32}$ = Diagonal of the square squaring-form

$$Q = (\ln\sqrt{(e^{\ln s})^2 * 2} / \ln e^{\ln s})^2 / 2.$$

$$M = (\ln\sqrt{\mathrm{S}^2 * 2} / \ln \mathrm{S})^2 / 2.$$

Squaring formulae

$$M = (\ln\sqrt{(e^{\ln S})^2 * 2} / \ln e^{\ln S})^2 / 2.$$

$$(\ln\sqrt{\mathrm{S}^2 * 2} / \ln \mathrm{S})^2 / 2 = M$$

$$(\ln\sqrt{\mathrm{S}^2 * 2} / \ln \mathrm{S})^2 * 2 = 4M$$

$$(\ln \mathrm{S} / \ln\sqrt{\mathrm{S}^2 * 2})^2 = R$$

$$(\ln \mathrm{S} / \ln\sqrt{\mathrm{S}^2 * 2})^2 * 2 = 2R$$

$$1 - (\ln\sqrt{\mathrm{S}^2 * 2} / \ln \mathrm{S})^2 / 2 = B$$

$$1 - (\ln \mathrm{S} / \ln\sqrt{\mathrm{S}^2 * 2})^2 = H$$

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Absolute values for the formulae:

The formulae with the big S is only sued for the group two.

$$(\ln\sqrt{S^2*2}\ /\ln S)^2/2=M \longrightarrow \mathcal{M}$$

$$(\ln\sqrt{S^2*2/S})^2/\ln S=R \longrightarrow \mathcal{R}$$

$$1-(\ln\sqrt{S^2*2/\ln S})^2/2=B \longrightarrow \mathcal{B}$$

$$1-(\ln S/\ln\sqrt{S^2*2})^2=H \longrightarrow \mathcal{H}$$

M:

The above formula gives the value of *M* that shows the inner circle covers 78.125 % of the square's area and perimeter. *M* = 0.78125

R is used for the calculation of the circle squaring-form. A further description of this term follows in the chapter describing the circle squaring-form.

A formula is needed to calculate the radius or the diameter of the inner circle with the help of the side of the square, i.e. 4.
Since the side of the square is equal to the inner diameter of the circle, the ratio is 1 and the ratio to the radius will be 0.5.
The above formula for *R* gives a value of 0.64. If *R* is multiplied by *M* and the side of the square, the radius of the inner circle can be obtained.
See below:

When diameter is equal side :

$$\text{Radius}=S*R*M\ =S*(\ln S/\ln\sqrt{S^2*2})^2*(\ln\sqrt{S^2*2/\ln S})^2/2$$

When perimeter is equal circumference; side < diameter :

$$\text{Radius}=S*R=S*(\ln S/\ln\sqrt{S^2*2})^2$$

The above is also valid for the calculation of the radius of the inner circle and circumference is equal perimeter, assuming that the value of the side of the square is known.
When circumference is equal perimeter, the radius is “side * *R*“ and diameter is “side * 2*R* “ diameter > side and circle's area > square's area.

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Also in this case “square’s area * 2*R* gives the circle’s area“.

When square area is equal circle's area in this case

perimeter $\div \sqrt{2R}$ gives the length of the circumference.

$s < d$

perimeter > circumference

Also in this case perimeter divides $\sqrt{2R}$ gives the length of the circumference

Equal area

perimeter $\div \sqrt{2R}$ = circumference

$d = s * \sqrt{1.28}$

$s = d \div \sqrt{1.28}$.

The above concept also applies when area of a circle is equal to a square’s area.

B is used for the calculation of areas and perimeters not covered by the inner circle in the square. See under ”Shaded parts” pages 181-193.

H is a supplementary formula that can be combined with the above formulae for calculation of different values.

$$M = (\ln\sqrt{e^{\ln S^2} * 2} / \ln e^{\ln S})^2 / 2.$$

$$M = (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$$

$$R = (\ln S / \ln\sqrt{S^2 * 2})^2$$

$$B = 1 - (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$$

$$H = 1 - (\ln S / \ln\sqrt{S^2 * 2})^2$$

When you use the formulae you will get a value for calculation of a circle. To understand how these works you have to study pages 34-39. With the formulae you can see the circles area -, circumference - and diameter proportion to the square which you have used in the formulae.

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Remember that the diameter is the same as the squares side, but when you calculate the circle with the chosen value you can see that the circles proportions are changed.

The only value that gives a correct diameter which is equal to the side is in group two. See pages 111-112.

Application of the formulae

The formulae can be used for calculation of the following:

Imagine a square with the side 1. An inner circle always covers 78.125% of the square.

$M = 0.78125$

This value shows the proportion of the square covered by its inner circle.

Remember that the inner circle has a diameter identical to that of the side of the square.

$\boldsymbol{Q = 0 < Q < 1}$

$\boldsymbol{Q = 0 < M < 1}$

There are circles that cover more or less of the square than 78.125 %. The proportional value that is larger than 0 but smaller than 1 is represented by *Q* and only the value "0.78125" represented by *M.*

- s = the side of a square, generally all the squares, except for the square with side 4.
- S = capital S is the side of the square squaring-form 4.

Note *M* is always 0.78125

$$M = (\ln\sqrt{S^2 * 2} \,/\, \ln S)^2 / 2$$

 & 

$$Q = (\ln\sqrt{s^2 * 2} \,/\, \ln s)^2 / 2$$

$$\sqrt{Q * 2} = \ln\sqrt{s^2 * 2} \,/\, \ln s$$

$$\sqrt{Q * 2} * \ln s = \ln\sqrt{s^2 * 2}$$

Example

When a square with the side 10 is put in the formula obtains Q = 0.6618423801...

If Q = 0.6618423801… a circle is obtained that covers 66.184… % of a square.

This value or per cent applies for calculation of a circle into a square.

If $Q \geq 0.50$ of a square or squares one need to use the formula with sides > $10_{\mathbf{E}}^{\mathbf{350}}$.

$$Q = (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2$$

Note that the above formula is very efficient for the calculation of astronomic values.

S = the side of the square squaring-form

R = relation between radius, side and diameter, perimeter and circumference and areas

D = diagonal of above square

d = diameter

r = radius

<u>Squaring formulae</u>

$$M = (\ln\sqrt{e^{\ln S^2} * 2} / \ln e^{\ln S})^2 / 2$$

$$M = (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$$

$$M = (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2$$

$$M = 0.78125$$

$$R = (\ln S / \ln\sqrt{S^2 * 2}\,)^2$$

$$R = (\ln 4 / \ln\sqrt{4^2 * 2}\,)^2$$

$$R = 0.64$$

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$$\text{Perimeter of spuare} = \text{S} * 4 * M * 2R$$

$$\text{Perimeter} = \text{S} * 4 * (\ln\sqrt{\text{S}^2 * 2} \,/\, \ln \text{S})^2/2) * (\ln \text{S} \,/\, \ln\sqrt{\text{S}^2 * 2}\,)^2 * 2)$$

$$16 = 4 * 4(\ln\sqrt{4^2 * 2} \,/\, \ln 4)^2/2) * (\ln 4 \,/\, \ln\sqrt{4^2 * 2}\,)^2 * 2)$$

$$\text{Diagonal} = \sqrt{\text{S}^2 * 2}$$

$$\text{D} = \sqrt{4^2 * 2} = \sqrt{32} = 5.65685424...$$

$$\sqrt{M * 2} * \ln \text{S} = \ln\sqrt{\text{S}^2 * 2}$$

$$\sqrt{0.78125 * 2} * \ln 4 = 1.73286795...$$

$$e^{1.73286795...} = \sqrt{4^2 * 2} = \sqrt{32} = 5.65685424...$$

$$\text{d} = \text{s} \,/\, (\ln\sqrt{\text{S}^2 * 2} \,/\, \ln \text{S})^2 \,/\, 2 \Rightarrow 4 \,/\, (\ln\sqrt{4^2 * 2} \,/\, \ln 4)^2 \,/\, 2$$

$$\text{r} = \text{s} * (\,\ln \text{S} \,/\, \sqrt{\text{S}^2 * 2})^2$$

If we select a square with sides < 4 we obtain $Q > M$, "$M = 0.78125$" that is the limit value.
If the side is < 4 then $Q > 0.78125$ (M).

Note all sides of the squares in group one are smaller than group two.

Group two has only one square with side 4.
If the side = 4, $Q = M$, and $M = 0.78125$. These values are produced by the group 2 square.
If we select a square in group three with sides > 4 we obtain $Q < M$, $M = 0.78125$ and M that is the limit value.
If the side > 4 then $Q < 0.78125$ (M).

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Note that the sides of squares in group three are bigger than group two. Group two has only one square with side 4.

For calculation of the diameter (d) and radius (r) of a circle that have the same circumference as a square perimeter, I use the squaring side and apply the following formula:

$d = S / M = S * 2R$

$$\text{diameter} = S / ((\ln \sqrt{S^2 * 2} / \ln S)^2 / 2)$$

$$\text{radius} = S * (\ln S / \ln \sqrt{S^2 * 2})^2$$

$r = S * R$

Example:
For a square and a circle with the same circumference, 16 cm, the area of the square is 16 cm^2.
I will calculate the diameter using the value for one side.

$$d = s / ((\ln \sqrt{S^2 * 2} / \ln S)^2 / 2).$$

$$d = 4 / ((\ln \sqrt{4^2 * 2} / \ln 4)^2 / 2) = 5.12 \text{ cm}.$$

The formula gives us the diameter of 5.12 cm and its area
$d^2 * M = 512^2 * 0.78125 = 20.48$

Notice:

1. If a circle's circumference is equal a square's perimeter the area of the circle is always greater than the square area.

2. If a circle's area is equal a square's area the circumference of the circle is lesser than the square perimeter.

i. For a square and a circle with a circumference of 28 cm, the area of the square is 49 cm^2.
The diameter of the circle will be:
diameter = s / M = 7 / 0.78125 = 8.96 cm

ii. diameter = s * $2R$ = 7 * (2* 0.64) = 8.96 cm
$2R$= 1.28
diameter = s * $2R$ = 7 * 1.28 = 8.96 cm

iii. radius = s * R = 4.48 cm

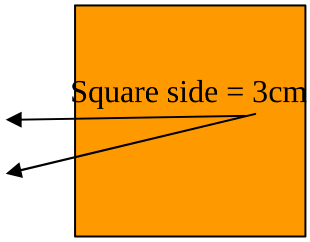
The above example shows that the formula is valid for all circles and squares that have the same circumference and perimeter.

If we now place a square with the side 3, which is smaller than the square squaring side 4, into the formulae for Q and 4Q, we obtain the following:

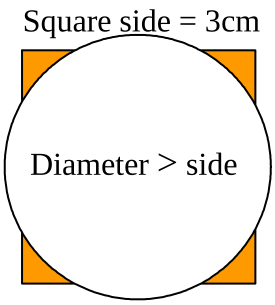
Values of the square with side 3

$$Q = (\ln\sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.865223921...$$

$$4Q = (\ln\sqrt{3^2 * 2} / \ln 3)^2 * 2 = 3.460895684...$$



$Q > M$: This shows that the circle is larger than the inner circle, thus it covers an area outside the square & diameter > side, see diagram.
This is true for all squares with sides < 4.

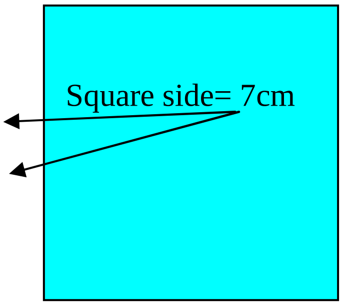


And

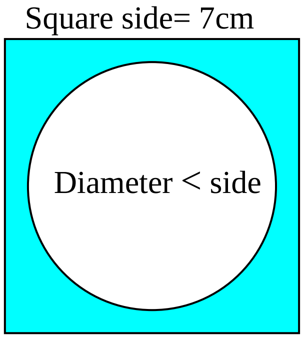
Values of the square with side 7

$$Q = (\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.6939640386...$$

$$4Q = (\ln\sqrt{7^2 * 2} / \ln 7)^2 * 2 = 2.775856154...$$



If a square with sides > 4 is put into the formulae we obtain Q < 0.78125, the limit value or M.
Diameter < side
This means that the circle will be smaller than the inner circle, see diagram.



Each formula is given its own designation or symbol:

$\mathscr{M}$	M = 0.78125
$4\mathscr{M}$	4M = 3.125
$\mathscr{R}$	R = 0.64
$2\mathscr{R}$	$2R$ = 1.28
$\mathscr{B}$	B = 0.21875
$\mathscr{H}$	H = 0.36

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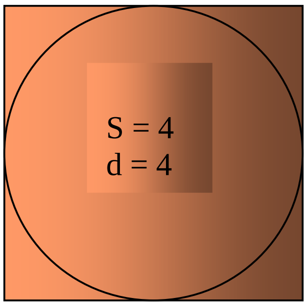
Chapter 2

PART THREE

CIRCLES

&

THE CIRCLE SQUARING-FORM



CIRCLE SQUARING-FORM

Circles are divided into three different groups.
Group 1 in which the circumference > the area
Group 2 in which the circumference = the area
Group 3 in which the circumference < the area

Note that I am not referring to units, only a common number.

Since the circle in group 2 has the same number for circumference and area, the ratio of these is 1.

As explained in part I and II, the circle in group 2 is the inner circle for a square with side of 4. The diameter of the circle is then equal to the side of the square. Remember that the perimeter is equal to the area for this square. I will now attempt to prove the relationship between the square and circle through the circle squaring-form.

There must be an exact number that can be used to calculate the values of a circle in which the circumference is equal to the area.

We know that a circle with the diameter 4 has the same number for area and circumference.

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I refer to the grading system I:1 below. The numbers in the system represent the sides of the squares.
The upper part of the system illustrates sides of the squares where the area is larger than the perimeter, which represents “group three”. In the middle the side is 4 and the perimeter = area, which represents “group two” and the lower part shows sides that produces an area smaller than the perimeter, that is “group one”.

Grading system 1:1

Area larger than perimeter		5-6-7-8-9-10 6-7-8-9-10 7-8-9-10 5-6-7 5-8 5	**Area > perimeter**
A = O	A = 1	$\leftleftarrows$ 4 $\rightrightarrows$	Square squaring-form, O = 1
Perimeter larger than area		3 1-2 1-2-3 3-2-1-2 2-3-1-3-2 3-2-1-2-1-3-2	**Perimeter > Area**

Note: The grading system can not be changed.

In the same way as in the grading system for squares, I have graded circles; see grading system II,I and II,II on the pages 61-64. The values shown in the system are the values *Q* and *4Q* for each circle.

We can see that when *Q* < 0.78125 then circles with a circumference smaller than their area are obtained, also diameter < side.

When *Q* = 0.78125 we obtain a circle with a circumference equal to the area and the diameter equal to the side.

Finally, when *Q* > 0.78125 circles are obtained where the circumference is larger than the area also diameter > side. See shadow page---------

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I made the circle grading system with attention to the squares grading system referring to its properties. All the values in the circle grading system II.I are brought from the percentage formulae , see page 45.
Circle grading system II.I , see below!

Grading system II.I for circles
percentage %

Group 3

Circumference < area — diameter < side

0.6618423801…
0.6701721995...
0.6805555555...
0.6939640386...
0.7121333329...
0.7385235566...

Group 2

Circumference = area — diameter = side

0.78125

Group 1

Circumference > area — diameter > side

0.7813063735...
0.7813627835...
0.7814192333...
0.7814757131...
0.7841141073...
0.7853453525...
0.7853981633...
0.7855818245...
0.7858783005...
0.7864742261...
0.7870741510...
0.7933029803...
0.8149142636...
0.865223920…
0.9497664070…
1.125
1.720059252…
2.060493357…

Note: The grading system can not be changed.

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The grading system II.II is also done with attention to the squares grading-system. The properties are valid for the circles too, see Relevant formulae page 44,

Grading system II.II for circles

relation between

diameter, circumference & area

Group 3 Circumference < area	2.6473695... 2.680688798... 2.722222222... 2.775856154... 2.954094226... 2.954094226...	diameter < side
Group 2 Circumference = area	**3.125**	diameter = side
Group 1 Circumference > area	3.125225494… 3.125225113… 3.125676933… 3.125902852… 3.136456429… 3.14138141… *3.141592653…* 3.142327298… 3.143513202… 3.145896904… 3.148296604… 3.173211921… 3.259657054... 3.46089568… 3.79906562… 4.5 6.88023700… 8.24197342…	diameter > side

Note: The grading system can not be changed.

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Here I explain the most important facts or points that one must keep in mind and remember through out this book! When you choose a value you should find it in the three grading systems:

1. Squares grading system I

2. Circles grading system II

3. Cylinders grading system III

Circles grading system 2 for circles is constructed accordingly to the squares grading system.

1. Group one: areas smaller than circumferences.
2. Group two: area equal circumference.
3. Group three: areas bigger than circumferences.

According to the squares grading system the values in circles grading system describe different lengths of diameter.

4. Values in group one produce diameters greater than the standard diameter.
5. The value in group two produce diameter for a standard circle. This means that the diameter equals the side, consequently an inner circle.
6. Values in group three produce diameters smaller than the standard diameter.

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To understand better follow the below instruction:

1. Choose a square.

2. Now use the square's side in all formulae!

3. You will obtain five different values.

4. Each value obtained above has a usable area. One introduces the size of a circle inside a square and one introduces their relationship and so on… See pages 34-39

5. For practical help, see pages 92-97 and diagrams 98-127,

I have earlier in this text explained the values and you should remember them as you read the chapter for cylinders.

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Note that each square's properties are very important. When a square is put in the formulae you have to think about:

6. Square properties used in formulae, (side, area and perimeter).
7. Find out which subgroup of the squares grading-system the square belongs to.
8. Locate the obtained value in the circles grading-system.
9. With the above or selected value calculate the circle properties.
10. Find out the correct properties for the above circle. Se application on pages 95-98.
11. Once you have the square and the correct circle you can find the related cylinder.
12. Locate the quadrilateral of the cylinder in the cylinders grading-system se pages 81-92.
13. Calculate the quadrilateral properties and then its ratio with the square and the circle.

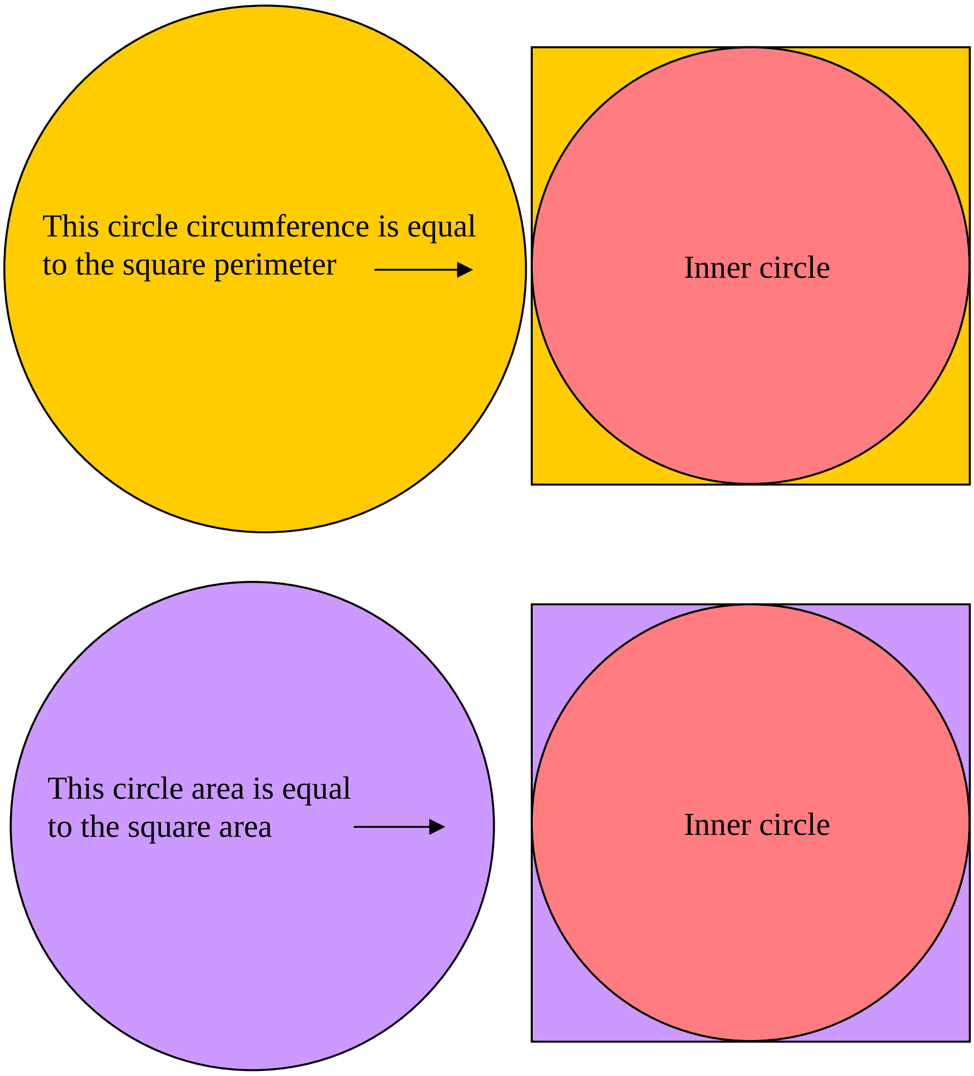
For details and further information for the above points se pages 34-38, 39, 45-48, 51, 52, 53-55, 61, 83-84,88 & analyses and diagrams pages 93-98, 99-127, 111-112 and 115-117.

Chapter Two

PART FOUR

When
Circle circumference equal square perimeter

When
Circle area equal square area



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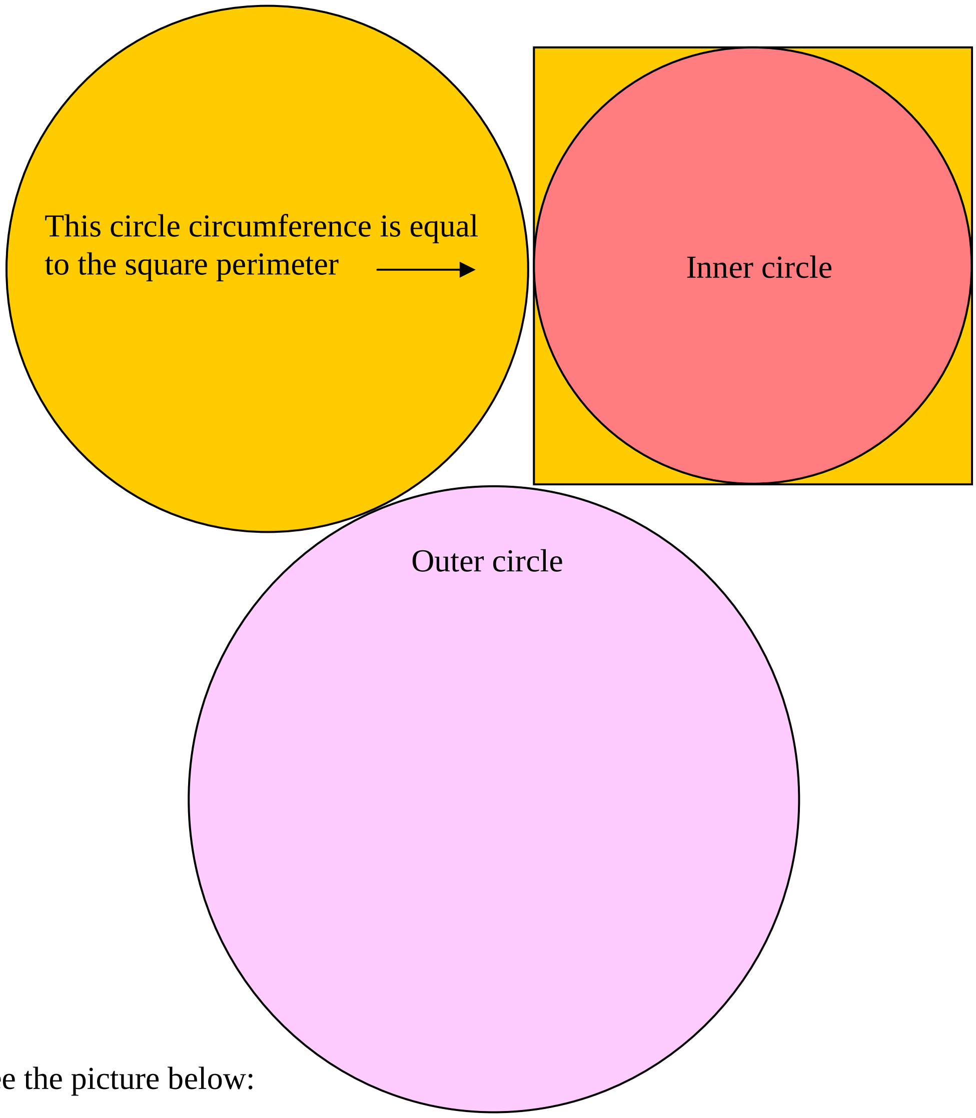
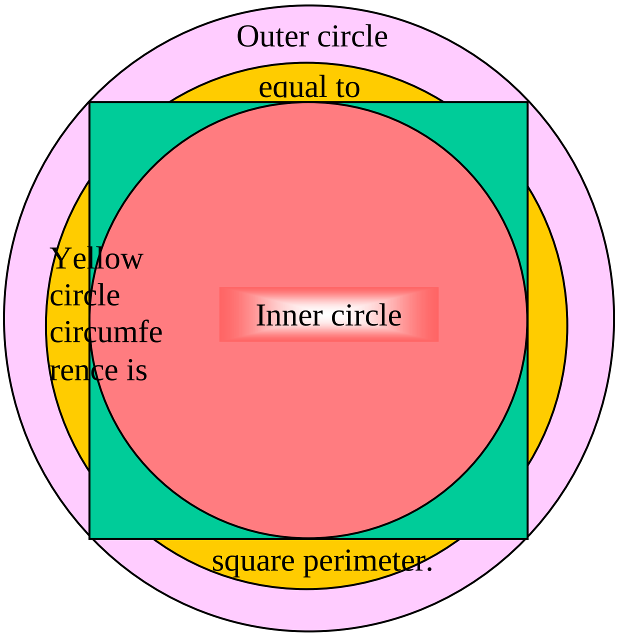
This part is even important for Cylinders grading systems.
Here you can see the relations between the square squaring-form and the circle squaring-form. When you read the chapter for cylinders you will see the relationship of the cylinder squaring-form to the circle squaring-form and the square squaring-form.



See the picture below:



Every square has three circles. This is explained in the following cases:

Case 1

A circle diameter is equal to the side of square. This circle can be drawn inside a square and as mentioned above is called the inner circle.

Side = diameter

Case 2

A circle with the diameter equal to that of the square's diagonal $(d = \sqrt{s^2 * 2})$ is called the outer circle, since the square is drawn inside the circle.

Diagonal = diameter

Case 3

A circle with same circumference as the square:

Perimeter of square = Circumference of circle.

Also Square's area * $2R$ = area of circle

Case 4

A circle with same area as the square:

Area of square = Area of circle.

Also perimeter $\div \sqrt{2R}$ = circumference

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<u>Circle with squaring characteristics:</u>

In the case of a square with its inner circle, i.e. side = diameter, the circle has a circumference that is smaller than the perimeter of the square.
The area of the circle is also smaller than the area of the square.
Also square's area or perimeter multiply 0.78125 = circle's area or circumference

In case 2, we have a circle with the diameter equal to the diagonal of the square. The circumference of the circle is larger than perimeter of the square and the area of the circle is larger than the area of the square.
Note that the diameter is longer than the side of the square.

The area of the inner circle is 50% of the area of the outer circle when compared with each other. In other words the area of the outer circle is twice as large as area of the inner circle.
The relationship of the circumferences will be "circumference of inner circle / circumference of outer circle" = $1 / \sqrt{2}$, which gives the sine and cosine of 45°.
The circumference of the outer circle is $\sqrt{2}$ times larger than the circumference of the inner circle.

Now we shall find the circle that has the squaring form.
In order to calculate the circumference, the area and the diameter of this circle we use the formulae below, also valid for other circles:

$0.78125 \rightarrow M = \mathcal{M}$	$0.64 \rightarrow R = \mathcal{R}$
$3.125 \rightarrow 4M = 4\mathcal{M}$	$1.28 \rightarrow 2R = 2\mathcal{R}$
$0.21875 \rightarrow B = \mathcal{B}$	$0.36 \rightarrow H = \mathcal{H}$

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S = 4, square squaring-side

$M = (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$ and $R = (\ln S / \ln\sqrt{S^2 * 2})^2$

$4M = (\ln\sqrt{S^2 * 2} / \ln S)^2 * 2$ and $2R = (\ln S / \ln\sqrt{S^2 * 2})^2 * 2$

When the perimeter or the area of the square with the squaring form is multiplied by the value "*M*" we obtain the area or the circumference of the circle with the squaring form.

The area and the circumference of this circle are equal, i.e. the ratio between the area and the circumference is 1. As a result of this, and since this circle is the inner circle for the square squaring-form, the circle is called the "circle squaring-form".

Note! Only in this case the diameter is equal to the side.

The unique circle

The circle squaring form

Circumference = area

Circumference of circle $= S * 4 * (\ln\sqrt{S^2 * 2}/\ln S)^2/2$

Area of circle $= S * (\ln\sqrt{S^2 * 2} / \ln S)^2 /2$

Circumference of circle $= 4 * 4 * (\ln\sqrt{4^2 * 2}/\ln 4)^2/2$ cm

Area of circle $= 4 * (\ln\sqrt{4^2 * 2} / \ln 4)^2 /2$ cm^2

Circumference = area $12.5 = 12.5$

$12.5\text{cm} = 12.5\text{cm}^2$

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We have now obtained a circle with squaring characteristics, i.e. the circumference and the area are 12.5. This circle has been calculated using the value M = 0.78125, as in the above formula.

The characteristics of a square with the squaring form are also valid for a circle with the squaring form.

The radius of the circle with the squaring form will be a combination of the following formulae:

$$\text{Radius} = \text{S} * M * R$$

$$\text{Radius} = \text{S} * (\ln\sqrt{\text{S}^2 * 2} / \ln \text{S})^2 / 2) * (\ln \text{S} / \ln\sqrt{\text{S}^2 * 2})^2$$

To be able to calculate the radius (r) and the diameter (d) of a circle with the same circumference as a square, the following formula is valid:

r = s * R , where s is the side of the square and R is the constant 0.64

$$\text{r} = \text{s} * (\ln \text{S} / \ln\sqrt{\text{S}^2 * 2})^2$$

It may now be seen that the formulae for the circle squaring form is valid for all circles.

Conclusion:

For calculating the radius of the inner circle of a square, the following is true:

r = s * M * R

For calculating the radius of a circle with the same circumference as a square, the following is true:

r = s * R

r = s / 2M

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When the circumference of a circle is equal to the perimeter of a square, as in case 3 above, the diameter and the radius are calculated using the side.
The area of the circle is obtained by dividing the area of the square by *M*.
It can be seen that the area of the circle is 1.28 times as large as the area of the square, or 128 % of the area of the square. This can also be expressed as *M* % (78.125 %) of the area of the circle.
The side of the square multiplied by 1.28 gives the diameter of the circle, i.e. the side of the square multiplied by *R* = 0.64 will give the radius of the circle.
I designate the value 0.64 as the constant *R*.
d / s = 2*R*

Therefore:
The radius is *R* % or 64 % of the side of the square.
The diameter is 2*R* % or 128 % of the side of the square, see formulae below.

Conclusion:

Diameter = s * 2*R* = s * 1.28
Diameter = s / *M* = s / 0.78125

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Area & Perimeter of a square with an inner circle

A circle with a diameter of 1 unit has an area and a circumference equivalent to *M* % = 78.125 % of the area and the perimeter of a square with the side 1 unit.
This means that the area of a circle with a diameter equal to that of the side of the square covers 78.125 % of the area of the square. The same is true for the circumference. For further information see chapter 2!

The following formulae are valid for all inner circles.
"Diameter of the circle = side of the square"
Oc = circumference of circle Ok = perimeter of square

The perimeter of the square multiplied by *M* gives the circumference of the circle
$Oc = Ok * (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$ Oc = Ok * ***M***
or
the circumference of the circle multiplied by 2*R* = 1.28 gives the perimeter of the square
$Ok = Oc * (\ln S / \ln\sqrt{S^2 * 2})^2 * 2$ Ok = Oc * 2***R***
or
the circumference of the circle divided by *M* gives the perimeter of the square
$Ok = Oc / (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$ Ok = Oc / ***M***
or
the perimeter of the square divided by 2***R*** gives the circumference of the circle
$Oc = Ok / (\ln S / \ln\sqrt{S^2 * 2})^2 * 2$ Oc = Ok / 2***R***

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The radius in the square multiplied by *M*,

$(r)^2 * M$ = gives 1/4 of the area of the circle.

r * 2*M* = gives 1/4 of the circumference of the circle.

Diameter * *M* = gives 1/4 of the circumference of the circle.

Area & Perimeter of a square and circle with the same circumference

For a circle with a circumference equal to that of a square, the following rules apply.

Ac = area of circle	Ak = area of square
***M* = 0.78125**	**2*R* = 1.28**

The area of the square divided by *M* gives the area of the circle.
Ac = Ak / *M*

The area of the circle is obtained by multiplying the area of the square by 2*R*.
Ac = Ak * 2*R*

The area of the circle multiplied by *M* gives the area of the square.
Ak = Ac * *M*

The area of the circle divided by 2*R* gives the area of the square.
Ak = Ac / 2*R*

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Explanation for squares and circles!

1. Other square: a square which has an inner circle.
2. Inner circle: a circle inside a square. The circles diameter is equal to the side of square.
3. Common square: a square that either its area or perimeter is equal to a circle's area or circumference.

So we understand that when a square's perimeter is equal to the circumference of a circle there is a connection between them: ***2R***.

Diameter and circumference:

1. Perimeter equal to circumference.

2. A common square has the relation $2R$ with the other square.
   Common square perimeter * $2R$ = Other square.
   Common square perimeter / M = Other square.

3. If the diameter is equal the side one finds the other square for the inner circle.

Diameter and area:

1. A square's area is equal to a circle's area.

2. $2R$ is the relation of the common square's area to the other square. The other square has an inner circle.

3. The diameter of the inner circle is equal to the side of the other square
   Common square perimeter * $2R$ = Other square.
   Common square perimeter / M = Other square.

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***M* = 0.78125**

1. *M* is used for calculating all the variables of the circle.

2. *M* describes the proportions of a square and a circle.

3. *M* is the relationship between the area of a square and the area of a circle.

4. *M* is the relationship between the perimeter of a square and the circumference of a circle.

5. *M* is the relationship between the area of a circle and its diameter in a square (diameter)^2.

4*M* = 3.125

1. *4M* is the relationship between the area of a circle and its radius in a square (radius)^2.

2. 4*M* is the relationship between the circumference and diameter of a circle.

Note!
s stands for a side of a square.
S marking the side of the square squaring-form.

Inner circle area $= s^2 * M = s^2 * (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2.$

Inner circle circumference $= s * 4 * M = s * 4 * (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2.$

Circumference of circle = perimeter of square.

Diameter of circle $= s / (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$

Diameter $= 4 / (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 5.12$ of circle that has same perimeter as the square.

Area of circle $= s^2 / (\ln\sqrt{(S^2 * 2} / \ln S)^2 / 2$ that has same perimeter as the square.

$d^2 * (\ln\sqrt{(S^2 * 2} / \ln S)^2 / 2$

$r^2 * 4 (\ln\sqrt{(S^2 * 2} / \ln S)^2 / 2$

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Summary of squaring form

A square with the squaring form has a side of 4 units. A circle with the squaring form also has a diameter of 4 units.
The relationship between this circle and the square is calculated in the following way:

$$\mathrm{Oc/Ok} = (\ln\sqrt{S^2 * 2}/\ln S)^2/2 \quad \rightarrow \quad 12.5/16 = 0.78125$$

$$\mathrm{Ok/Oc} = (\ln S/\ln\sqrt{S^2 * 2})^2 * 2 \quad \rightarrow \quad 16/12.5 = 1.28$$

The radius of the circle is $S * M * R = 4 * 0.78125 * 0.64 = 2$

The circumference of the circle is
$S * 4 * M = 4 * 4 * 0.78125 = 12.5$
$S^2 * M = 4^2 * 0.78125 = 12.5$
12.5 is also the area of the circle with the squaring form.

The perimeter of the square squaring-form is
$Oc / M = 12.5 / 0.78125 = 16$
$Oc * 2R = 12.5 * 1.28 = 16$
16 is also the area of the square with the squaring form.

If the circumference of a circle = perimeter of a square, but the areas are different, we obtain

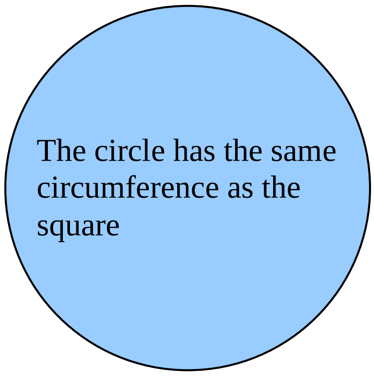
radius of circle = S * R = 4 * 0.64 = 2.56

diameter of circle = S / M = 4 / 0.78125 = 5.12

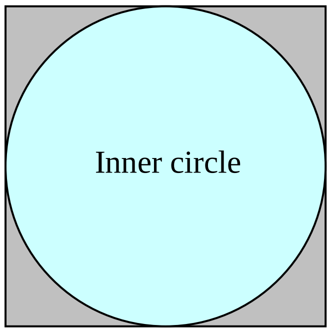
or

Diameter = S * 2R = 4 * 1. 28 = 5.12

Side → 4 * 1.28 = 5.12cm, diameter →



S = 4 cm →
d = 4 cm →



In this case there are two alternatives for calculating values of the circle:

1. Via M = 0.78125

   Area = d^2 * M → Area of circle = s^2 * M

   Circumference = d * 4 * M → Circumference = s * 4 * M

2. Via 2R = 1.28

   Area = d^2 / 2R

   Circumference = 4d / 2R

I defined the method for the formulae in chapter 2, part two. I will give a short description of cylinders and its characteristics. The aim of these descriptions are that one easier gets a more structured view of cylinders and also preparing ones mind about the new theory.

The definition of cylinders is described later in chapter 3 part two and you can find a more detailed description regarding cylinders in chapter 3, part two.

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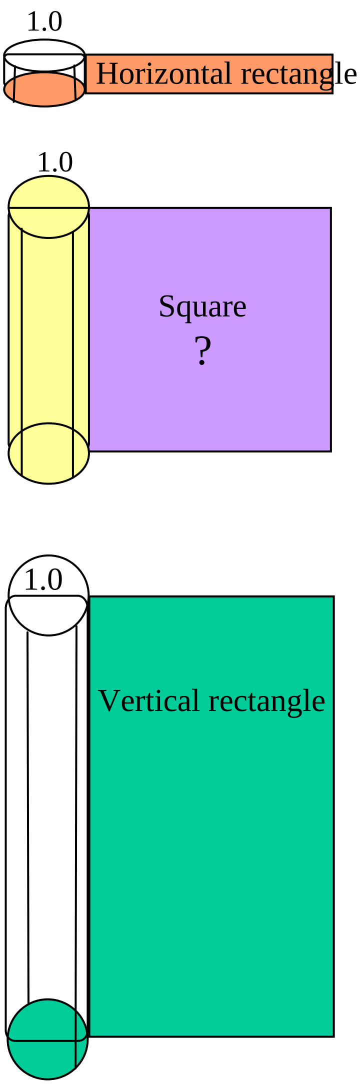
Chapter 3

PART ONE

CYLINDERS

Where I describe cylinders and show a short review of cylinders properties.



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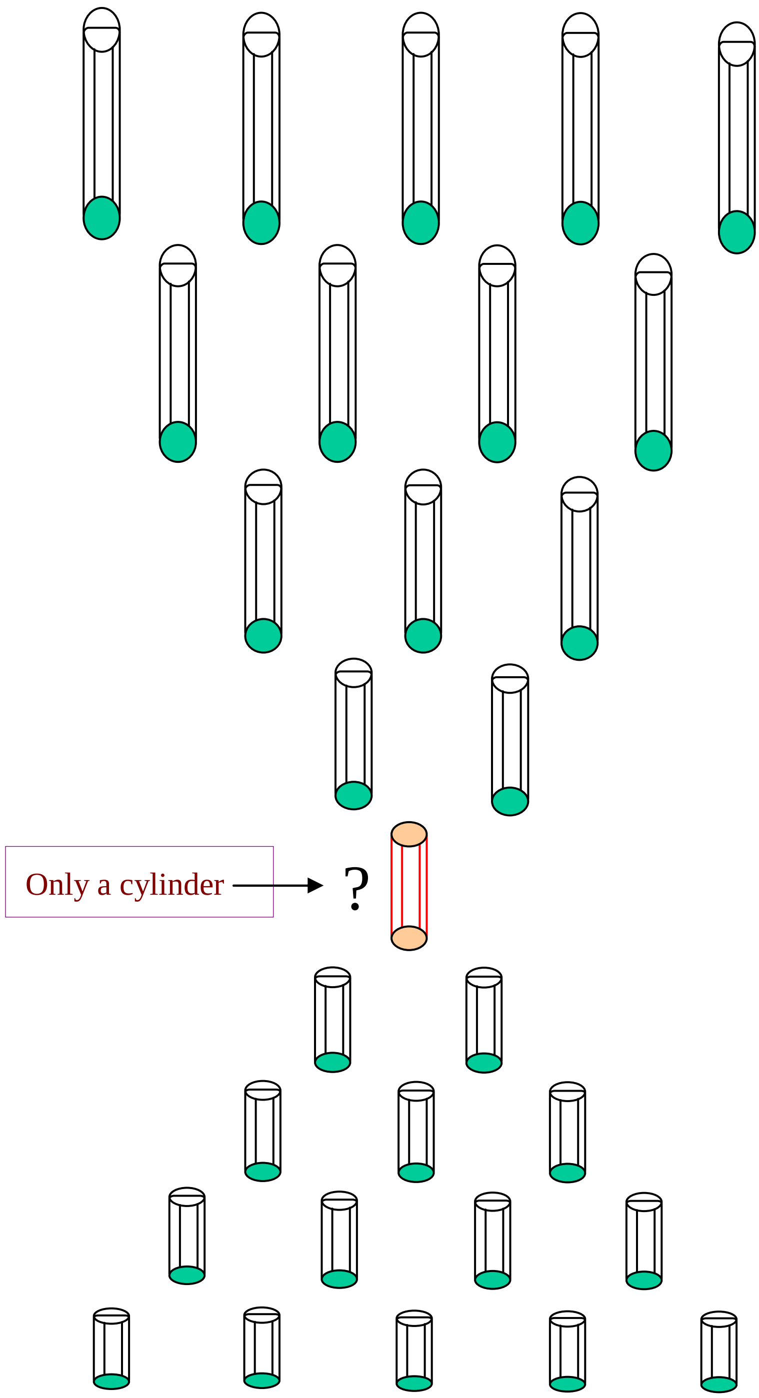
Look at the cylinder figures, all with diameter 1 u.l. but with different heights



Cylinders are divided in to three groups. If you roll up a cylinder with diameter 1 but with different heights it will give you a four-sided figure.

1. Group one cylinders produces horizontal rectangles.
2. Group two only a square.
3. Group three produces vertical rectangles.

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Grading system for cylinders is grading system III. See below!

Cylinders grading system III

Which square is in group two?

The square in group two presents the cylinder squaring-form

Cylinders
Grading system III

Group three

8-8.5-9-9.5-10-100
5-5.5-6-6.5-7-7.5
3.3-3.4-3.5-4.5
3.18-3.19-3.2
3.160-3.170
3.2-3.300
3.145

Vertical rectangles

Group two

↑
← **?** →
↑

In group two is only a square

Group one

3.120
2.95-3,00
2.850-2.900
2.70-2.75-2.80
2.25-2.50-2.600
1.40-1.75-1.50-2.0
0.5-0.75-0.9-1.20-1.30

Horizontal rectangles

Cylinders grading-system III are illustrated with pictures below:

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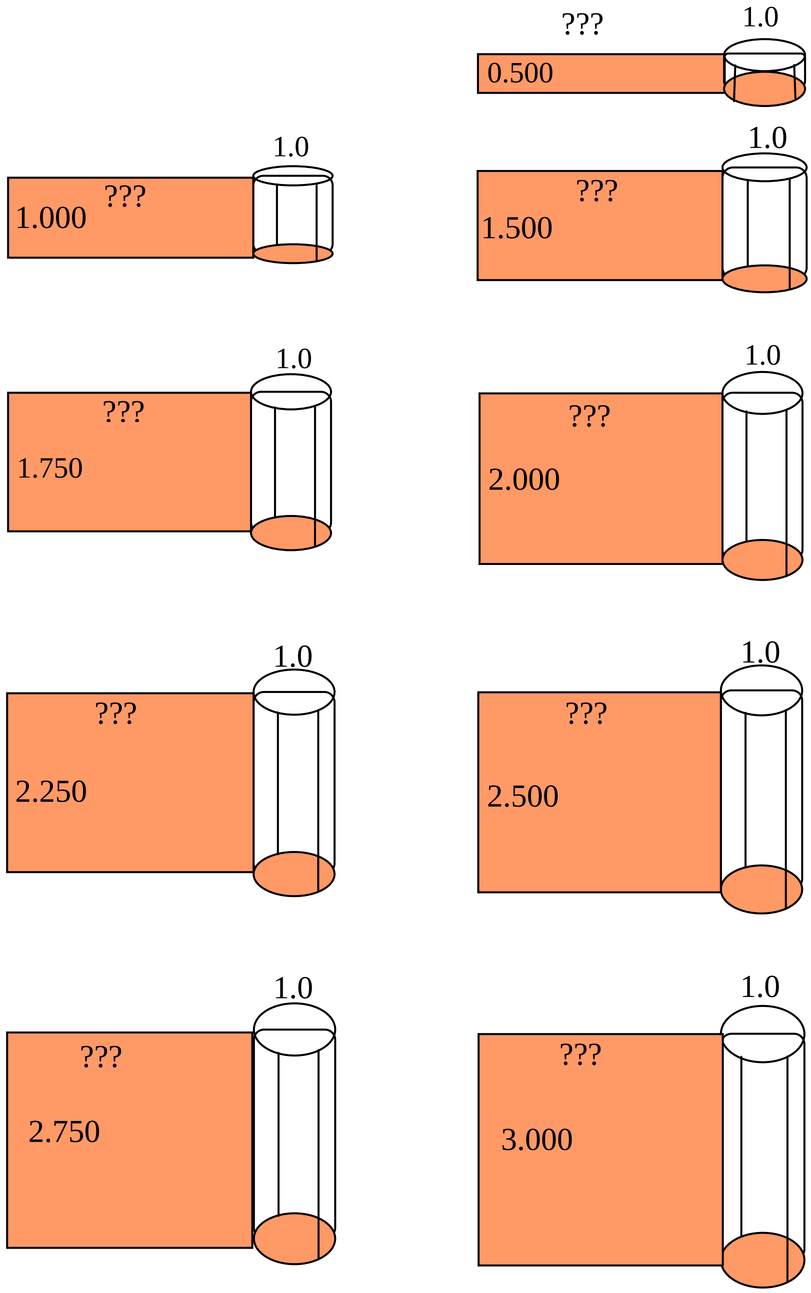
Group 1
Horizontal rectangles



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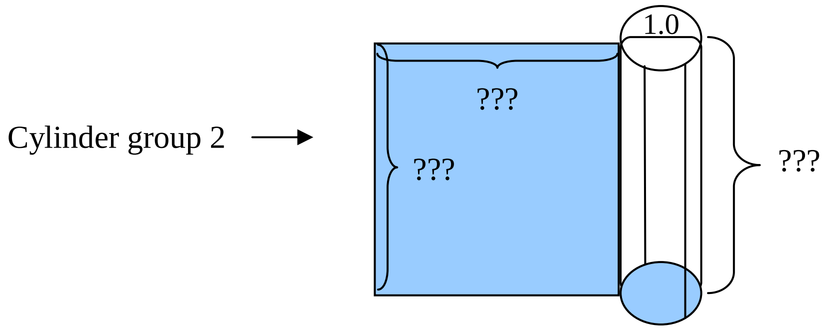
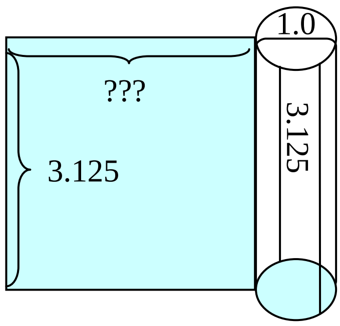
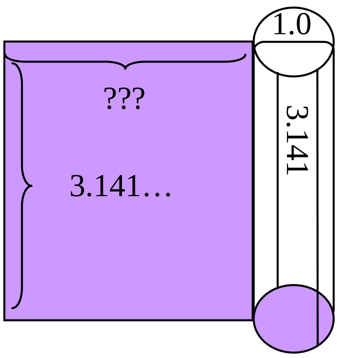
Cylinder in group 2

Group two has only one cylinder. The cylinder produces a square when rolled up. The cylinder is named cylinder squaring-form.







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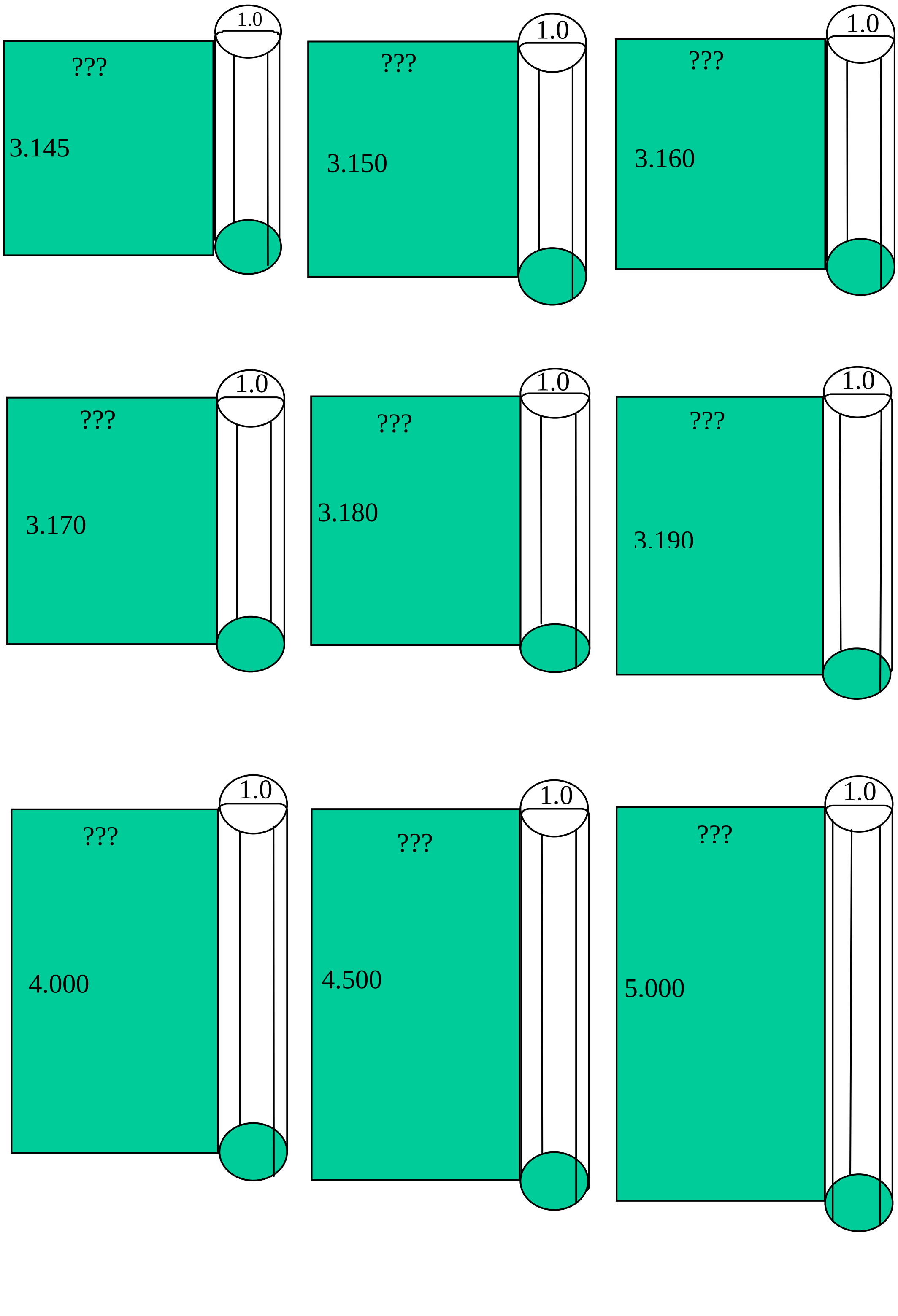
Group 3
Vertical rectangles



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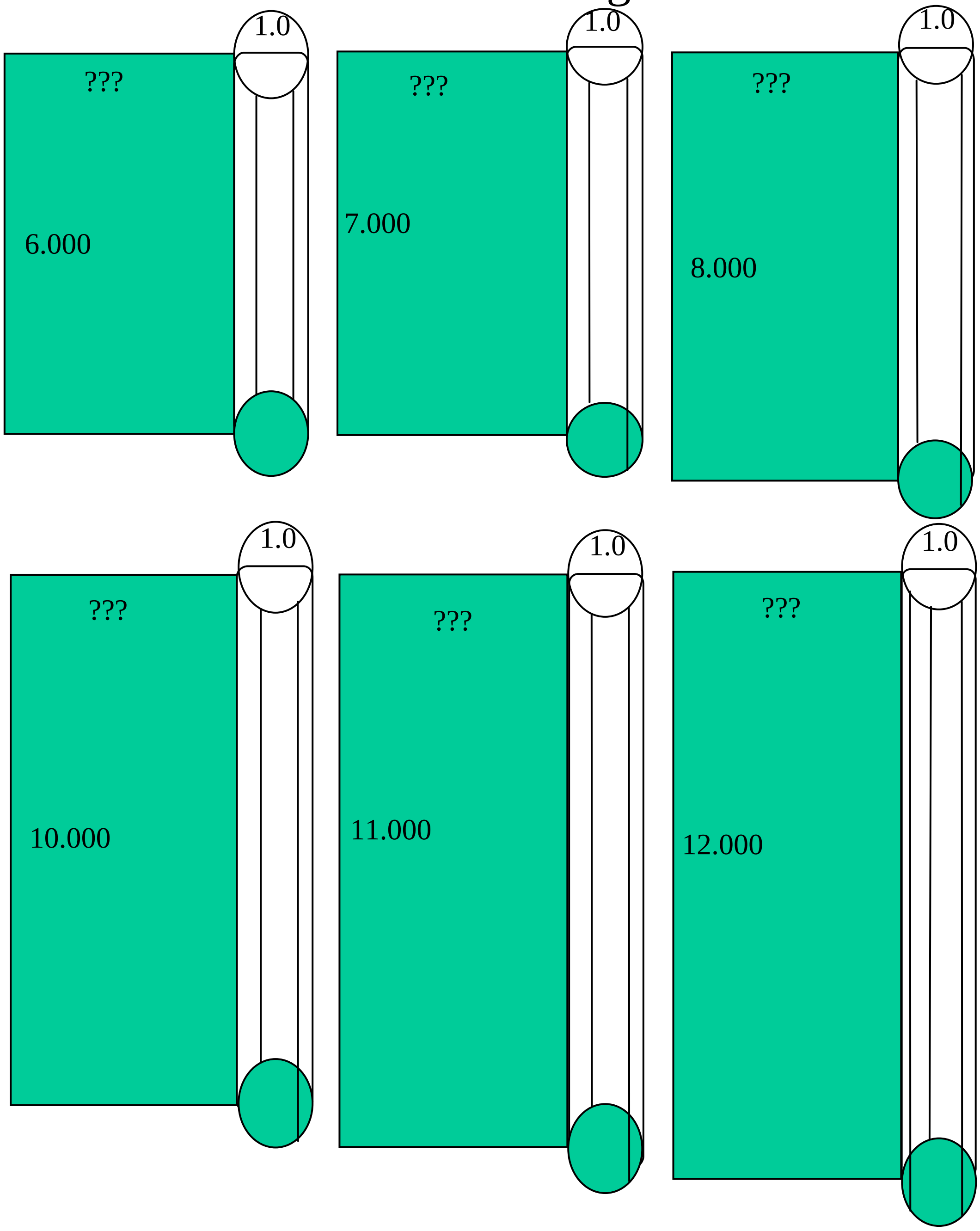
Group 3
Vertical rectangles



The side of the square in group two is still unknown. First I have to find the values for the circle squaring-form which I have presented in chapter two, part two, three & four. The values can help us find the correlation between the squaring forms. The only way to find the cylinder squaring-form which produces the square is the relation between the cylinder squaring-form, the circle squaring-form and the square squaring-form. See pages 81-83 and 84, 81-91.

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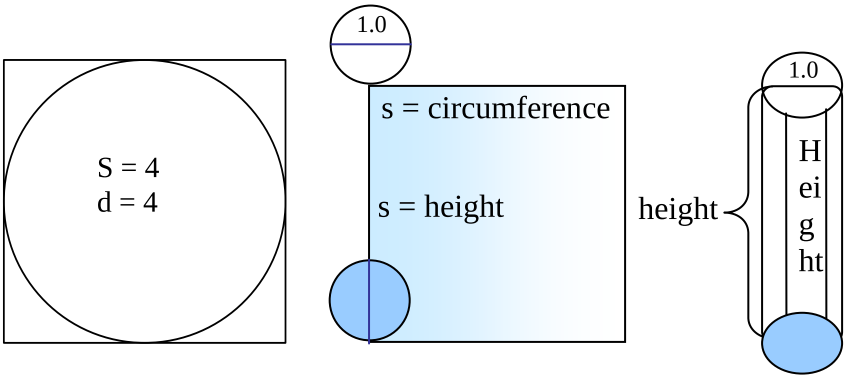
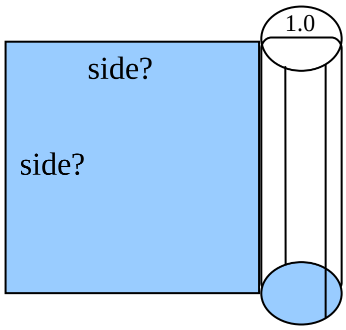
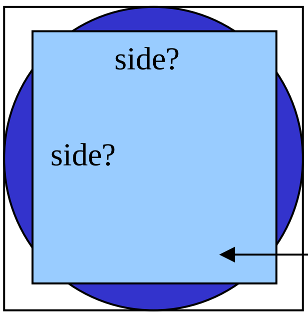
I am looking for a cylinder which will have been rolled one or 360˚ and produces a square. Circumference equal height; see below:



Cylinder in group 2





Side of the outer square, which is the square squaring-form, is 4 u.l and its area and perimeter are 16 u.l.

The circle inside the square also has diameter of 4 u.l. The small square is the square of the cylinder squaring-form.

What is the side of the square that originates from the cylinder in group 2?

Study the above illustration and try to find how their sides, diameter, areas & circumferences relate to each other! On chapter 2 part four 57-69 and chapter3, part two pages 79-91.

Now we know little about cylinders as well. But a more detailed and thorough description is given in future chapters.

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Chapter 3

Cylinders

The unique cylinder

Cylinder squaring-form

The square
of
cylinder squaring-form

Mantle squaring-form

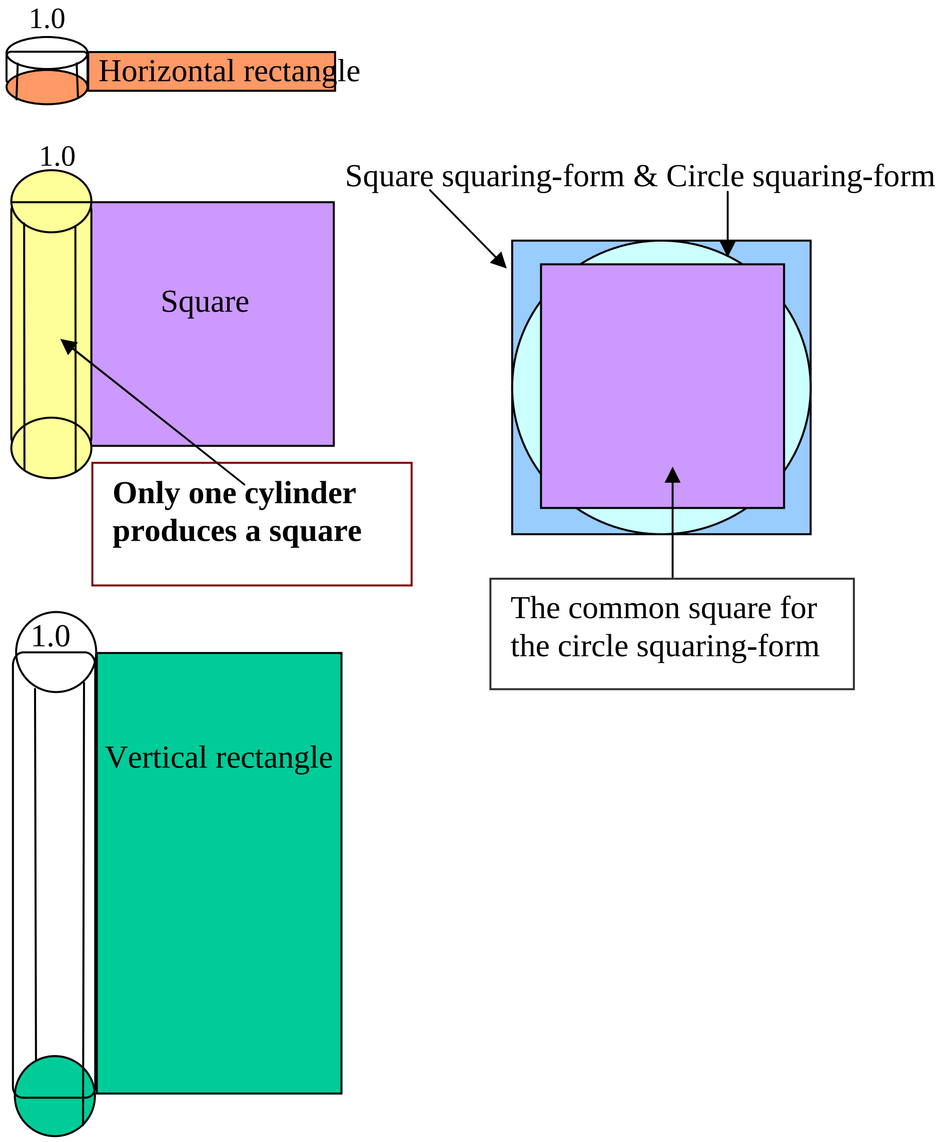
You can find a more detailed description regarding cylinders in chapter 3, part two.

Chapter 3

PART TWO

CYLINDERS

In this chapter I describe the cylinders and demonstrate its properties and relations to the circle and the square.



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CYLINDERS

The definition of a cylinder:
A cylinder is a combination of two circles and a rectangle. Cylinders are also divided into three groups. These groups are sorted by their specific patterns and characteristics. Common to all the groups is their diameter, of 1 u.l. It is only the height that varies.

Through the squares grading-system one and circles grading-system two I have constructed a grading system for cylinders. We have to remember their properties and their relations to each other. **We know that there is only one cylinder where its mantle is a square**. We are also aware that this square is in the centre of the cylinder groups. If you move down from this point the cylinders produces horizontal rectangles and if you move up the cylinders produces vertical rectangles. Because of this property, the cylinder squaring-form is unique like the square squaring-form and the circle squaring-form. **The cylinder squaring-form is principally associated, connected and related with the square squaring-form and circle squaring-form.**

Notice:
You must by all times remember the grading system forms I and II to better understand the grading system III.

Analysis

I can see that the square of the cylinder squaring-form has relation with the square squaring-form and the circle squaring-form.

The perimeter of the square, in group two, of the cylinder squaring-form is equal to the circumference of the circle, in group two, of the circle squaring-form. The area of this square has a relation with the above mentioned circle. Circles area multiplied with *M* gives the area of the cylinder squaring-form. The square squaring area * M^2 = area of the cylinder squaring-form. The ratio of their perimeter is also *M*, see below.

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Circumference = perimeter:

Circle squaring-form circumference is equal to mantle area of the square that is produced by the cylinder squaring-form: 12.5 = 12.5 u.l.

Area:

Circle squaring area * M = → 12.5 * 0.78125 = 9.765625 → this is the area of the square of the cylinder squaring-form (mantle area).
Square squaring area * M^2 = →16 * 0.78125^2 = 9.765625→ this is the area of the square (mantle area) of the cylinder squaring-form.

The geometrical figures of the squaring forms are unique; each one is special in its own way. They are always in the centre of the group and they are connected to each other in a special way.

1. When a square's perimeter and a circle's circumference are equal, the area of the circle is larger than the square area.

2. When a square's perimeter and a circle's circumference are equal, the diameter of the circle is larger than the square side.

3. When a square's area and a circle's area are equal, the square's perimeter is larger than the circle circumference.

4. When a square's area and a circle's area are equal, the side of the square is smaller than the circles diameter.

We know in advance that:

1. Square squaring-form with area and perimeter 16

2. Circle squaring-form with area and circumference 12.5

3. The square produced by the cylinder squaring-form, must have relation with the above points 1 and 2. It is the only way to find the single square.

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Mantle squaring-form:

Taking into consideration that circumference and perimeter are equal and the relation of square squaring and circle squaring, I have chosen the square with the side 3.125. This square make group two in the cylinders grading-system III and I call it mantle squaring-form.

In relation to square squaring-form, circle squaring-form and the mantle squaring-form we can understand that the cylinder with the height 3.125 u.l. is the only cylinder that form a square.

Note: The grading system can not be changed.

Squares grading system I

Grading system II.II for circles relation between diameter, circumference & area

5-6-7-8--9-10
6-7-8-9-10
7-8-9-10
Group three
5-6-7
5-6
5
4.0…1

Area > Perimeter

2.6473695...
2.680688798...
2.722222222...
2.775856154...
2.954094226...
2.954094226...

Area > circum
Group 3
diameter < side

Group two
4
O = A
3.125
Area = circum
Group 2
diameter = side

3.999
3.9750
Group one
3.950000
3.928105767
3.7-38
Group one
3. 4-3.5-3.6
3.0-3.1-3.2-3.3
1.5-1.4-2.3-2.5-2.6
0….-0.5-0.6-0.7-0.8-0.9

Perimeter > Area

3.125225494…
3.125225113…
3.125676933…
3.125902852…
3.136456429…
3.14138141…
3.141592653…
3.142327298…
3.143513202…
3.145896904…
3.148296604…
3.173211921…
3.259657054...
3.46089568…
3.79906562…
4.5
6.88023700…
8.24197342…

Area < circum
Group 1
diameter > side

Look at the arrow that is pointed from the value of $\pi = 3.141592653$ to the square with the side 3.928105767 it produces the number of π. Here we can see that both numbers are in group one.

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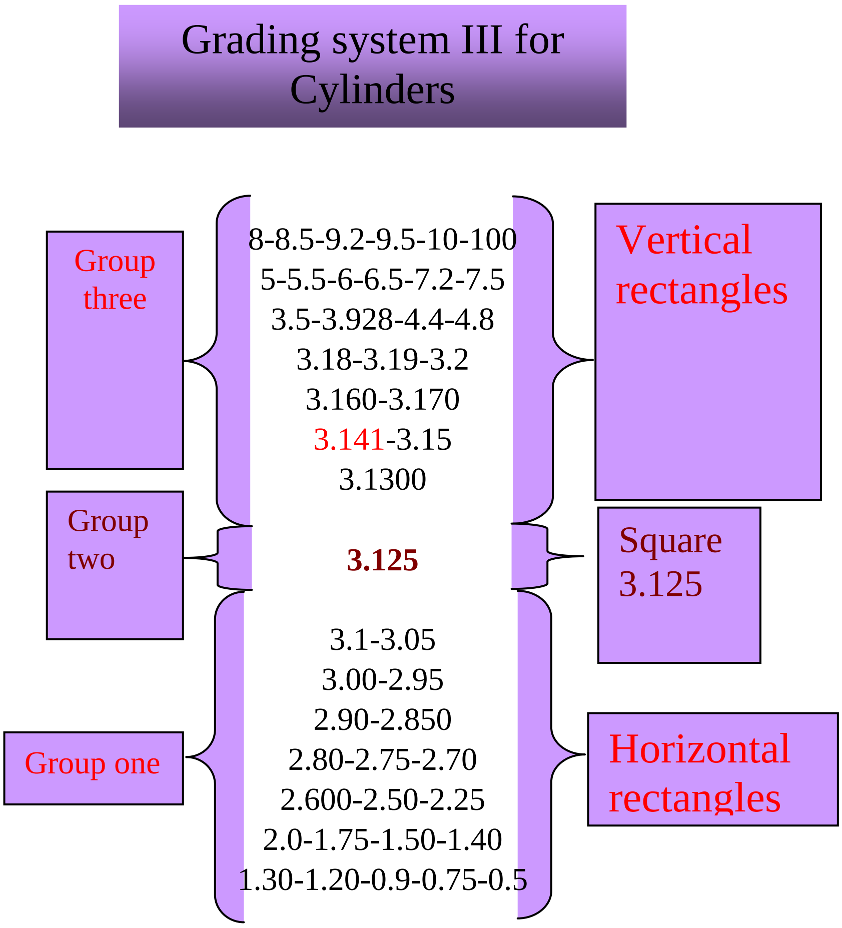
Grading system III

With help of all these significant explanations I constructed the cylinders grading-system. Here I found the only cylinder that produces a square. This cylinder is called cylinder squaring form and the square mantle squaring form. See the grading system III below:



Note: The grading system can not be changed.

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CYLINDERS IN GROUP

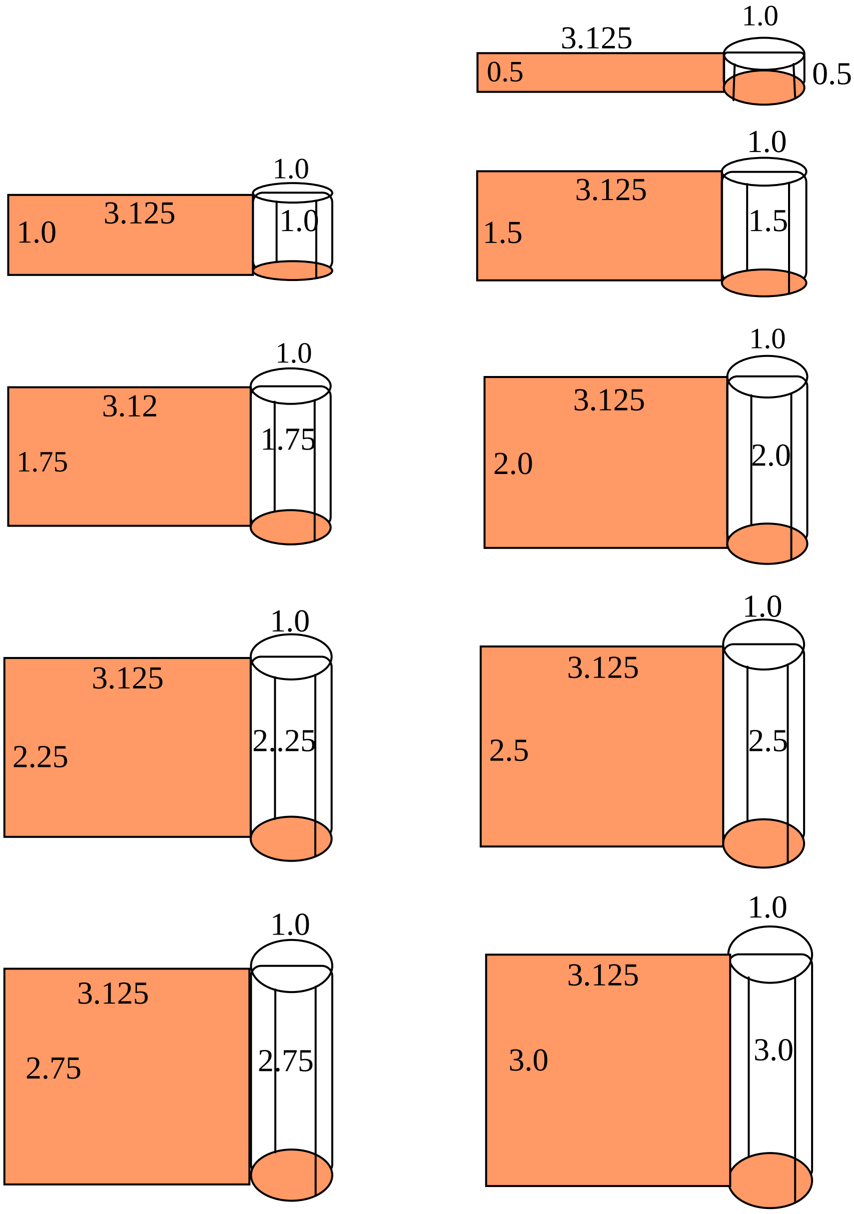
The definition of a cylinder:
A cylinder is a combination of two circles and a rectangle. Cylinders are also divided into three groups. These groups are sorted by their specific patterns and characteristics. Common to all the groups is their diameter, of 1 u.l. It is only the height that varies.

Group 1:

Cylinders that belong to group 1 have a diameter of 1 u.l. and a height of lesser than 3.125 u.l.

If a cylinder in this group is rolled one revolution, i.e. 360 degrees, the result will be a rectangle that has a width of 3.125 u.l.
All cylinders in this group have the same width, i.e. 3.125 u.l. but note that the length varies.
The circumference of the cylinder's two circles gives the width of the rectangle and the length is the same as the height of the cylinder.
Rectangles that are formed from group 1 are horizontal rectangles.
Some examples are illustrated below:

Group 1: Horizontal rectangles.



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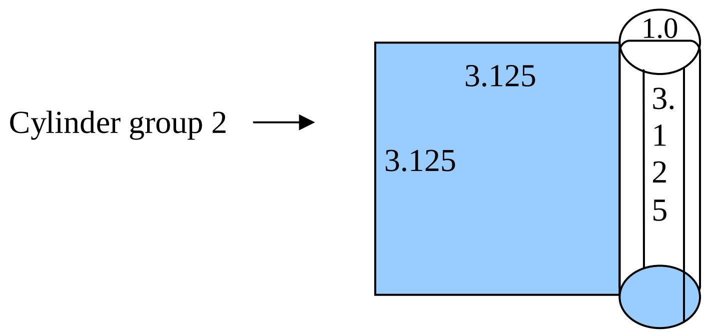
GROUP 2:

A unique cylinder
Group 2 consists of only one cylinder. Again, the cylinder has a diameter of 1 u.l., and a height of exactly 3.125 u.l. **A square is created when the cylinder is unrolled one revolution**. Two of the sides of the squares originate from the height of the cylinder and the remaining two from the circumferences of the circles.
The cylinders in groups 1 and 3 only produce rectangles. The cylinders in group 1, where the length is smaller than 3.125 u.l. produce horizontal rectangles and group 3, where the length is larger than 3.125 u.l. produces vertical rectangles. It is important to **note that only the cylinder in group 2 produces a square**.

The value 3.125 is the length of the horizontal rectangles in group 1. In group 3 it is the width instead that is 3.125 for the vertical rectangles, **while in group 2 the value of 3.125 is the length of the sides of the square**.

The cylinder in group 2 is unique since it functions as a limit for the cylinders in group 1 and group 3.
I have named the cylinder in group 2 the cylinder squaring-form. See illustration below:



Take a closer look at the three grading systems next to each other and the arrows.

Look at the grading systems I, II, III and locate the value 3.141.
Try to relocate the number 3.141 to another group in grading system I, II, III and then see what happens!

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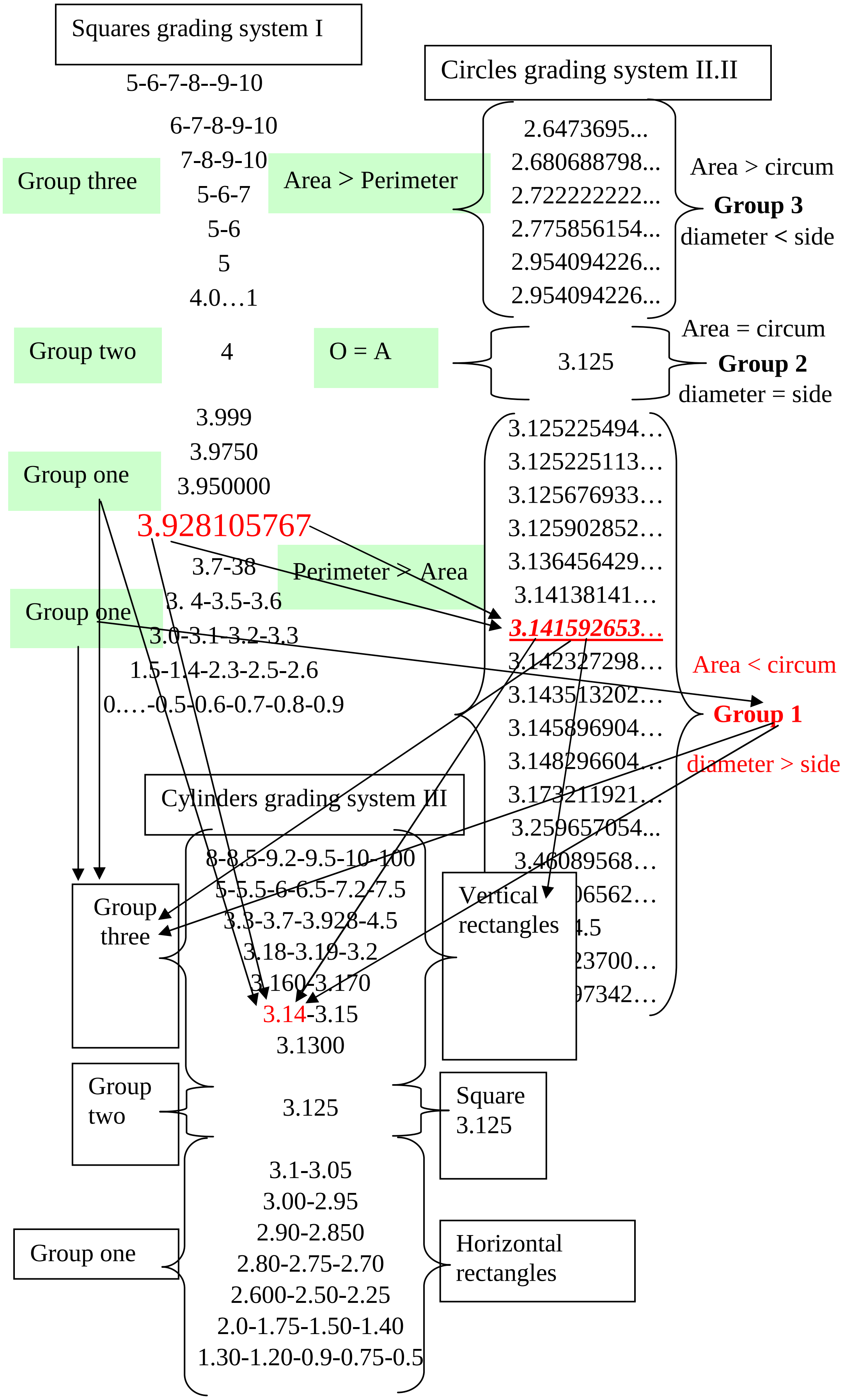
The correct values for a circle



Note: The grading system can not be changed.

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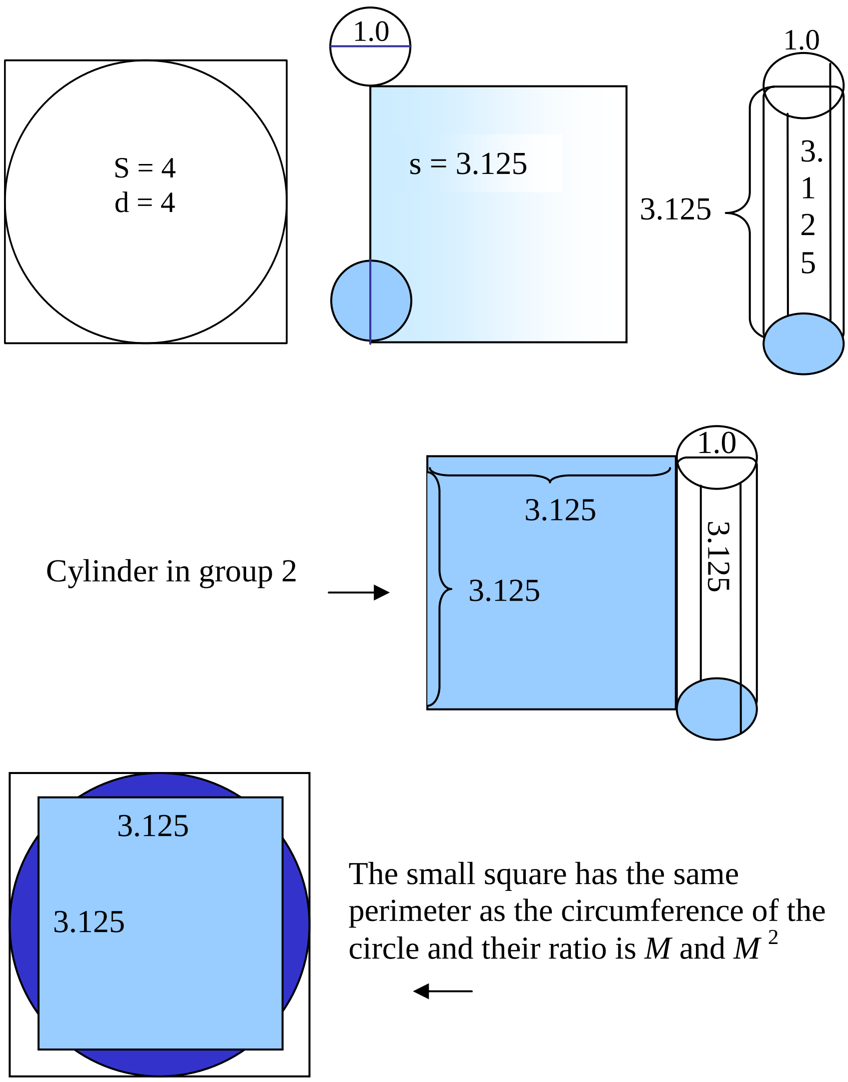
On the cases I have presented so far there is no possibility to choose any other value then 3.125. Only the cylinder with the height 3.125 gives us a square. See the illustrations above and below.

A unique cylinder
Cylinder squaring form



Study the above illustration and try to find how their sides, diameter, areas & circumferences relate to each other!

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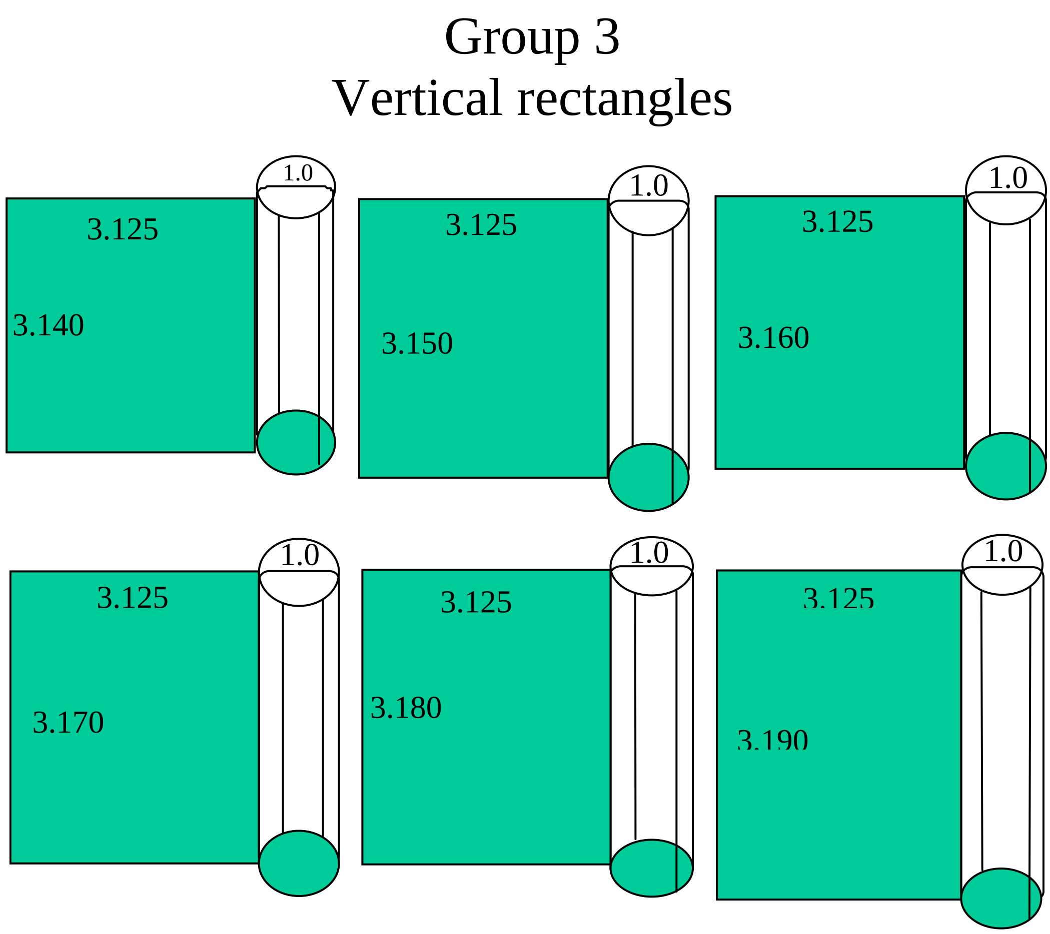
Group 3:

Cylinders belonging to group 3 have a height that is greater than 3.125 u.l. Remember that the diameter of the circles in group 1 is 1 u.l. When these cylinders in group 1 are rolled out they form rectangles. Here too the rectangles formed vary in length but the width remains the same. **In contrast to group 1, the rectangles in group 3 are vertical**, compare illustrations of group 1 above and group 3 below. The length of the rectangles originates in the height of the cylinders. The width is equivalent to the circumference of the circles of the cylinders that make up the top and bottom of the cylinders. See examples below:



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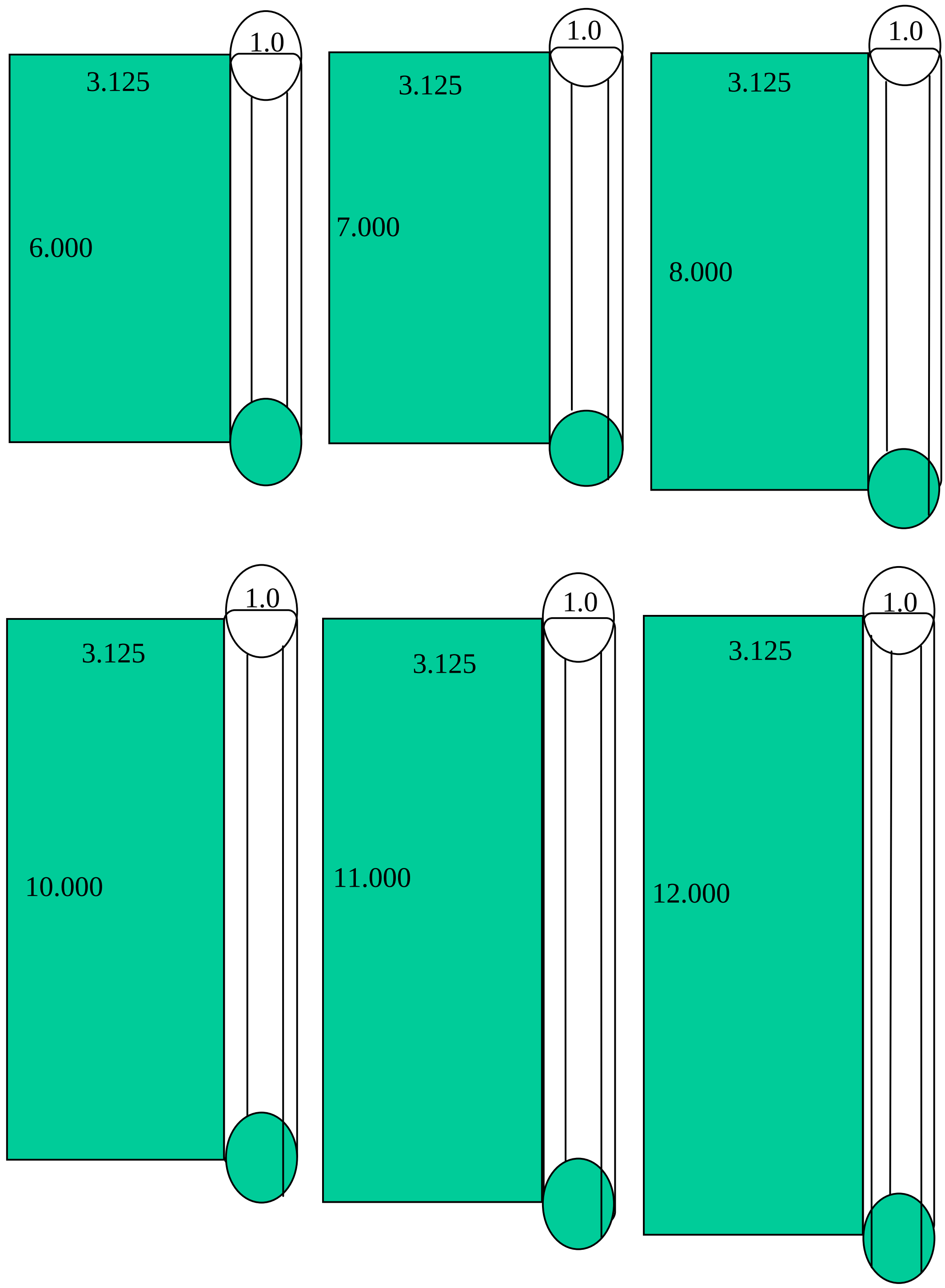

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Note that each square's properties are very important. When a square is put in the formulae you have to think about:

1. Square properties used in formulae, (side, area and perimeter).
2. Find out which subgroup of the squares grading-system the square belongs to.
3. Locate the obtained value in the circles grading-system.
4. With the above or selected value calculate the circle properties.
5. Find out the correct properties for the above circle. Se application on pages 95-98.
6. Once you have the square and the correct circle you can find the related cylinder. Se pages 71-78 and 81-92
7. Locate the quadrilateral of the cylinder in the cylinders grading-system se pages 83, 84, 88.
8. Calculate the quadrilateral properties and then its ratio with the square and the circle.

For details and further information for the above points se pages 34-38, 39, 45-48, 51, 52, 53-55, 61, 83-84,88 & analyses and diagrams pages 93-98, 99-127, 111-112 and 115-117.

Chapter 4

ANALYSIS

IN PRACTICE & APPLICATION

VALUES AND DIAGRAMS

When you use the formulae you will get a value for calculation of a circle. To understand how these works you have to study pages 33-39. With the formulae you can see the circles area -, circumference - and diameter proportion to the square which you have used in the formulae.
Remember that the diameter is the same as the square's side, but when you calculate the circle with the chosen value you can see that the circles proportions are changed.

The only value that gives a correct diameter which is equal to the side is in group two. See pages 111-112 and approximate value 115-117.

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Practice and Application

There must be a method of measuring a circle with 100 % accuracy.

The diagrams below illustrate squares with sides of 10 to 1.4 units. Values larger than 10 are not shown since the numbers produced are astronomical in size and are therefore difficult to write down.

We return to the squaring formulae.

Explanations

I have illustrated every square in the grading system I with a diagram. It can be seen how the values obtained from grading system II produce circles and how these are positioned in relation to their squares in grading system I. The diagrams illustrating squares in group 1 are compared with diagram of square in group 2 and squares in group 3. It is clear that the circles in group 3 expand into their squares the closer they come to squares in group 2. In group 1 however the circles decrease in size the closer they come to square in group 2.

Note how the diameters changes within the squares to outside squares when we use values on steps

See diagrams on pages 98-127, 111-112, 115-117, 131, 134-137, Application 92-97

Method:

A square is selected and its side put into the formula

$M = (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2$

This produces a value with whose help a circle is drawn. The position of the circle relative to the square depends on which group it belongs to.

Diagrams for squares 10 – 9 – 8 – 7 – 6 – 5 – 4 – 3.929 – 3.9 – 3.5 – 3 – 2.5 –2 – 1.5 and 1.4 are illustrated on pages 98-127.

In order to make the descriptions simpler in grading system II, I have limited my calculations to side values of 10 – 1.4.

Some examples follow below:

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Application

Here follows a description of the practical application of the squaring formulae:
k_1 = square in formula.
k_2 = square which perimeter is equal circumference.
k_3 = every square which produces a standard circle.

k_1: The side of a square is put into the formula **k_1**.

$$M = (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$$
$$Q = (\ln\sqrt{s^2 * 2} / \ln s)^2 / 2$$

1. The value provided by the formula (Q) is multiplied by the perimeter of the square. This gives the circumference of a circle.
Q * perimeter of square = circumference of circle.
perimeter k_1 * Q = circumference of circle.

2. Imagine that we have a square (k_2) whose perimeter is equal to the circumference of the above circle. With the help of this square it is possible to calculate the area and diameter of the circle. See below

3. The side k_2 / M = diameter Area k_2 / M = area of circle
The side k_2 * $2R$ = diameter Area k_2 * $2R$ = area of circle
The side k_3 * $4M$ = a standard circumference
Perimeter k_3 * M = a standard circumference, Area k_3 * M = a standard area
Perimeter k_3 / $2R$ = a standard circumference, Area k_3 / $2R$ = a standard area

4. Now we draw the square (k_1) whose side was put into the formula.
In order to draw the circle whose circumference has been calculated, we must know the diameter or area.

5. It is now possible to draw the circle and place it inside the square whose side was put into the formula. The position of the circle in relation to the square depends on which group the square belongs to.

In summary, the formula below is obtained for calculating the diameter:
$d = Q * s_1 * 4 / 4 / M$

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$$d = \sqrt{(Q * \text{perimeter of square}_1 \ / 4)^2 \ / M^2}$$

Note into the formulae are used “s” and “S” they are different qualification, so they are not same.

$$d = \sqrt{((\ln\sqrt{s^2 * 2} / \ln s)^2 / 2) * s * 4 / 4)^2 / (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2)^2}$$

Equivalent formulae

$$M = (e^{\ln\sqrt{e^{\ln S^2} * 2}} / e^{\ln S})^2 / 2$$

$$M = (\ln\sqrt{S^2 * 2} / \ln S)^2 / 2$$

$$M = (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2.$$

$$M = 0.78125.$$

$$R = (\ln S / \ln\sqrt{S^2 * 2})^2$$

$$R = (\ln 4 / \ln\sqrt{4^2 * 2})^2.$$

$$R = 0.64.$$

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The next example can be followed:

If we have a square with a side of 10 units, *Q* will be:

$k_1 : (\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.661842380...$

1. Perimeter of square * Q = circumference of circle
k_1 = circumference is 10 * 4 * 0.6618423801… = 26.4736951…cm

2. Imagine a square with the same circumference as that of the circle (**k_2**), its side will be: 26.4736951… / 4 = 6.618423801… side of the square **k_2**.

2.1 The area of the circle can now be calculated using this side of the square: we use *M* = 0.78125 because that is the only value which gives diameter equal side and also a circumference that cuts the square's perimeter in four points.
6.618423801^2… / 0.78125 = 56.0685230… cm² area of circle or
6.618423801^2… * 1.28 = 56.0685230… cm² area of circle.

2.2 6.618423801… / 0.78125 = 8.47158246… diameter of the circle
6.618423801… * 1.28 = 8.47158246… diameter of the circle.

The diameter of the circle can also be calculated using *M*, *R* and the area:

$d = \sqrt{56.06852302..../0.78125} = 8.471582465...$

$d = \sqrt{56.06852302....*1.28} = 8.47158246...$

$d = \sqrt{((6.618423801....^2 / 0.78125)*1.28)} = 8.471582465...$

$d = \sqrt{6.618423801....^2 / 0.78125^2} = 8.471852465...$

The circumference of the circle is

$8.4715822465...*4*0.78125 = 26.4736952$ circumference or

$8.4715822465...*4/1.28 = 26.4736952$ circumference

3. Draw the square whose side was put into the formula (k_1).

4. Now draw the circle whose diameter and circumference has been calculated.

5. We can see that the diameter is 8.47158246…, which is shorter than the side of the square 10. This means that the circle does not fill the square

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completely.

The perimeter of the circle has just filled 66.18423801 % of the perimeter of the square 10, and the circle's area cover 56.068 % of the square's area and the diameter is 84.7158246 % of the square.

This square, therefore belongs to group 3.

Note:

1. The values in group 3, give diameters smaller than diameter of a standard circle.

2. The value in group 2, gives the standard circle.

3. The values in group 1, give diameters bigger than diameter of standard circle.

This method has been applied to all of the squares below:

10 – 9 – 8 – 7 – 6 – 5 – 4 – 3. 929 – 3.928105767 - 3.9 – 3. 5 – 3 – 2.5 – 2 – 1. 5 - 1.4.

Standard circle = an inner circle where its diameter is equal its square's side.

1. Values in group one produce diameters greater than the standard diameter.
2. The value in group two produce diameter for a standard circle.
   This means that the diameter equals the side, consequently an inner circle.
3. Values in group three produce diameters smaller than the standard diameter.

GROUP 3 $\longrightarrow$ **Area > perimeter**

Square with side 10 See diagram 1

$$\text{Values of the square with side } 10$$
$$Q = (\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.6618423801...$$
$$4Q = (\ln\sqrt{10^2 * 2} / \ln 10)^2 * 2 = 2.647366952...$$
$$Q = 0.6618423801...$$
$$4Q = 2.647366952...$$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
10 * 4 * 0.6618423801…= 26.473695… cm circumference of circle.
Perimeter of square = 26.473695… cm $\mathbf{k_2}$
26.473695… / 4 = 6.1842380… cm side of square $\mathbf{k_2}$

Area of circle = 6.18423801…^{2} / 0.78125 = 56.0685230…cm^2 or
Area of circle = 6.18423801…^{2} * 1.28 = 56.0685230…cm^2

diameter of the circle = 6.618423801… / 0.78125 = 8.47158246…
diameter of the circle = 6.618423801… * 1.28 = 8.47158246…

$$\text{Square of } 10$$
$$10 * 4 * 0.6618423801\ldots = 26.473695\ldots \text{ cm circumference of circle.}$$
$$\text{Imagine circumference equal a square perimeter} : \mathrm{k}_2$$
$$26.473695\ldots / 4 = 6.1842380... \text{ cm side of square}$$
$$6.618423801^2\ldots / 0.78125 = 56.0685230... \text{ the are of the circle}$$
$$\mathrm{d} = \sqrt{(6.1842380^2 * 1.28) / 0.78125} = 8.47158246...$$
$$\mathrm{d} = \sqrt{(56.0685230 / 0.78125} = 8.47158246...$$
$$\mathrm{d} = \sqrt{(56.0685230 * 1.28} = 8.47158246...$$

A circle with this diameter is drawn.
This value produces a diameter smaller than standard circle's diameter!
Since the diameter of the circle is smaller than the side of square, i.e. 10 u.l.
this square falls into group 3. A circle with this value cannot function as an inner circle for the square. With this value cannot produce an inner circles for squares.

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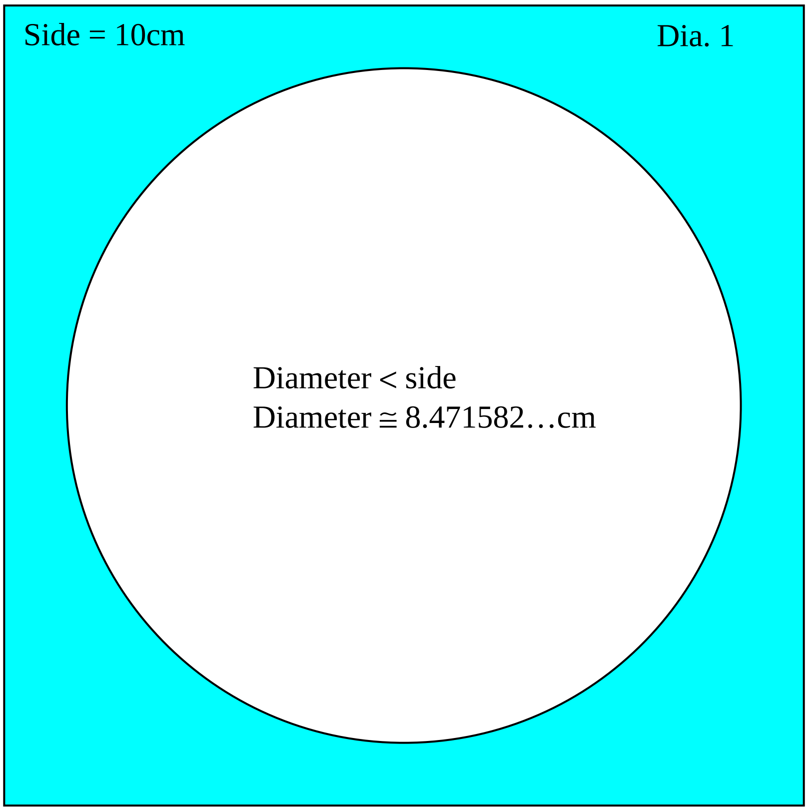
Note too that the diameter of the circle is smaller than the side of the square and thus the circle is not an inner circle, which touches the square.
Remember that a square's inner circle has a diameter equal to the side of the square.

This circle cannot function as an inner circle for the square.

1. The circumference of the circle has just filled ≈ 66.184 % of the perimeter of the square.

2. The circle's area covers ≈ 56.07 % of the square's area.

3. The diameter is ≈ 84.716 % of the square with the side of 10.



An inner circle's diameter is always equal to the side of the square!

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Square with side 9 See diagram 2

Values of the square with side 9

$Q = (\ln\sqrt{9^2 * 2} / \ln 9)^2 / 2 = 0.6701721995...$

$4Q = (\ln\sqrt{9^2 * 2} / \ln 9)^2 * 2 = 2.680688798...$

$Q = 0.6701721995..$

$4Q = 2.680688798...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
9 * 4 * 0.670172199… = 24.1261991…cm circumference of circle.
Perimeter of square = 24.1261991…cm k_2
24.1261991… / 4 = 6.03154979… cm side of square k_2.

Square of 9

$9 * 4 * 0.670172199\ldots = 24.1261991\ldots$ cm circumference of circle.

Imagine circumference equal a square perimeter : k_2

$24.1261991.../ 4 = 6.03154979....$ cm side of square

$6.03154979^2 / 0.78125 = 46.5658788$ the are of the circle

$d = \sqrt{(6.03154979^2 * 1.28) / 0.78125} = 7.72038373...$

$d = \sqrt{(46.5658788 / 0.78125} = 7.72038373...$

$d = \sqrt{(46.5658788 * 1.28} = 7.72038373...$

A circle with this diameter is drawn.
This value produces a diameter smaller than standard circle’s diameter!
Since the diameter of the circle is smaller than the side of square, i.e. 9 u.l.
This diameter is 85.8 % of the diameter of a circle of 9. This means that the circle is smaller than the square since the diameter of the circle is shorter than the side of square that is 9 u.l.
This square falls into group 3.
Remember that a square’s inner circle has a diameter equal to the side of the square.

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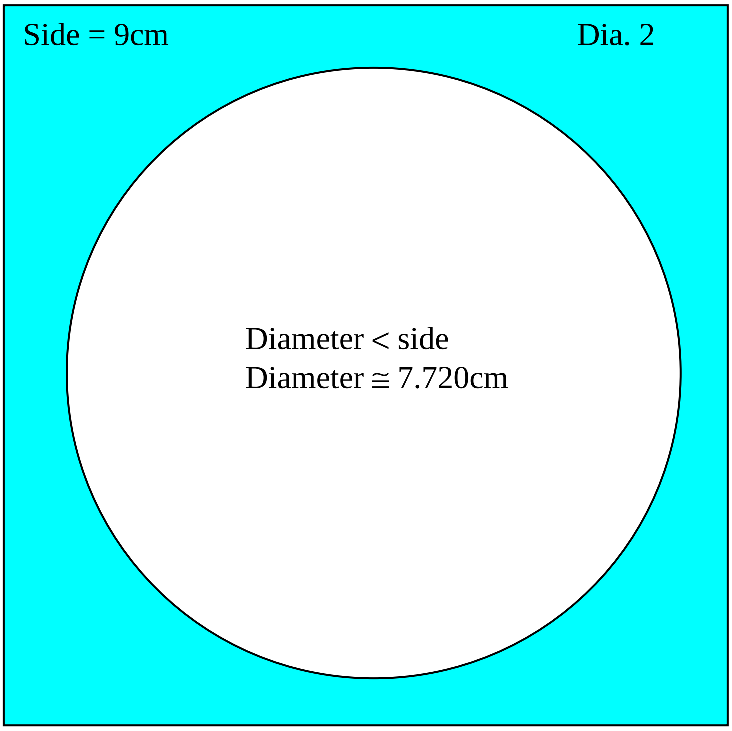
This circle cannot function as an inner circle for the square.

1. The circumference of the circle has just filled ≈ 67 % of the perimeter of the square.

2. The circle's area covers ≈ 57.5 % of the square's area.

3. The diameter is ≈ 85.8 % of the square with the side of 9.



An inner circle's diameter is always equal to the side of the square!

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Square with side 8 See diagram 3

Values of the square with side 8

$Q = (\ln\sqrt{8^2 * 2} / \ln 8)^2 / 2 = 0.6805555555...$

$4Q = (\ln\sqrt{8^2 * 2} / \ln 8)^2 * 2 = 2.722222222...$

$Q = 0.680555555...$

$4Q = 2.722222222...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
8 * 4 * 0.680555… = 21.77777777…cm circumference of circle.

Square of 8

$8 * 4 * 0.680555\ldots = 21.77777777\ldots \text{cm circumference of circle.}$

Imagine circumference equal a square perimeter :

$21.77777777.../\ 4 = 5.44444444....\ \text{cm side of square}$

$5.44444444^2 / 0.78125 = 37.9417284$ the are of the circle

$\text{d} = \sqrt{(5.44444444^2 * 1.28) / 0.78125} = 6.96888...$

$\text{d} = \sqrt{(37.9417284 / 0.78125} = 6.96888...$

A circle with this diameter is drawn.
This value produces a diameter smaller than standard circle’s diameter!
Since the diameter of the circle is smaller than the side of square, i.e. 8 u.l.
This diameter is 87 % of the diameter of a circle of 8. This means that the circle is smaller than the square since the diameter of the circle is shorter than the side of square that is 8 u.l.
This square falls into group 3.
Remember that a square’s inner circle has a diameter equal to the side of the square.

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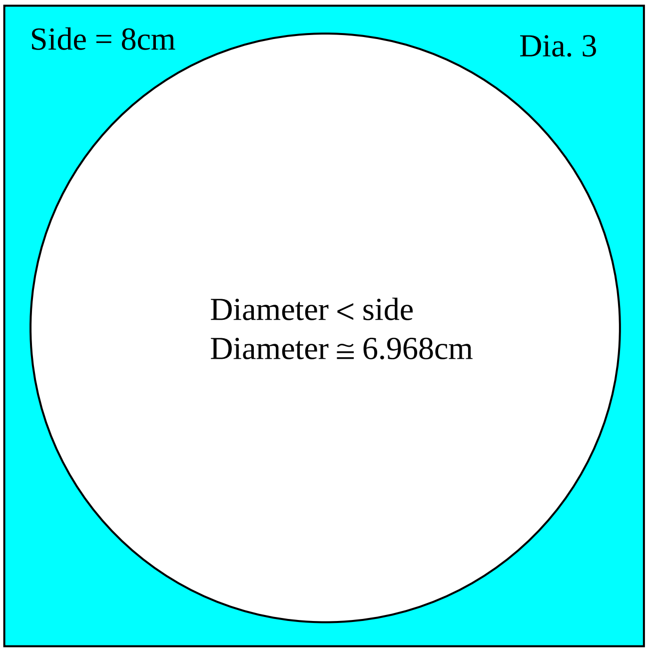
This circle cannot function as an inner circle for the square.

1. The circumference of the circle has just filled ≈ 68 % of the perimeter of the square

2. the circle's area covers ≈ 59.28 % of the square's area

3. the diameter is ≈ 87 % of the square with the side of 8.



An inner circle's diameter is always equal to the side of the square!

Square with side 7 See diagram 4

Values of the square with side 7

$Q = (\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.6939640386...$

$4Q = (\ln\sqrt{7^2 * 2} / \ln 7)^2 * 2 = 2.775856154...$

$Q = 0.6939640386..$

$4Q = 2.775856154...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
7 * 4 * 0.693964038… = 19.4309930…cm circumference of circle.

Square of 7

$7 * 4 * 0.693964038\ldots = 19.4309930\ldots$ cm circumference of circle.

Imagine circumference equal a square perimeter : k_2

$19.430\ldots / 4 = 4.8577482...$ cm side of square

$4.8577482^2 / 0.78125 = 30.2050785$ the are of the circle

$d = \sqrt{(4.8577482^2 * 1.28) / 0.78125} = 6.21791778$

$d = \sqrt{(30.2050785 / 0.78125} = 6.21791778$

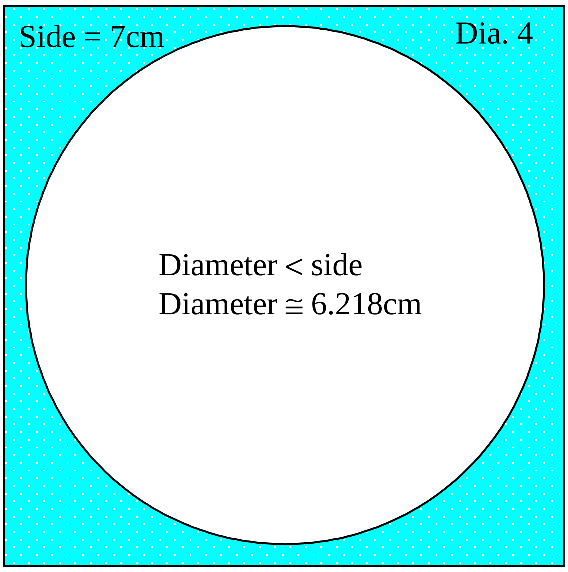
A circle with this diameter is drawn.
This value produces a diameter smaller than standard circle's diameter!
Since the diameter of the circle is smaller than the side of square, i.e. 7 u.l.
This diameter is 88.83 % of the diameter of a circle of 7. This means that the circle is smaller than the square since the diameter of the circle is shorter than the side of square that is 7 u.l.
This square falls into group 3.
Remember that a square's inner circle has a diameter equal to the side of the square.

This circle cannot function as an inner circle for the square.

1. The circumference of the circle has just filled ≈ 69.4 % of the perimeter of the square

2. the circle's area covers ≈ 61.64 % of the square's area

3. the diameter is ≈ 88.83 % of the square with the side of 7.



An inner circle's diameter is always equal to the side of the square!

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Square with side 6 See diagram 5

Values of the square with side 6

$Q = (\ln\sqrt{6^2 * 2} / \ln 6)^2 / 2 = 0.7121332904...$

$4Q = (\ln\sqrt{6^2 * 2} / \ln 6)^2 * 2 = 2.848533192...$

$Q = 0.7121332904...$

$4Q = 2.848533192...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
6 * 4 * 0.7121332903… = 17.09119896…cm circumference of circle.

Square of 6

$6 * 4 * 0.7121332903\ldots = 17.09119896\ldots$cm circumference of circle.

Imagine circumference equal a square perimeter : k_2

$17.0911989\ldots / 4 = 4.272799742...$ cm side of square

$4.272799742^2 / 0.78125 = 23.36872657$ the are of the circle

$d = \sqrt{(4.272799742^2 * 1.28) / 0.78125} = 5.46918367$

$d = \sqrt{(23.36872657 / 0.78125} = 5.46918367$

A circle with this diameter is drawn.
This value produces a diameter smaller than standard circle's diameter!
Since the diameter of the circle is smaller than the side of square, i.e. 6 u.l.
This diameter is 91 % of the diameter of a circle of 6. This means that the circle is smaller than the square since the diameter of the circle is shorter than the side of square that is 6 u.l.
This square falls into group 3.
Remember that a square's inner circle has a diameter equal to the side of the square.

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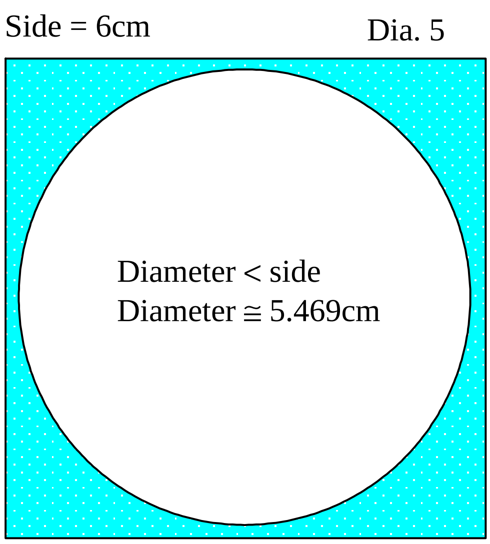
This circle cannot function as an inner circle for the square.

1. The circumference of the circle has just filled ≈ 71.2 % of the erimeter of the square

2. the circle's area covers ≈ 64.9 % of the square's area

3. the diameter is ≈ 91.15 % of the square with the side of 6.



An inner circle's diameter is always equal to the side of the square!

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Square with side 5 See diagram 6

Values of the square with side 5

$Q = (\ln \sqrt{5^2 * 2} / \ln 5)^2 / 2 = 0.7385235662...$

$4Q = (\ln \sqrt{5^2 * 2} / \ln 5)^2 * 2 = 2.954094263...$

$Q = 0.7385235662..$

$4Q = 2.954094263...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
5 * 4 * 0.7385235661… = 14.77047131…cm circumference of circle.
14.77047131… / 4 = 3.692617830…cm side of square $k_{2.}$

Square of 5

14.77047131… / 4 = 3.692617830…cm side of square

Imagine circumference equal a square perimeter : k_2

14.77047131… / 4 = 3.692617830 cm side of square

$3.692617830^2 / 0.78125 = 17.45334584$ the are of the circle

$d = \sqrt{(3.692617830^2 * 1.28) / 0.78125} = 4.726550822$

$d = \sqrt{(17.45334584 / 0.78125} = 4.726550822$

A circle with this diameter is drawn.
This value produces a diameter smaller than standard circle's diameter!
Since the diameter of the circle is smaller than the side of square, i.e. 5 u.l.
This diameter is 94.53 % of the diameter of a circle of 5. This means that the circle is smaller than the square since the diameter of the circle is shorter than the side of square that is 5 u.l.
This square falls into group 3.
Remember that a square's inner circle has a diameter equal to the side of the square.

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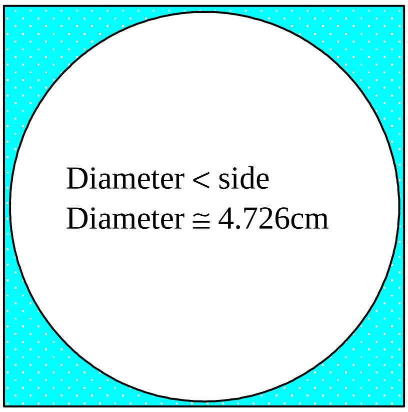
This circle **cannot** function as an inner circle for the square.
This value gives a diameter smaller than side.

1. The circumference of the circle has just filled ≈ 73.85235661 % of the perimeter of the square

2. the circle’s area covers ≈ 69.81338336 % of the square’s area

3. the diameter is ≈ 94.53101645… % of the square with the side of 5.

Side = 5cm Dia. 6



An inner circle’s diameter is always equal to the side of the square!

Standard circle = an inner circle where its diameter is equal its square’s side.

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GROUP 2

Square squaring-form → **Area = perimeter**

Square with side 4 See diagram 7

Values of the square with side 4

$Q = (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.78125...$

$4Q = (\ln\sqrt{4^2 * 2} / \ln 4)^2 * 2 = 3.125...$

$Q = 0.78125$

$4Q = 3.125$

A circle with this value can function as an inner circle for the square.
This value can produce inner circles for squares.

Circumference of circle squaring-form = 4 * 4 * 0.78125 = 12.5 cm.

Area of circle squaring-form = 4^2 * 0.78125 = 12.5 cm^2.

$d = \sqrt{12.5 / 0.78125} = 4$ cm diameter of the circle

$d = \sqrt{12.5 * 1.28} = 4$ cm

A circle with this diameter is drawn.

This value produces a diameter equal standard circle's diameter!

It can be seen from the result that the diameter is equal to the side of square. This circle functions as an inner circle for a square with the side 4, since the diameter = side.

The cylinder squaring mantel area and circumference relation to the circle squaring-form:

12.5 / 4 = 3.125 cm the side of the square which, that is produced of the cylinder squaring-form and the common square for the circle squaring-form.

cyks = the square which, that produces of the cylinder squaring-form.
Relationship:
Perimeter cyks: 3.125 * 4= 12.5cm equal to perimeter of the circle squaring-form.

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Area of cyks: 3.125^2 / 0.78125 = 12.5 area of circle
Area of cyks: $3.125^2 * 1.28$ = 12.5 area of circle.

Area of cyks: 3.125^2 / 0.78125^2 = 16 area of square squaring-form
Area of cyks: $3.125^2 * 1.28^2$ = 16 perimeter of square squaring-form.

This circle **can function** as an inner circle for the square, and it is only value which that gives an absolute correct size diameter equal side.

1. The circumference of the circle has just filled = 78.125 % of the perimeter of the square.

2. The circle's area covers = 78.125 % of the square's area.

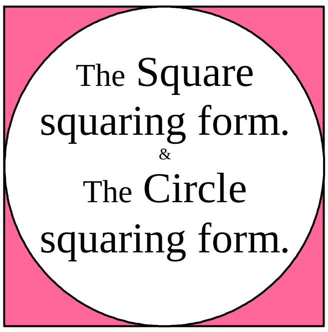
3. The diameter is = 100 % of the square with the side of 4.

The circle is an inner circle

Dia. 7

Side = 4cm

Diameter = side
Diameter = 4cm.



An inner circle's diameter is always equal to the side of the square!
Standard circle = an inner circle where its diameter is equal its square's side.

Values of the square with side 4 into formulae produce inner circles or standard circles.

$$M = (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.78125...$$
$$4M = (\ln\sqrt{4^2 * 2} / \ln 4)^2 * 2 = 3.125...$$
$$M = 0.78125$$
$$4M = 3.125$$

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GROUP 1 → **Area < perimeter**

Square with side 3.929 See diagram 8

Values of the square with side 3.929

$Q = (\ln \sqrt{3.929^2 * 2} / \ln 3.929)^2 / 2 = 0.7853453526...$

$4Q = (\ln \sqrt{3.929^2 * 2} / \ln 3.929)^2 * 2 = 3.141381411...$

$Q = 0.7853453526...$

$4Q = 3.141381411...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.

3.929 * 4 *0.7853453525… =12.34248755…cm circumference of circle.
12.34248755… / 4 = 3.085621890… cm the side of the square k_2.

Square of 3.929

$3.929 * 4 * 0.7853453525\ldots = 12.34248755\ldots \text{cm circumference}$

Imagine circumference equal a square perimeter :

$12.34248755\ldots / 4 = 3.085621890\ldots \text{cm side of square}$

$3.085621890^2 / 0.78125 = 12.18695993$ the are of the circle

$d = \sqrt{(3.085621890^2 * 1.28) / 0.78125} d = 3.949596019$

$d = \sqrt{(12.18695993 / 0.78125} = 3.949596019$

A circle with this diameter is drawn.
This value produces a diameter larger than standard circle’s diameter!
Since the diameter of the circle is larger than the side of square, i.e. 3.929 u.l.
This diameter is 100.5242 % of the diameter of a circle of 3.929. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 3.929.
This square falls into group 1.
Remember that a square’s inner circle has a diameter equal to the side of the square.

This circle **cannot** function as an inner circle for the square.
This value gives a diameter bigger than side.

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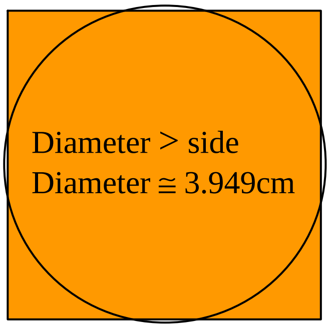
1. The circumference of the circle has just filled ≈ 78.53453519… % of the perimeter of the square

2. The circle's area covers ≈ 78.94621731 % of the square's area

3. The diameter is ≈ 100.52 % of the square with the side of 3.929.



An inner circle's diameter is always equal to the side of the square!

Standard circle = an inner circle where its diameter is equal its square's side.

Comment:
Thinking Reality, if we use a value instead for pi, number as 3.929, what happen to circle, well circumference and area get to be bigger and diameter get be bigger too how we can know this fact.
When we have the precious formulae which that can tell you even the length of diameters. When we use each value, the formulae tell us the absolute exactly correct, of the decimal to decimal when a diameter changes whit different values.

See the places of 3.14… and the square which that gives 3.14 on the grading system I, II, III.

Relevant formula :$\Rightarrow$ $4Q = (\ln\sqrt{s^2 * 2} / \ln s)^2 * 2$

$\pi = (\ln\sqrt{s^2 * 2} / \ln s)^2 * 2$

$3.141592653 = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 * 2$

This square is in group one and area < circumference

See below!

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GROUP 1 → **Area < perimeter**

Square with side 3.928105767 See diagram 9

Values of the square with side 3.928105767

$Q = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.7853981633...$

π or $4Q = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 * 2 = 3.1415926533...$

$Q = 0.7853981633...$

$4Q = 3.1415926533...$

A circle with this value **cannot function** as an inner circle for the square.

This value **cannot produce** inner circles for squares.

This value gives diameters greater than sides.

Standard circle = an inner circle where its diameter is equal its square's side.

Square perimeter k_1: 3.928105767* 4= 15.71242307.

Square area k_1: 3.928105767 ^{2} = 15.43001492.

π /4 = 0.7853981633

$Q = 0.7853981633$ $\pi = 3.1415926533$

$$Q = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.7853981633$$

$$\pi = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 * 2 = 3.1415926533$$

This value produces a diameter larger than standard circle's diameter!

Inner circle's circumference: 3.928105767* 4* 0.7853981633 = 12.34050822…

Circumference: 3.928105767* π = 12.34050822

Imagine the circumference is equal to a square perimeter, $k_{2,}$

Square perimeter k_2, Ok_2 / 4 = side of k_2:

The side of square k_2 is: 12.34050822 / 4 = 3.085127055cm.

Circle's area via side k_2: 3.085127055 ^{2} * 1/(π /4) = 12.11870538cm^2.

Circle's area via side k_2: 3.085127055^2 / (π /4) = 12.11870538cm^2.

Circle's area via side k_1: (3.928105767/2)^2 / π = 12.11870538cm

Circumference = 3.085127055 * 1/ (π /4) * π = 12.34050822cm.

Circumference = 3.928105767 * π = 12.34050822cm.

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Square of k_1 in formulae 3.928105767

$3.928105767 * 4 * 0.7853981633 = 12.34050822\ldots$ circumference of circle

Imagine circumference equal a square perimeter : k_2

$12.34050822... / 4 = 3.085127055...$ cm the side of the square k_2

$3.085127055^2 / 0.78125 = 12.18305145$ the are of the circle

diameter via side of k_2 : $3.085127055 / 0.78125 = 3.94896263$ d > s

Diameter of circle :

$$\text{diameter} = \sqrt{(3.085127055^2 * 1.28) / 0.78125} = 3.94896263 \ d > s$$

$$\text{diameter} = \sqrt{(12.18305145 / 0.78125} = 3.94896263 \ d > s$$

$$\text{diameter} = \sqrt{(12.18305145 * 1.28} = 3.94896263 \ d > s$$

A circle with this diameter is drawn.

This value produces a diameter larger than its square's side!

This value produces a circumference and area larger than standard circle's circumference and area!

Since the diameter of the circle is larger than the side of square, i.e. 3.928105767 u.l. Diameter = 3.94896263cm

This diameter is 100.5309649 % of the diameter of a circle of 3.928105767. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 3.928105767.

This circle cannot function as an inner circle for the square.

This square falls into group 1.

Remember that a square's inner circle has a diameter equal to the side of the square.

This circle **cannot function** as an inner circle for the square or squares.

1. The circumference of the circle has just filled ≈ 78.53981633… % of the perimeter of the square.
2. The circle's area covers ≈ 78.9568352… % of the square's area.
3. The diameter is ≈ 100.5309649… % of the square with the side. of 3.928105767.

When you use the value 3.1415926533, it will always give you the above proportions. See diagram below:

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This square falls into group 1.
Remember that a square’s inner circle has a diameter equal to the side of the square.
This circle **cannot function** as an inner circle for the square or squares.

1. The circumference of the circle has just filled ≈ 78.53981633… % of the perimeter of the square.

2. The circle’s area covers ≈ 78.9568352… % of the square’s area.

3. The diameter is ≈ 100.5309649… % of the square with the side. of 3.928105767.

This means that a circle calculated with 3.14…, results in a diameter bigger than its squares side. This is valid for all circles calculated with 3.14...
This value gives diameters larger than sides.

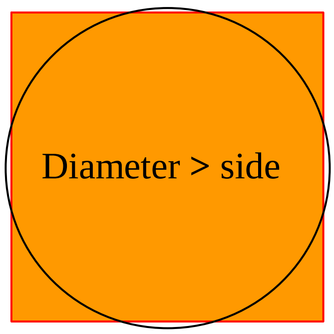
Dia. 9

Square and its circle
Value 3.141592653

Diameter > side

Square side = 3.928105767

Diameter = 3.94896263



An inner circle’s diameter is always equal to the side of the square!
Standard circle = an inner circle where its diameter is equal its square’s side.

Standard circle:
Area $(3.928105767 / 2)^{2} * 3.125 = 12.05469915$cm
Area $3.928105767^{2} * 0.78125 = 12.05469915cm^{2}$
Area $3.928105767^{2} / 1.28 = 12.05469915cm^{2}$
Circumference 3.928105767 * 3.125 = 12.27533052cm
Circumference 3.928105767 * 4 * 0.78125 = 12.27533052cm
Circumference 3.928105767 * 4 / 1.28 = 12.27533052cm

GROUP 1 → **Area < perimeter**

Square with side 3.9 See diagram 10

Values of the square with side 3.9

$Q = (\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 / 2 = 0.7870741511...$

$Q4 = (\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 * 2 = 3.148296604...$

$Q = 0.7870741511...$

$4Q = 3.148296604...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.

Square of 3.9

$3.9 * 4 * 0.787074151\ldots = 12.27835675\ldots$ cm circumference of circle.

Imagine circumference equal a square perimeter : k_2

$12.278\ldots / 4 = 3.069589188\ldots$ cm the side of the square k_2.

$3.069589188^2\ldots / 0.78125 = 12.0606435...$ the are of the circle

Diameter of circle :

$d = \sqrt{(3.069589188^2 * 1.28) / 0.78125} = 3.929074161...$

$d = \sqrt{(12.0606435 / 0.78125} = 3.929074161...$

$d = \sqrt{(12.0606435 * 1.28} = 3.929074161...$

A circle with this diameter is drawn.
This value produces a diameter larger than standard circle’s diameter!
Since the diameter of the circle is larger than the side of square, i.e. 3.9 u.l.
This is 100.745491 % of the diameter of a circle of 3.9.
This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 3.9.
This square falls into group 1.
Remember that a square’s inner circle has a diameter equal to the side of the square.

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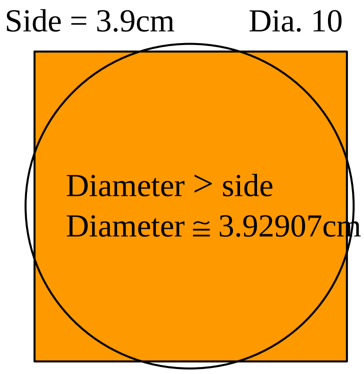
This circle **cannot** function as an inner circle for the square.
This value gives diameters larger than sides.

1. The circumference of the circle has just filled ≈ 78.70741506 % of the perimeter of the square,

2. the circle's area covers ≈ 79.2941716 % of the square's area,

3. the diameter is ≈ 100.74549 % of the square with the side of 3.9.



An inner circles diameter is always equal to the side of the square!

Standard circle = an inner circle where its diameter is equal its square's side.

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Square with side 3.5 See diagram 11

Values of the square with side 3.5

$Q = (\ln \sqrt{3.5^2 * 2} / \ln 3.5)^2 / 2 = 0.814914293...$

$4Q = (\ln \sqrt{3.5^2 * 2} / \ln 3.5)^2 * 2 = 3.25965705...$

$Q = 0.814914293...$

$4Q = 3.25965705...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.

3.5 * 4 * 0.8149142636…= 11.40879968…cm circumference of circle.
Imagine circumference equal a square perimeter; k_2
11.40879968… / 4= 2.852199922… cm the side of the square k_2.

$2.852199922…^2 / 0.78125 = 10.41285682…\text{cm}^2$ area of circle.

$d = \sqrt{10.41285682... / 0.78125} = 3.65081590...$ cm diameter of circle.

$d = \sqrt{10.41285682... * 1.28} = 3.65081590...$ cm diameter of circle.

$d = \sqrt{((2.852199922...^2 * 1.28) / 0.78125)} = 3.65081590...$ cm.

A circle with this diameter is drawn.
This value produces a diameter larger than standard circle’s diameter!
Since the diameter of the circle is larger than the side of square, i.e. 3.5 u.l.
This is 104.309 % of the diameter of a circle of 3.5. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 3.5. This circle cannot function as an inner circle for the square.
This square falls into group 1.
Remember that a square’s inner circle has a diameter equal to the side of the square.

This circle cannot function as an inner circle for the square.

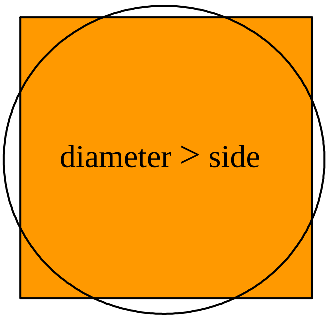
1. The circumference of the circle has just filled ≈ 81.49 % of the perimeter of the square.

2. The circle's area covers ≈ 85... % of the square's area.

3. The diameter is ≈ 104.3 % of the square with the side of 3.5.

Dia. 11 Side = 3.5cm

Diameter > side
Diameter ≅ 3.650cm



An inner circles diameter is always equal to the side of the square!

Standard circle = an inner circle where its diameter is equal its square's side.

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Square with side 3 See diagram 12

Values of the square with side 3

$Q = (\ln \sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.865223921...$

$4Q = (\ln \sqrt{3^2 * 2} / \ln 3)^2 * 2 = 3.460895684...$

$Q = 0.865223921...$

$4Q = 3.460895684...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.

3 * 4 * 0.86522392… = 10.38268704…cm circumference of circle.
Imagine circumference equal a square perimeter; k_2
10.38268704… / 4 = 2.595671762…cm the side of the square k_2.

2.5965671762…^{2} * 1.28 = 8.624015233…cm^2 the area of circle.

$d = \sqrt{8.624015233.../0.78125} = 3.322459856...$ cm.

$d = \sqrt{8.624015233...*1.28} = 3.322459856...$ cm.

$d = \sqrt{((2.595671762...^2 * 1.28)/0.78125)} = 3.322459856...$ cm.

A circle with this diameter is drawn.
This value produces a diameter larger than standard circle's diameter!
Since the diameter of the circle is larger than the side of square, i.e. 3 u.l.
This is 110.74866 % of the diameter of a circle of 3. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 3. This circle cannot function as an inner circle for the square.

This square falls into group 1. Remember that a square's inner circle has a diameter equal to the side of the square.

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This circle cannot function as an inner circle for the square.

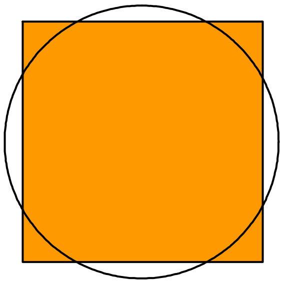
1. The circumference of the circle has just filled ≈ 86.5 % of the perimeter of the square

2. The circle’s area covers ≈ 95.82 % of the square’s area

3. The diameter is ≈ 110.75 % of the square with the side of 3.

Dia. 12 Square side = 3cm

Diameter > side
Diameter ≅ 3.322cm



An inner circles diameter is always equal to the side of the square!

Standard circle = an inner circle where its diameter is equal its square’s side.

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Square with side 2.5 See diagram 13

Values of the square with side 2.5

$Q = (\ln \sqrt{2.5^2 * 2} / \ln 2.5)^2 / 2 = 0.9497664071...$

$4Q = (\ln \sqrt{2.5^2 * 2} / \ln 2.5)^2 * 2 = 3.799065628...$

$Q = 0.9497664071...$

$\mathrm{Q} = 3.799065628...$

A circle with this value cannot function as an inner circle for the square.

This value cannot produce inner circles for squares.

2.5 * 4 * 0.949766407… = 9.49766407…cm circumference of circle.

Imagine circumference equal a square perimeter, k_2.

9.49766407… / 4 = 2.37441601… cm the side of the square k_2.

$2.374416017\ldots^2 / 0.78125 = 7.216449823\ldots \text{cm}^2$ area of circle.

$\mathrm{d} = \sqrt{7.216449823\ldots / 0.78125} = 3.039252502...\,\mathrm{cm}$

$\mathrm{d} = \sqrt{7.216449823\ldots * 1.28} = 3.039252502...\,\mathrm{cm}$

$\mathrm{d} = \sqrt{((2.37441601...^2 * 1.28) / 0.78125)} = 3.039252502...\,\mathrm{cm}.$

A circle with this diameter is drawn.

This value produces a diameter larger than standard circle's diameter!

Since the diameter of the circle is larger than the side of square, i.e. 2.5 u.l.

This is 121.57 % of the diameter of a circle of 2.5. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 2.5. This circle cannot function as an inner circle for the square.

This square falls into group 1.

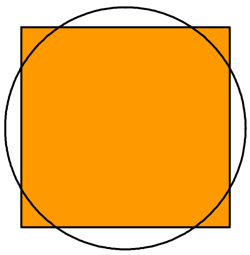
Remember that a square's inner circle has a diameter equal to the side of the square.

1. The circumference of the circle has just filled ≈ 95 % of the perimeter of the square.
2. The circle's area covers ≈ 115.46 % of the square's area
3. The diameter is ≈ 121.57 % of the square with the side of 2.5.

Side = 2.5cm

Diameter > side

Diameter ≅ 3.0392cm



Dia. 13

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Square with side 2 See diagram 14

Values of the square with side 2

$Q = (\ln\sqrt{2^2 * 2} / \ln 2)^2 / 2 = 1.125$

$4Q = (\ln\sqrt{2^2 * 2} / \ln 2)^2 * 2 = 4.5$

$Q = 1.125$

$4Q = 4.5$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
2 * 4 * 1.125 = 9 cm circumference of circle.
Imagine circumference equal a square perimeter, k_2.
9 / 4 =2.25cm side of square k_2.

$2.25^2 / 0.78125 = 6.48cm^2$ area of circle.

$d = \sqrt{6.48 / 078125} = 2.88$ cm. Diameter of circle.

$d = \sqrt{6.48 * 1.28} = 2.88$ cm.

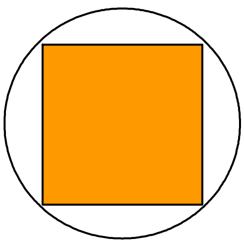
$d = \sqrt{((2.25^2 * 1.28) / 0.78125)} = 2.88$ cm.

A circle with this diameter is drawn.
This value produces a diameter larger than standard circle's diameter!
Since the diameter of the circle is larger than the side of square, i.e. 2 u.l.
This is 144 % of the diameter of a circle of 2. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 2. This circle cannot function as an inner circle for the square.
This square falls into group 1.
Remember that a square's inner circle has a diameter equal to the side of the square.

1. The circumference of the circle has just filled ≈ 112.5 % of the perimeter of the square.
2. The circle's area covers ≈ 162 % of the square's area.
3. The diameter is ≈ 144.5 % of the square with the side of 2.

Dia. 14 Side = 2cm

Diameter > side
Diameter = 2.88cm



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Square with side 1.5 See diagram 15

Values of the square with side 1.5

$Q = (\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 / 2 = 1.72005925...$

$4Q = (\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 * 2 = 6.8802370...$

$Q = 1.72005925...$

$4Q = 6.8802370...$

A circle with this value cannot function as an inner circle for the square.

This value cannot produce inner circles for squares.

1.5 * 4 * 1.720059253… = 10.32035551…cm circumference of circle.

Imagine circumference equal a square perimeter; k_2.

10.32035551… / 4 = 2.580088878…cm side of square k_2.

$2.58008888\ldots^2 * 1.28 = 8.520779036\ldots cm^2$ the area of the circle.

$d = \sqrt{8.520779036\ldots / 0.78125} = 3.302513764...$ cm diameter of circle.

$d = \sqrt{8.520779036\ldots * 1.28} = 3.302513764...$ cm.

$d = \sqrt{((2.580088878....^2 * 1.28) / 0.78125)} = 3.302513764...$ cm.

A circle with this diameter is drawn.

This value produces a diameter larger than standard circle's diameter!

Since the diameter of the circle is larger than the side of square, i.e. 1.5 u.l.

This is 220.167 % of the diameter of a circle of 1.5. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 1.5. This circle cannot function as an inner circle for the square.

This square falls into group 1.

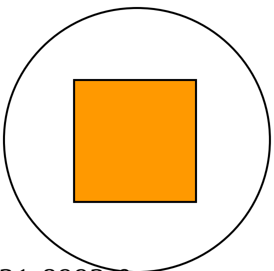
Remember that a square's inner circle has a diameter equal to the side of the square.

1. The circumference of the circle has just filled ≈ 172 % of the perimeter of the square.
2. The circle's area covers ≈ 381.3 % of the square's area.
3. The diameter is ≈ 220.167 % of the square with the side of 1.5.

Square side = 1.5cm

Diameter > side

Diameter ≅ 3.3cm



Dia. 15

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Square with side 1.4 See diagram 16

Values of the square with side 1.4

$Q = (\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 / 2 = 2.060493358...$

$4Q = (\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 * 2 = 8.241973432...$

$Q = 2.060493358...$

$4Q = 8.241973432...$

A circle with this value cannot function as an inner circle for the square.
This value cannot produce inner circles for squares.
1.4 * 4 * 2.060493357… =11.5387628…cm circumference of circle.
Imagine circumference equal a square perimeter; k_2.
11.5387628… / 4 = 2.88469070…cm side of square k_2.

2.88469070…^{2} *1.28 = 10.65144376…cm^2 the area of the circle

$d = \sqrt{10.65144376\ldots / 0.78125} = 3.69240409...$ cm diameter of circle.

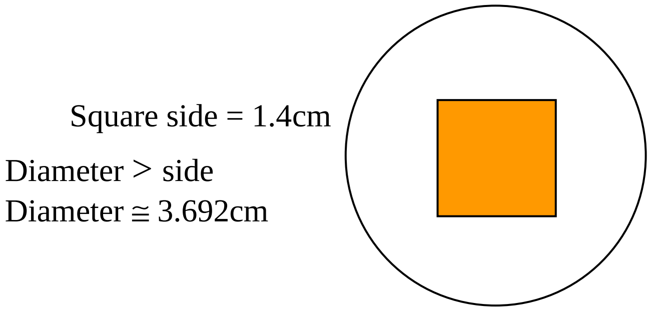
$d = \sqrt{10.65144376\ldots * 1.28} = 3.69240409...$ cm

$d = \sqrt{((2.88469...^2 * 1.28) / 0.78125)} = 3.69240409...$ cm

A circle with this diameter is drawn.
This value produces a diameter larger than standard circle's diameter!
Since the diameter of the circle is larger than the side of square, i.e. 1.4 u.l.
This is 263.74 % of the diameter of a circle of 1.4. This means that the circle is larger than the square since the diameter of the circle is greater than the side of the square, i.e. 1.4. This circle cannot function as an inner circle for the square.
This square falls into group 1.
Remember that a square's inner circle has a diameter equal to the side of the square.

1. The circumference of the circle has just filled ≈ 200 % of the perimeter of the square.
2. The circle's area covers ≈ 543.44 % of the square's area
3. The diameter is ≈ 263.74 % of the square with the side of 1.4.

Dia.16



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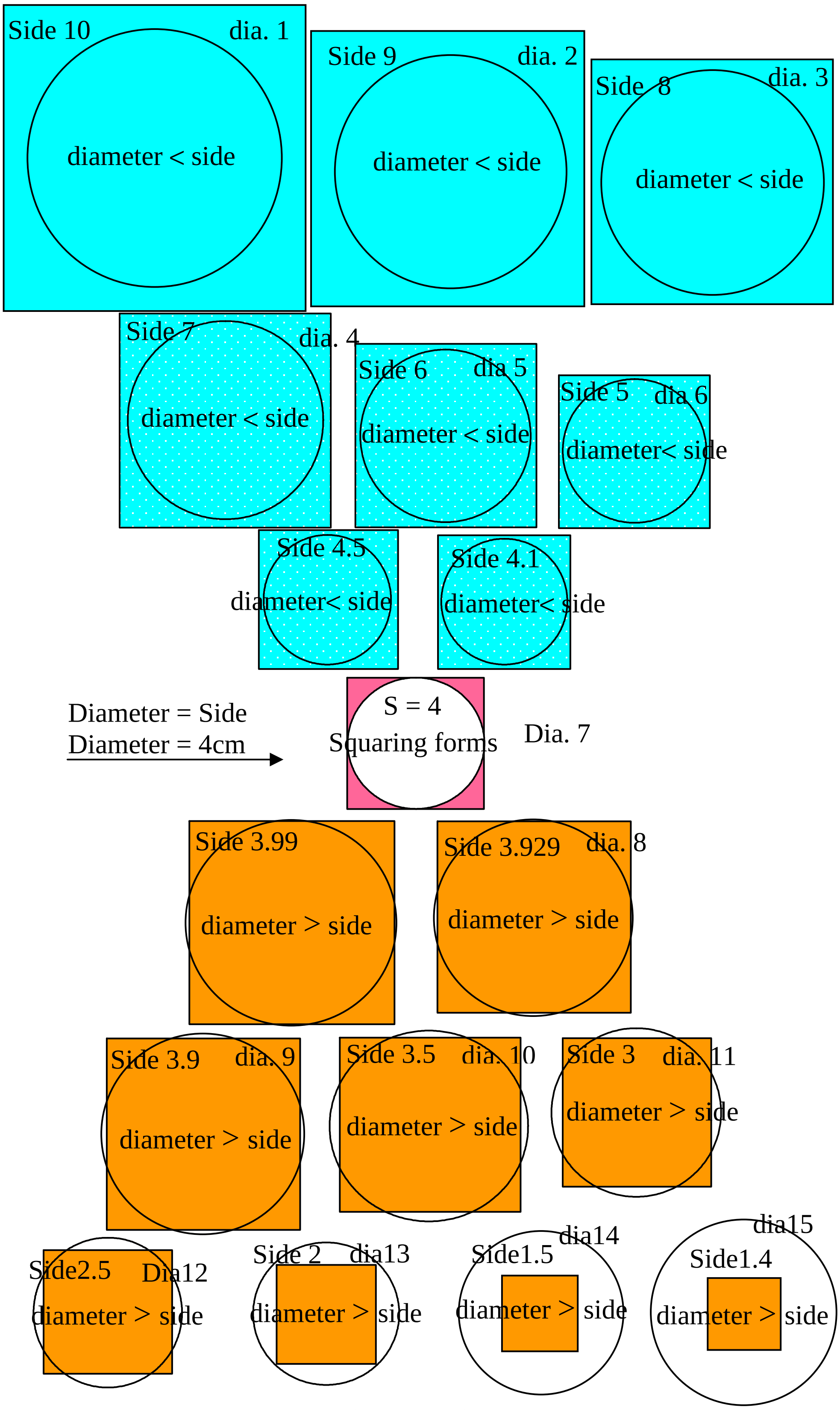
Grading-system I & II

Illustration of grading system I & II in practice and applications. See the pictures below! See how diameters are increased!



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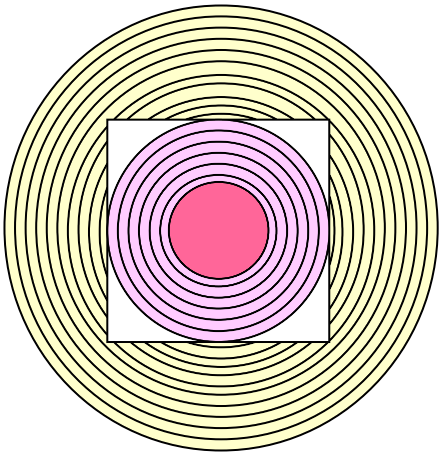
Diagrams 1 – 15 are shown on pages 98-127 in order of size along with their formulae on pages 129-131 and 142-146.

When the circles are placed in order of size the diagram below is obtained. This illustration of the circles and their respective formulae are approximate models.



The formulae below are for the circles that are drawn inside the squares, in order of size from the smallest to the largest.

$M = (\ln\sqrt{(e^{\ln S})^2 * 2} / \ln e^{\ln S})^2 / 2.$

$(\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.6618423801...$

$(\ln\sqrt{9^2 * 2} / \ln 9)^2 / 2 = 0.6701721995...$

$(\ln\sqrt{8^2 * 2} / \ln 8)^2 / 2 = 0.680555555...$

$(\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.6939640386...$

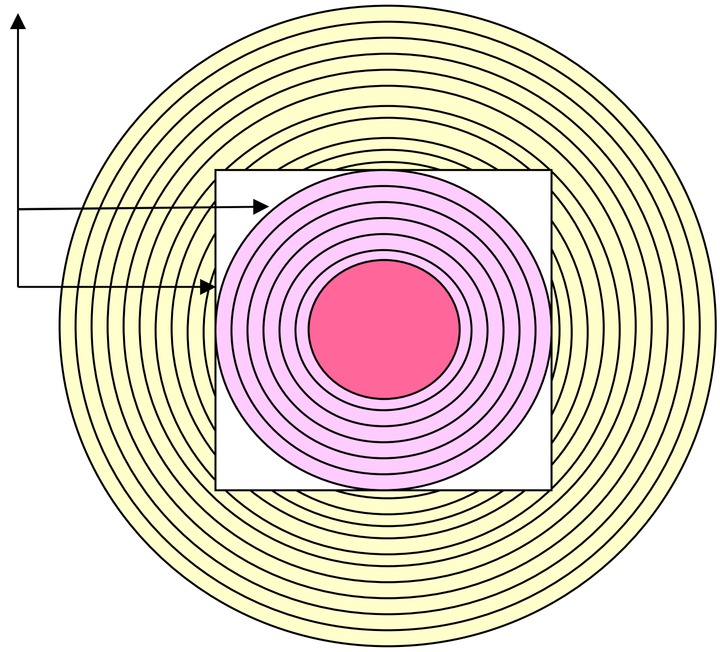
$(\ln\sqrt{6^2 * 2} / \ln 6)^2 / 2 = 0.712133332904...$

$(\ln\sqrt{5^2 * 2} / \ln 5)^2 / 2 = 0.73852355662...$

$(\ln\sqrt{4.5^2 * 2} / \ln 4.5)^2 / 2 = 0.756970023...$

This formula describes the circle that touches the sides of the square:

$(\ln\sqrt{4^2 * 2} / \ln 4)^2 * 2 = 3.125. \Leftrightarrow (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.78125.$



These formulae relate to the circles drawn outside the squares.

$(\mathrm{cy}\sqrt{\mathrm{S}^2 * 2} / \mathrm{cy}\,\mathrm{S})^2 / 2 = M$

$(\ln\sqrt{3.999^2 * 2} / \ln 3.999)^2 / 2 = 0.781306373...$

$(\ln\sqrt{3.998^2 * 2} / \ln 3.998)^2 / 2 = 0.781362783...$

$(\ln\sqrt{3.97^2 * 2} / \ln 3.97)^2 / 2 = 0.78141923...$

$(\ln\sqrt{3.96^2 * 2} / \ln 3.96)^2 / 2 = 0.781475713...$

$(\ln\sqrt{3.95^2 * 2} / \ln 3.95)^2 / 2 = 0.784114107...$

continued on next page

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$$(\ln\sqrt{3.929^2 * 2} / \ln 3.929)^2 / 2 = 0.7853453526...$$

$$(\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.7853981633...$$

$$(\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 * 2 = 3.141592653...$$

$$(\ln\sqrt{3.925^2 * 2} / \ln 3.925)^2 / 2 = 0.7855818245...$$

$$(\ln\sqrt{3.92^2 * 2} / \ln 3.92)^2 / 2 = 0.7858783005...$$

$$(\ln\sqrt{3.91^2 * 2} / \ln 3.91)^2 / 2 = 0.786474226...$$

$$(\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 / 2 = 0.7870741511...$$

$$(\ln\sqrt{3.8^2 * 2} / \ln 3.8)^2 / 2 = 0.7933029803...$$

$$(\ln\sqrt{3.5^2 * 2} / \ln 3.5)^2 / 2 = 0.8149142637...$$

$$(\ln\sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.865223921...$$

$$(\ln\sqrt{2.5^2 * 2} / \ln 2.5)^2 / 2 = 0.9497664071...$$

$$(\ln\sqrt{2^2 * 2} / \ln 2)^2 / 2 = 1.125$$

$$(\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 / 2 = 1.720059253...$$

$$(\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 / 2 = 2.060493358...$$

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We can now see which square gives us this value, referring to grading systems I and II in chapters I, II and the appendix on pages ---, ---, ---. The result is **a square with sides of 3.928105767**. This square is put into the formulae for *M* and 4*M*. The result is 0.7853981633 and 3.141592653 which is one quarter of **π and 4π;** see below and pages 140-148-150-153!

$$(\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = \underline{0.7853981633}.$$

$$(\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 * 2 = \underline{3.141592653}.$$

The value 0.7853981633 does not result in an inner circle for the square of sides 3.928105767. This value cannot function as a constant for the calculation of other squares and their inner circles since it does not produce an exact result.

The table below clarifies the above statement.

The squares, squaring forms and their results can be seen.

M	side = diameter 4	perimeter	area
1	4*4*1 = 16	16	16
0.9	4*0.9 = 14.4	14.4	14.4
0.8	4*4*0.8 = 12.8	12.8	12.8
3.141…/ 4	4*4*0.7853…= 12.566	12.56…	12.56…
<u>0.78125</u>	4*4*0.78125 = 12.5	12.5	12.5
0.78	4*4*0.78 = 12.48	12.48	12.48
0.75	4*4*0.75 = 12	12	12
0.7	4*4*0.70 = 11.2	11.2	11.2

See similar values on page 152-153.

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The characteristics of the three unique diagrams are as follows:

 = 0.78125

 = 0.64

Square squaring-form	perimeter = 16 u.l. area = 16 u.a. side = 4 u.l.
Circle squaring-form	circumference = 12.5 u.l. area = 12.5 u.a. diameter = 4 u.l.
Cylinder squaring-form mantle	perimeter = 12.5 u.l. area = 9.765625 u.a. side = 3.125 u.l.

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1. Definition of squares with the help of grading system I:

	10-9-8-7-6	
Area > perimeter	5-6-7-8	Area > 16
	8-7-6	
	5-6	
Perimeter = 16	← 4 →	Area = 16
	3.9	
	3.7-3.5	
Area < perimeter	3-2.5-2.2	Area < 16
	2-1.5- 0.7-0.5	

M and *R* are written as  and 

The following formulae are only valid for the square and the circle whose perimeter is equal in u.l.

Relationship between side / diameter = 0.78125 *M*

Relationship between square's perimeter and circumference

Relationship between square's area and circle's area

Relationship between radius / side = 0.64 *R*

Relationship between diameter / side = 1.28 2*R*

Relationship between side / radius = 1.5625 2*M*

Relationship between radius / *M* * *R* = diameter

Relationship between diameter * *M* * *R* = radius

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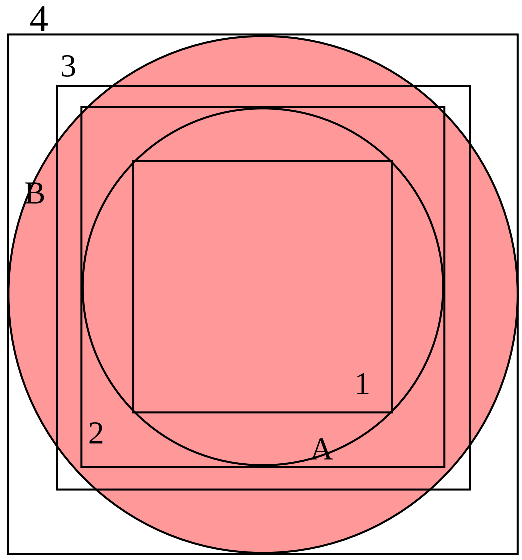
Principle of common circumferences

$M =$

The characteristics of a circle may be calculated using the perimeters of squares.



A square, no. 1, with sides of 3.2 u.l. has a diagonal of
$\sqrt{3.2^2 * 2} = 4.5254833...\text{cm}$
This square is inside the circle (A) whose diameter is equal to that of the diagonal of the square. A square named no. 2 is drawn so that the circle A lies inside it as an inner circle. The sides of square no. 2 are equal to the diameter of the circle A. $\sqrt{3.2^2 * 2} = 4.5254833...\text{cm}$

A circle (B) is drawn around square no. 2, so that the square lies inside the circle. The diameter of the circle is equal to the diagonal of the square. A third square, no. 3, can now be drawn. This has the same perimeter as that of circle no. 2. The formula for circles and squares with the same perimeter can now be used to calculate the values of the circle.
The diagonal of square no. 4 is $\sqrt{3.2^2 * 4} = 6.4$ Square no. 4 is drawn using this diagonal, which will have sides of 6.4 cm, i.e. the sides of the square are equal to the diagonal of square no. 2. Circle no. 2B functions as an inner circle for square no. 4.
The relationship between the sides of square no. 2 and the sides of square no. 4 will be the same as the relationship between $\sqrt{M * R}$, see below.

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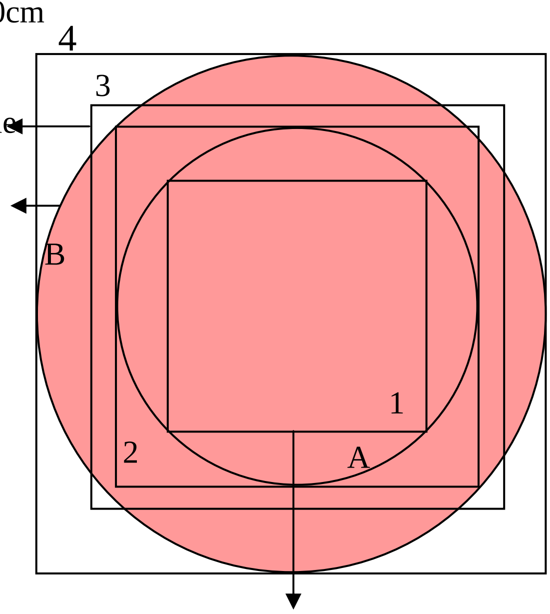
The side of square no. 2 is divided by the side of square no. 4 giving the sine or cosine of 45° = 0.70710678… which is that equal to $\sqrt{M * R} = 0.707106781$ also giving the sine or cosine of 45°. The relationship between the side of square no. 2 and the diameter of circle B is also 0.70710678… The relationship between the diameter of circle A and the side of square no. 2 is 0.70710678...

The side of square no. 4, the diameter of circle B and the diagonal of square no. 2 $= \sqrt{3.2^2 * 4} = 6.4$

Perimeter of square no. 3 = 20cm
Area of square no. 3 = 25cm²
Side of square no. 3 = 5cm
Square perimeter 3 equal circle circumference B.
Circumference of circle B = 20cm.
Square side no4 is 6.4cm
Diameter of circle B = 6.4cm
Area of circle B = 32 cm²

Diagonal of square 1 equal circle A's diameter equal side of square 2.



Side of square no.1 = 3.2cm

With the aid of the above figures it is possible to calculate the diameter of circle B. The circumference of this circle was calculated to be 20 cm. A square is drawn using the same perimeter of 20 cm. The area of this square is divided by *M* or multiplied by 2*R*. The result is the area of circle B. Provided that the circumference is identical for a circle and a square it is possible to calculate the other values of the circle.

The relation between a square and its inner circle and the square which has the same perimeter as the inner circle's circumference is consequently *M* or 2*R*.

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Principle of common area

The values of a circle can also be calculated using the area of a square.

The area of the circle is assumed to be equal to the area of the square. The side of square is calculated from its area.

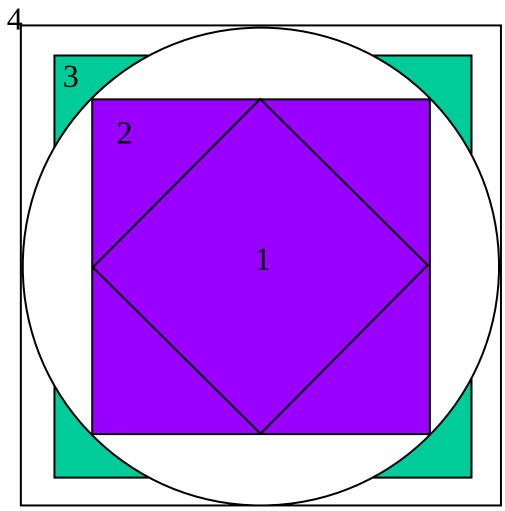
We now have three important values:

a) the area of the square

b) the side of the square

c) the area of the circle.

When the areas of the circle and the square are identical, the circumference of the circle will be smaller than the perimeter of the square. The diameter of the circle will be:



Draw the circle as an inner circle in square no. 4.

Draw square no. 2 inside the circle. The diagonal of this square is equal to the diameter of the circle.

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The diagonal of square no. 1 is equal to the side of square no. 2.
It is now possible to calculate the diameter of the circle.
For example:
The symbol 2^n represents a number that is related to which square is selected for substitution in the formula n = 1, 2, 3 or 4.

$$\text{Area of circle} = \sqrt{s^2 * 2^n} * M$$

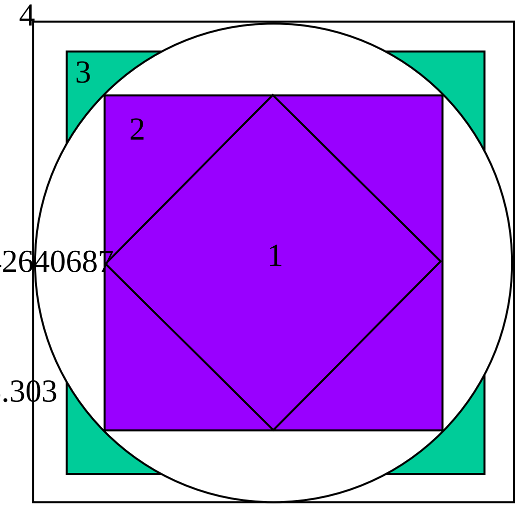
$$\text{Area of circle} = s^2 * 2^n * M$$

diameter of circle = $\sqrt{\text{Area of square} / M}$
Area of circle = $3^2 * 2^2 * M$

Area of square 3 = 28.125 cm²
Side of square 3 ≈ 5.303 cm

Area of circle = 28.125 cm²
diameter of circle will be 6 cm

Side of square 2 = $\sqrt{6^2 / 2^1}$ = 4.142640687
Side of square 1 = 3 cm
Area of circle = $3^2 * 2^2 * M$
Side of square = $\sqrt{3^2 * 2^2 * M}$ = 5.303



The relationship between a square with same area as a circle and the area of an inner square is M or $2R$:

The relationship between the area of an inner square and a square that has the same area as a circle is R:

(Area of inner square) / (area of square = area of circle) / 2 = M

Using the above formulation it is possible to calculate the values of a circle either as the outer circle of a square or as an inner circle of a square.

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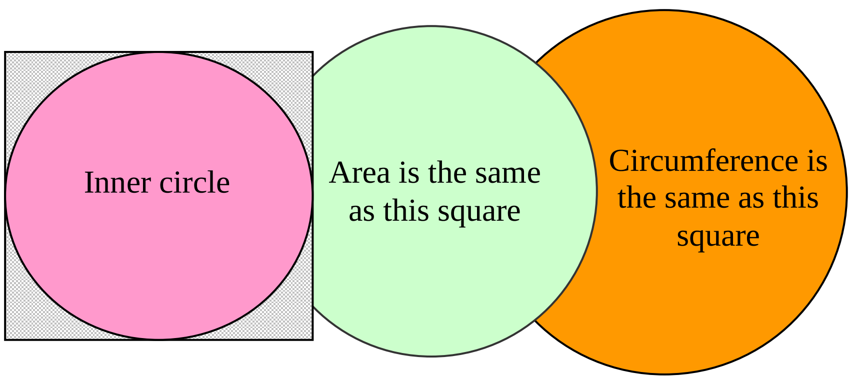
M = 0.78125

A square with a perimeter of 20 u.l. and a side of 5 u.l. and a circle with a circumference of 20 u.l. and a diameter of 6.4 u.l. will have the following values:

M	diameter 6.4	circumference 20
1	6.4*4*1 =	25.6
0.9	6.4*4*0.9 =	23.04
0.8	6.4*4*0.8 =	20.48
3.141… / 4	6.4*4*0.7853981633≈	20.106192…
0.78125	6.4*4**M* =	20
0.78	6.4*4*0.78 =	19.968
0.75	6.4*4*0.75 =	19.2
etc.		

From the above it can be seen that the value of *M* can be obtained from a square and a circle that have the same circumference.

Perimeter of square = Circumference of circle



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Chapter five

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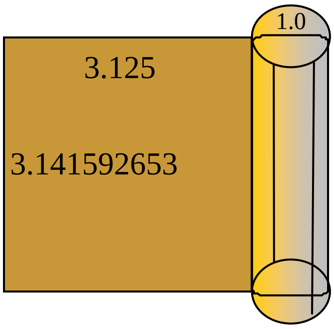
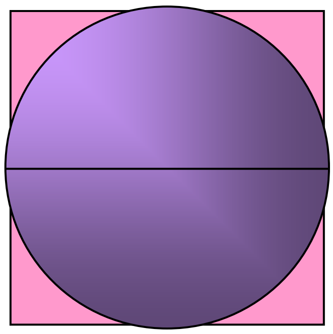
3.141592653…

&

3.141592653… / 4 = 0.7853981633…





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Why is $\pi \approx 3.141592653\ldots$?

If I return to the squares and circles in Chapter 1, 2II and Chapter 5, I divided them into three groups.

Group 1 in which circumference > area & diameter > side

Group 2 in which circumference = area & diameter = side

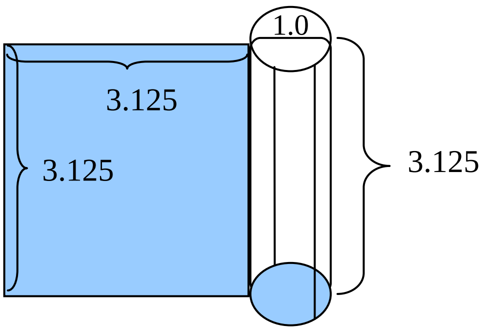
Group 3 in which circumference < area & diameter < side

The circle in group 2 is the inner circle for the square in group 2. In the grading system II it can be seen that the inner circle covers 78.125 % of the area of the square.
It is the only value which gives an absolute correct diameter that equals the side.

If π = 3.141592653 is now used for the calculation of the area of the inner circle and circumference, the circumference will be larger than the area. This can be seen in the grading system II in group one, see below.
When squares with sides of 4 = S and s = 3.928105676 are put into the formulae for the squaring form, values are obtained between 3.125 and 0.78125 then 3.141… and 0.785398…. See next two pages for approximate values.
The squaring formulae

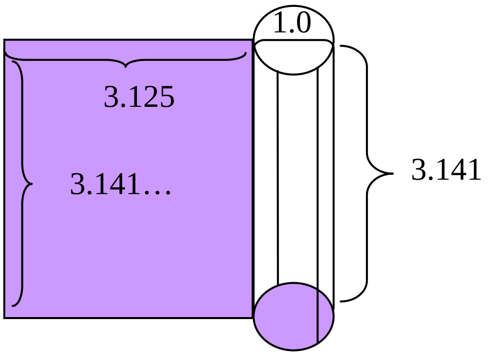
$$(\ln\sqrt{S^2 * 2 / \ln S})^2 * 2 = 4M$$
$$(\ln\sqrt{S^2 * 2 / \ln S})^2 / 2 = M$$

Cylinder group 2 →



$$(\ln\sqrt{s^2 * 2 / \ln s})^2 * 2 = 4Q$$
$$(\ln\sqrt{s^2 * 2 / \ln s})^2 / 2 = Q$$

Cylinder group 3 →



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$$(\ln\sqrt{s^2*2}/\ln s)^2*2=4Q \qquad (\ln\sqrt{S^2*2}/\ln S)^2*2=4M$$
$$(\ln\sqrt{s^2*2}/\ln s)^2/2=Q \qquad (\ln\sqrt{S^2*2}/\ln S)^2/2=M$$

Equal: Equal:

$$(\mathrm{cy}\sqrt{s^2*2}/\mathrm{cy}\, s)^2*2=4Q \qquad (\mathrm{cy}\sqrt{S^2*2}/\mathrm{cy}\, S)^2*2=4M$$
$$(\mathrm{cy}\sqrt{s^2*2}/\ln s)^2/2=Q \qquad (\mathrm{cy}\sqrt{S^2*2}/\mathrm{cy}\, S)^2/2=M$$

No.	See notes after the values:	
1	$(\mathrm{cy}\sqrt{4.2^2*2}/\mathrm{cy}\,4.2)^2*2=3.08264684...$	**Group three**
2	$(\mathrm{cy}\sqrt{4.1^2*2}/\mathrm{cy}\,4.1)^2*2=3.10316298...\prec M$	
3	$(\mathrm{cy}\sqrt{4^2*2}/\mathrm{cy}\,4)^2/2=\underline{0.78125=M}$	**Group two only**
4	$(\mathrm{cy}\sqrt{4^2*2}/\mathrm{cy}\,4)^2*2=\underline{3.125=4M}$	
5	$(\mathrm{cy}\sqrt{3.999^2*2}/\mathrm{cy}\,3.999)^2*2=3.12522549...\succ M$	**Group one**
6	$(\mathrm{cy}\sqrt{3.99^2*2}/\mathrm{cy}\,3.99)^2*2=3.12726152...$	
7	$(\mathrm{cy}\sqrt{3.98^2*2}/\mathrm{cy}\,3.98)^2*2=3.129537778...$	
8	$(\mathrm{cy}\sqrt{3.97^2*2}/\mathrm{cy}\,3.97)^2*2=3.13182891...$	
9	$(\mathrm{cy}\sqrt{3.96^2*2}/\mathrm{cy}\,3.96)^2*2=3.13413507...$	
10	$(\mathrm{cy}\sqrt{3.95^2*2}/\mathrm{cy}\,3.95)^2*2=3.13645642...$	
11	$(\mathrm{cy}\sqrt{3.94^2*2}/\mathrm{cy}\,3.94)^2*2=3.13879312...$	
12	$(\mathrm{cy}\sqrt{3.93^2*2}/\mathrm{cy}\,3.93)^2*2=3.14114533...$	
13	$(\mathrm{cy}\sqrt{3.929^2*2}/\mathrm{cy}\,3.929)^2*2=3.14138141...$	
14	$(\mathrm{cy}\sqrt{3.928105767^2*2}/\mathrm{cy}\,3.928105767)^2/2=\underline{0.7853981633}.$	3.141…
15	$(\mathrm{cy}\sqrt{3.928105767^2*2}/\mathrm{cy}\,3.928105767)^2*2=\underline{3.141592653}$	
16	$(\mathrm{cy}\sqrt{3.928^2*2}/\mathrm{cy}\,3.928)^2*2=3.14161764...$	
17	$(\mathrm{cy}\sqrt{3.927^2*2}/\mathrm{cy}\,3.927)^2*2=3.1418540...$	
18	$(\mathrm{cy}\sqrt{3.926^2*2}/\mathrm{cy}\,3.926)^2*2=3.1420905...$	
19	$(\mathrm{cy}\sqrt{3.925^2*2}/\mathrm{cy}\,3.925)^2*2=3.14232729...$	
20	$(\mathrm{cy}\sqrt{3.92^2*2}/\mathrm{cy}\,3.92)^2*2=3.14351320...$	
21	$(\mathrm{cy}\sqrt{3.91^2*2}/\mathrm{cy}\,3.91)^2*2=3.14589690...$	
22	$(\mathrm{cy}\sqrt{3.9^2*2}/\mathrm{cy}\,3.9)^2*2=3.14829660...$	

$$(\ln\sqrt{s^2*2}/\ln s)^2/2=Q \qquad (\ln\sqrt{s^2*2}/\ln s)^2*2=4Q$$

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Grading system II for circles

Group 3 Circumference < area	0.6618423801…	Area > Circumference diameter < side	2.6473695...
	0.6701721995…		2.680688798...
	0.6805555555…		2.722222222...
	0.6939640386…		2.775856154...
	0.7121333329…		2.954094226...
	0.7385235566…		2.954094226...
Group 2 Circumference = area	0.78125	Area = Circumference diameter = side	3.125
Group 1 Circumference > area	0.7813063735…	Area < Circumference diameter > side	3.125225494…
	0.7813627835…		3.125225113…
	0.7814192333…		3.125676933…
	0.7814757131…		3.125902852…
	0.7841141073…		3.136456429…
	0.7853453525…		3.14138141…
	0.7853981633…		*3.141592653…*
	0.7855818245…		3.142327298…
	0.7858783005…		3.143513202…
	0.7864742261…		3.145896904…
	0.7870741510…		3.148296604…
	0.7933029803…		3.173211921…
	0.8149142636...		3.259657054...
	0.865223920…		3.46089568…
	0.9497664070…		3.79906562…
	1.125		4.5
	1.720059252…		6.88023700…
	2.060493357…		8.24197342…

Note: The grading system can not be changed or ignored.

When a square with a side of 3.928105767 is put into the formula we obtain 0.7853981633… that is one quarter of 3.1415926533…
This square belongs to group 1 from the grading system where the circumference is larger than the area.

Square’s side = 3.928105767

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$$\pi = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 * 2 = 3.141592653$$

$$Q = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.7853981633$$

$$\pi / 4 = Q$$

$$3.141592653 / 4 = 0.7853981633$$

Result

s = 3.928105767

Perimeter > area

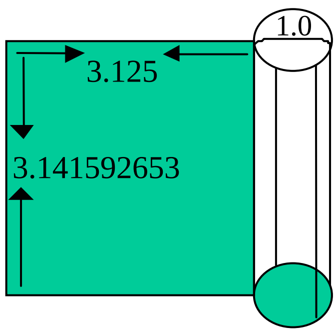
Circumference > area

When the side approaches 4 the difference between the circumference and the area decreases.

When the side is 4 the circumference and the area have the same number.

I now refer to cylinders in chapter. 3
The cylinders are divided into 3 groups.
Group 1 has heights < 3.125.
Group 2 height = 3.125.
Group 3 has heights > 3.125.
The diameter in all groups is constant, 1.0

The cylinder in group 2 where height = width gives a square, while groups 1 and 3 produce horizontal and vertical rectangles respectively.
Accordingly, the cylinder with a height of 3.1415926533… produces a vertical rectangle that has a width of 3.125 and length of 3.1415926533….
This cylinder belongs to group 3.



I showed above, using the squaring formulae, that a square with the side 3.928105767… gives 0.7853981633… that in turn is one quarter of 3.141592653…. This square has a perimeter > the area.

If we draw a circle using 0.7853981633… and place it in a square with a side of 3.928105767 and other squares the circle will be outside the sides of the square

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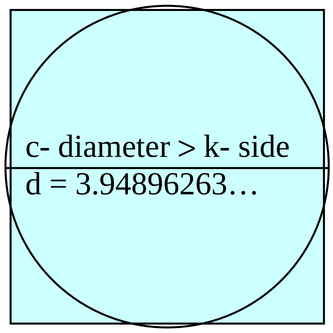
(see diagram below illustrating this). In other words, the diameter of the circle is larger than the side of the square.

Side of square = 3.928105767→
Diameter of circles > 3.928105767→
Diameter of circle is larger than the side of the square
The diameter is 3.94896263…



The cylinder that produces a rectangle with the length 3.141 and width 3.125 cannot have an inner circle.
Note that rectangles cannot have inner circles.
The only cylinder that can have an inner circle is the cylinder in group 2 that produces a square with sides 3.125. Again, if π is used to calculate the inner circle of a square, we will obtain a circle whose diameter is larger than 3.125.
Using 0.78125 however results in a circle with the diameter equal to the side of the square, i.e. 3.125.
From the above statements it can be seen that if 3.14 is used for calculating the inner circle, an exact result is not obtained. But if the value 0.78125 is used for the same calculation, it results in the inner circle diameter being equal to the sides of the square.
See appendix on pages --- and ------- for approximate values.

<u>Formulae</u>

$$(\ln\sqrt{S^2 * 2}\ / \ln S)^2 * 2 = 4M$$
$$(\ln\sqrt{S^2 * 2}\ / \ln S)^2 / 2 = M$$

$$(\ln S / \ln\sqrt{S^2 * 2}\ )^2 * 2 = 2R$$
$$(\ln S / \ln\sqrt{S^2 * 2}\ )^2 = R$$

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Consequences for ***M*** and **π**

Example for squares in group 3

$$(\ln\sqrt{s^2*2}\;/\ln s)^2*2=4Q$$
$$(\ln\sqrt{s^2*2}\;/\ln s)^2/2=Q$$
$$(\ln s/\ln\sqrt{s^2*2}\;)^2*2=2R$$
$$(\ln s/\ln\sqrt{s^2*2}\;)^2/2=R$$

If a square is selected from group 3, with a side of 10, we can imagine that there is a circle with a diameter of 10.
10 is put into the formula above and the value of 0.6618423801… is obtained.
The perimeter of the square is:
s * 4 = 10 * 4 = 40
The circumference of the circle is:
s * 4 * 0.6618423801… = 26.4736951…

If the circumference of the circle is 26.4736951… we can imagine that there is a square with the same perimeter.
The side of the square is = 26.4736951… / 4 = 6.618423801….
The area of the circle will be:
Area = s^2 / *M* → 6.618423801^2… / 0.78125= **56.06852301…**cm^2

If we change *M* to (π / 4) the area will be:
Area *= 6.6184238012… / (3.141592654… / 4) =* ***5<u>5.7</u>7239118…****cm^2*

It can be seen that the result for the area is smaller when (π / 4) is used instead of *M*.

The circle's above have the following diameters:
d = (s * *R*) * 2) = (6.618423801… * 0.64) * 2 = 8.471582465…
see next page.

Area = $(d/2)^2$ * 4M

(8.471582465… /2)^2 * (4 * 0.78125) = **56.06852301…**cm²

Area = $(d/2)^2 * \pi$

$(8.471582465…/2)^2$ * π = ***56.36622720…*** cm²

Here it can be seen that the result for the area calculated with π is larger than that calculated using *M*.

***NB* the area remains the same, irrespective of which formula is used with *M*.**

Example of a square in group 1

A square is selected with a side of 2.75 and a circle with a diameter of 2.75.

When 2.75 is put into $(\ln\sqrt{s^2 * 2} / \ln s)^2 / 2$ the value of 0.9012862092… is obtained.

$$Q = (\ln\sqrt{2.75^2 * 2} / \ln 2.75)^2 / 2 = 0.9012862092$$

$$4Q = (\ln\sqrt{2.75^2 * 2} / \ln 2.75)^2 * 2 = 3.605144837$$

If the side of the square is 2.75, the perimeter will be 11.

The circle with a diameter of 2.75 has a circumference of

2.75 * 4 * 0.9012862092… = 9.914148302…

A square k_2 with the perimeter 9.914148302… has a side of 2.478537075…

s of k_2 = 2.478537075…

The area of the circle will be;

Area = s^2 / M = 7.863226924…

Area = s^2 / (π / 4) = ***7.821696460…***

The area will be smaller when (π / 4) is used for the calculation.

d = 3.172527456…

The diameter of the circle is d = s * 2R = 3.172527456…

Area = $(d / 2)^2$ * 4M = **7.863226924…**

Area = $(d / 2)^2 * \pi$ = ***7.904977900…***

The area will be larger when π is used for the calculation.

Again note that the area remains the same when *M* is used, irrespective of the formula.

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The circumference of the circle has just filled ≈ 78.53981633… % of the perimeter of the square

The circle’s area covers ≈ 78.95683519… % of the square’s area

The diameter is ≈ 100.5309649… % of the square with the side of 3.928105767.

When you use the value 3.1415926533, it will always give you the above proportions.

An inner circles diameter is always equal to the side of the square!

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Conclusion

When π is used for calculating the values of a circle, the results obtained vary. When M is used instead of $\boldsymbol{\pi}$ *the results obtained are identical, irrespective of the formula.*

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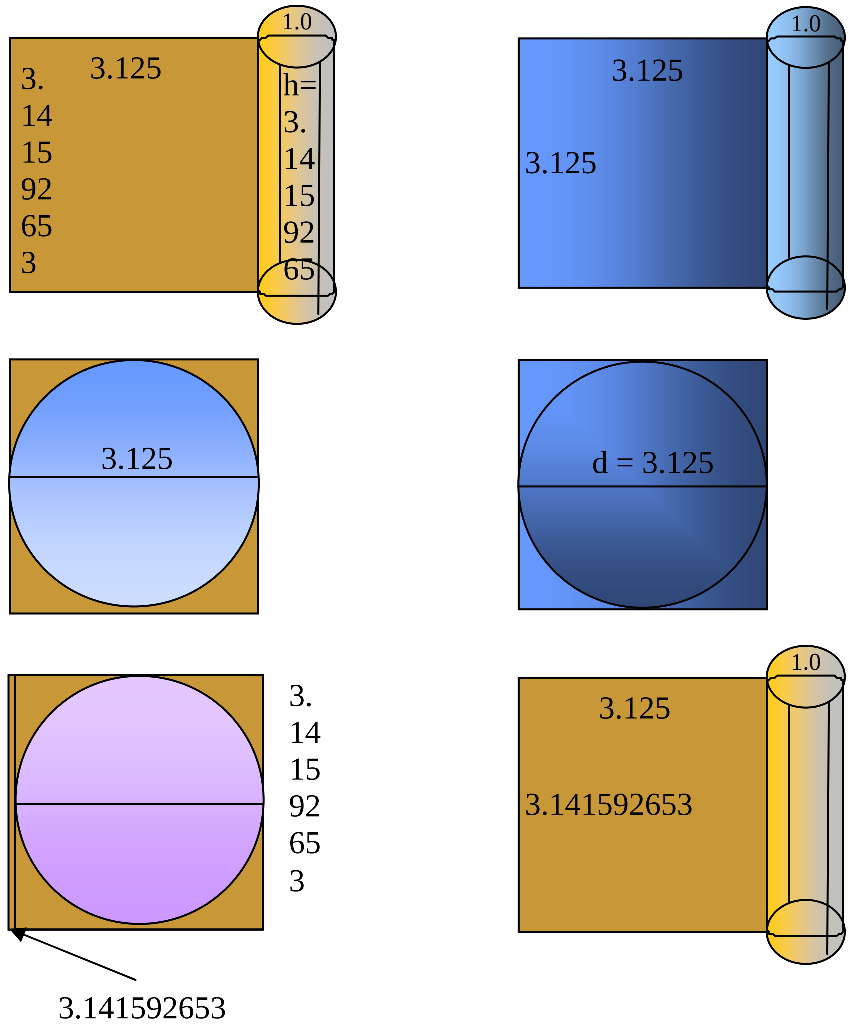
Conclusion:

Correct

Values for a Circle



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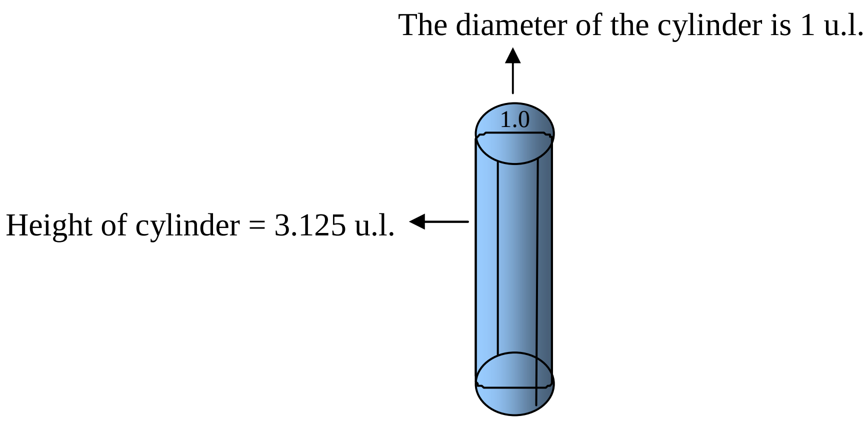
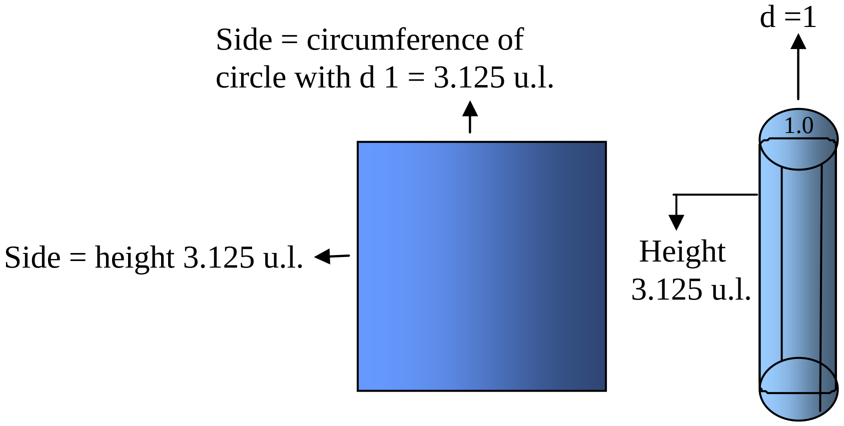
Only cylinder 3.125 and cylinder 3.141

Squares, circles and cylinders were described in Chapters 1, 2, 3.
Squares were divided into three groups, in which group 1 contains squares with a perimeter larger than the area, group 2 where the perimeter = area and group 3 where the area was larger than the perimeter. The square in group 2 had a side of 4 u.l. This was designated the square squaring-form.
Circles were divided into three groups in a similar fashion. The circle in group 2 has a circumference = area. The diameter of this circle is 4u.l. and is designated the circle squaring-form.

Cylinders were divided by their length, the diameters remaining constant. Group 1 showed that cylinders with a height less that than 3.125 u.l. resulted in horizontal rectangles while group 3 comprised rectangles with heights greater than 3.125 u.l., these producing vertical rectangles. Only group 2 resulted in a square with a side of 3.125 u.l. as in the illustration below. This cylinder is designated the cylinder squaring-form.



When the cylinder is opened, it produces a square with sides 3.125 u.l.



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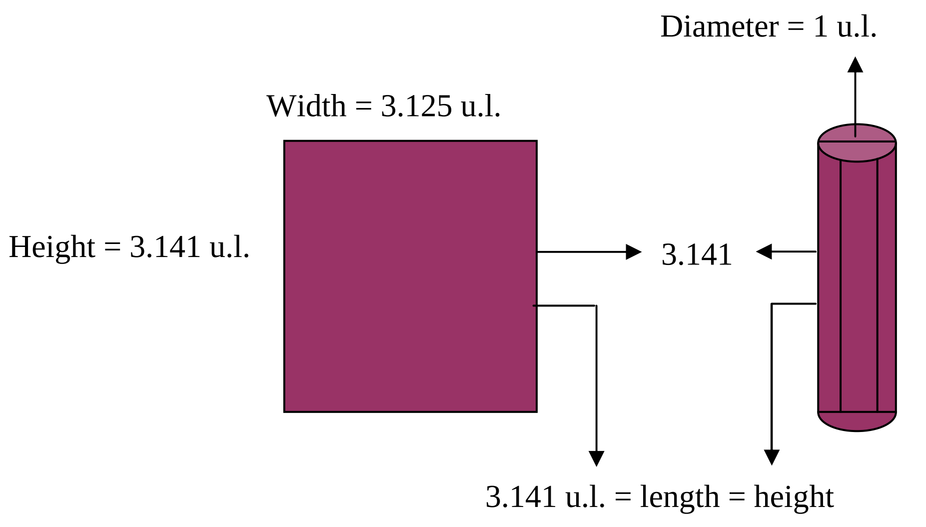
The square, circle and cylinder in group two function as limit values for the calculation of circumference and area.

The relationship between these three may be followed below.

When the perimeter of the square produced from the cylinder is divided by its own area the result is 2R.
The area of the square divided by the perimeter gives the value *M*. In this case the side of the square is 3.125 u.l.
$(3.125 * 4) / 3.125^2 = 2R$
$3.125^2 / (3.125 * 4) = M$
The area of the square divided by the area of the square squaring-form, i.e. S^2, gives:
$3.125^2 / S^2 = 3.125^2 / 4^2 = 0.6103515625 \rightarrow 0.78125^2 \rightarrow M^2$

The perimeter of the square divided by the square squaring-form perimeter, i.e. S * 4, gives:
$(3.125 * 4) / (S * 4) = (3.125 * 4) / (4 * 4) = 0.78125 \rightarrow \sqrt{0.6103515625}$
It transpires that the square with sides 3.125 has a perimeter equal to that of the circle squaring-form.

A cylinder with the height of 3.141 u.l. produces the following rectangle:



It can be seen that the cylinder with a height of 3.141 u.l. produces a vertical rectangle that belongs to the cylinders in group 3.
A square with sides of 3.141 u.l. belongs to the squares in group 1, in which perimeter > area.

π / 4 = 3.141592653 / 4 = *0.7853981633*

We can now see which square gives us this value, referring to grading systems I and II in chapters I, II and the appendix on pages ---, --- - ---. The result is a square with sides of 3.928105767. This square is put into the formula for *M*. The result is 0.7853981633, which is one quarter of π, see next page!
Chapter 6

Document for the number

3.141592653…

&

3.141592653… / 4 = 0.7853981633…

Consequences for M and π

In practice, you make two cylinders. First a cylinder with the height of 3.125 u.l. and second a cylinder with the height of 3.141 u.l.
The diameters are 1 u.l. in both cases. Now roll out each cylinder as pictured below. One can immediately see and recognize which of the cylinders form a square. For better clarification see the pictures below.

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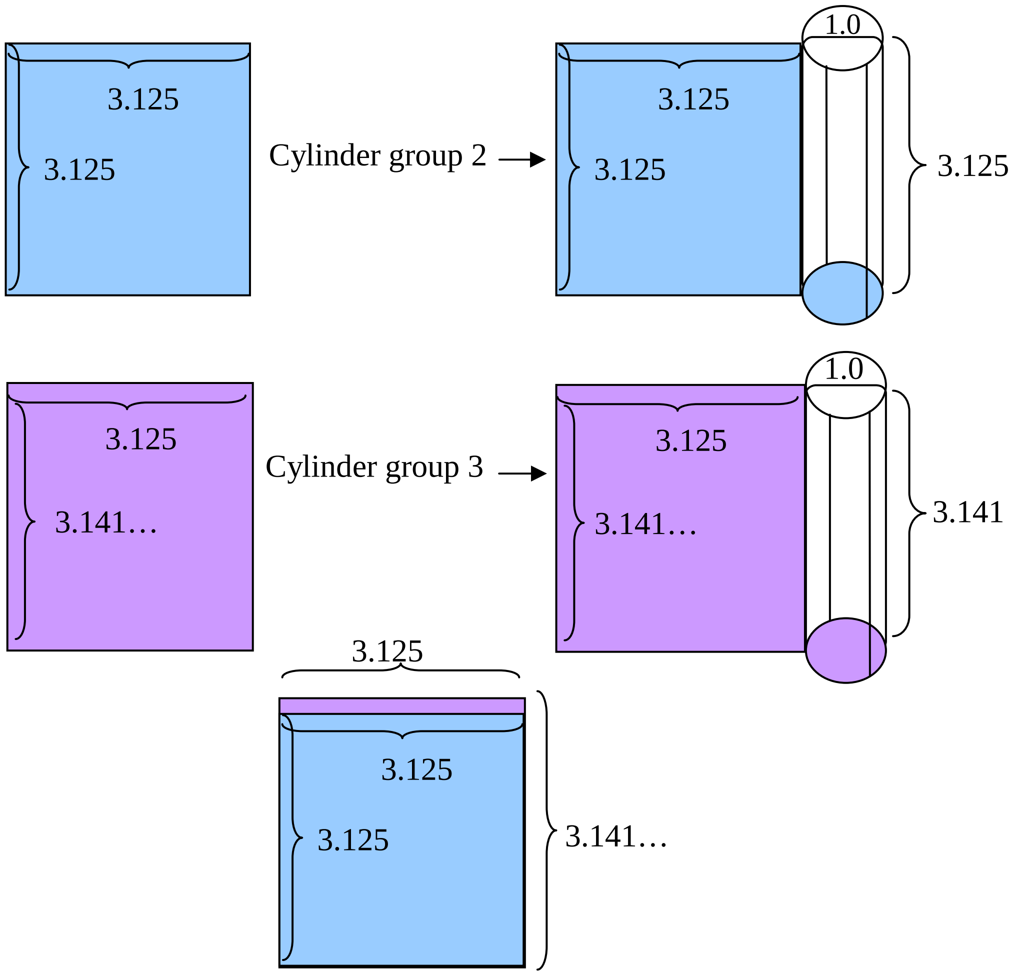

Conclusion:

Correct

Values for a Circle (Pi)

See Index 155-169

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I refer to treatments 1,2,3,4 and 5. The formulae below are designed specially for group two. I will call it “S”. When we use “S” we will always remember the system of squaring form where the circumference is equal to the area.

The correct value and it’s subordinated values

The correct value is 3.125 and its subordinated values are
0.78125, 1.28, 0.64, and 0.21875

In the formulae below compare the gained values with correct values above!
See pages 157-165 and 166-169

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The correct values 3.125, 0.78125, 1.28, 0.64, 0.21875.

No.1/26

In group One. The square with the side 1.4 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 * 2 = 8.24197343... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 / 2 = 2.060493358... > M$ (Correct value 0.78125)

$2r = (\ln 1.4 / (\ln\sqrt{1.4^2 * 2})^2 * 2 = 0.4853206617... < 2R$ (Correct value 1.28)

$r = (\ln 1.4 / (\ln\sqrt{1.4^2 * 2})^2 = 0.2426603309... = r < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 / 2 = -1.060493358... < B$ (Correct value 0.21875)

No. 2/26

In group One. The square with the side 1.5 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 * 2 = 6.8802370... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 / 2 = 1.720059253... > M$ (Correct value 0.78125)

$2r = (\ln 1.5 / (\ln\sqrt{1.5^2 * 2})^2 * 2 = 0.5813753209... < 2R$ (Correct value 1.28)

$r = (\ln 1.5 / (\ln\sqrt{1.5^2 * 2})^2 = 0.2906876605... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 / 2 = -0.7200592526... < B$ (Correct value 0.21875)

No. 3/26

In group One. The square with the side 2 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{2^2 * 2} / \ln 2)^2 * 2 = 4.5 > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{2^2 * 2} / \ln 2)^2 / 2 = 1.125... > M$ (Correct value 0.78125)

$2r = (\ln 2 / (\ln\sqrt{2^2 * 2})^2 * 2 = 0.888888... < 2R$ (Correct value 1.28)

$r = (\ln 2 / (\ln\sqrt{2^2 * 2})^2 = 0.44444... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{2^2 * 2} / \ln 2)^2 / 2 = -0.125... < B$ (Correct value 0.21875)

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No. 4/26

In group One. The square with the side 2.5 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{2.5^2 * 2} / \ln 2.5)^2 * 2 = 3.799065628... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{2.5^2 * 2} / \ln 2.5)^2 / 2 = 0.9497664071... > M$ (Correct value 0.78125)

$2r = (\ln 2.5 / (\ln \sqrt{2.5^2 * 2})^2 * 2 = 1.052890471... < 2R$ (Correct value 1.28)

$r = (\ln 2.5 / (\ln \sqrt{2.5^2 * 2})^2 = 0.5264452357... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{2.5^2 * 2} / \ln 2.5)^2 / 2 = 0.1850857363... < B$ (Correct value 0.21875)

No. 5/26

In group One. The square with the side 3 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3^2 * 2} / \ln 3)^2 * 2 = 3.46089568... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.865223921... > M$ (Correct value 0.78125)

$2r = (\ln 3 / (\ln \sqrt{3^2 * 2})^2 * 2 = 1.155770172... < 2R$ (Correct value 1.28)

$r = (\ln 3 / (\ln \sqrt{3^2 * 2})^2 = 0.577885086... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.134776069... < B$ (Correct value 0.21875)

No. 6/26

In group One. The square with the side 3.5 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.5^2 * 2} / \ln 3.5)^2 * 2 = 3.259657005... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.5^2 * 2} / \ln 3.5)^2 / 2 = 0.8149142637... > M$ (Correct value 0.78125)

$2r = (\ln 3.5 / (\ln \sqrt{3.5^2 * 2})^2 * 2 = 1.227122956... < 2R$ (Correct value 1.28)

$r = (\ln 3.5 / (\ln \sqrt{3.5^2 * 2})^2 = 0.6135614779... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.5^2 * 2} / \ln 3.5)^2 / 2 = 0.1850857363... < B$ (Correct value 0.21875)

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No. 7/26

In group One. The square with the side 3.9 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 * 2 = 3.148296603... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 / 2 = 0.7870741511... > M$ (Correct value 0.78125)

$2r = (\ln 3.9 / (\ln\sqrt{3.9^2 * 2})^2 * 2 = 1.270528321... < 2R$ (Correct value 1.28)

$r = (\ln 3.9 / (\ln\sqrt{3.9^2 * 2})^2 = 0.6352641607... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 / 2 = 0.2129258489... < B$ (Correct value 0.21875)

No. 8/26

In group One. The square with the side 3.92 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.92^2 * 2} / \ln 3.92)^2 * 2 = 3.141381410... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.92^2 * 2} / \ln 3.92)^2 / 2 = 0.7858783005... > M$ (Correct value 0.78125)

$2r = (\ln 3.92 / (\ln\sqrt{3.92^2 * 2})^2 * 2 = 1.272461651... < 2R$ (Correct value 1.28)

$r = (\ln 3.92 / (\ln\sqrt{3.92^2 * 2})^2 = 0.6362308257... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.92^2 * 2} / \ln 3.92)^2 / 2 = 0.2141216995... < B$ (Correct value 0.21875)

No. 9/26

Incorrect value: 3.141592653

The square is in group one & the value is in group three.

The square with the side 3.928105767 u.l. gives the value 3.141592653

3.141592653 $\neq$ (Correct values for a circle)

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 * 2 = 3.141592653... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.785398163... > M$ (Correct value 0.78125)

$2r = (\ln 3.928105767 / (\ln\sqrt{3.928105767^2 * 2})^2 * 2 = 1.273239545... < 2R$ (Correct value 1.28)

$r = (\ln 3.928105767 / (\ln\sqrt{3.928105767^2 * 2})^2 = 0.6366197724... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.2146018367... < B$ (Correct value 0.21875)

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No.10/26

In group One. The square with the side 3.93 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.93^2 * 2} / \ln 3.93)^2 * 2 = 3.141145331... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.93^2 * 2} / \ln 3.93)^2 / 2 = 0.7852863328... > M$ (Correct value 0.78125)

$2r = (\ln 3.93 / (\ln \sqrt{3.93^2 * 2})^2 * 2 = 1.273420863... < 2R$ (Correct value 1.28)

$r = (\ln 3.93 / (\ln \sqrt{3.93^2 * 2})^2 = 0.6367104317... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.93^2 * 2} / \ln 3.93)^2 / 2 = 0.2147136672... < B$ (Correct value 0.21875)

No.11/26

In group One. The square with the side 3.94 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.94^2 * 2} / \ln 3.94)^2 * 2 = 3.138793128... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.94^2 * 2} / \ln 3.94)^2 / 2 = 0.7846982819... > M$ (Correct value 0.78125)

$2r = (\ln 3.94 / (\ln \sqrt{3.94^2 * 2})^2 * 2 = 1.274375162... < 2R$ (Correct value 1.28)

$r = (\ln 3.94 / (\ln \sqrt{3.94^2 * 2})^2 = 0.63717875809... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.94^2 * 2} / \ln 3.94)^2 / 2 = 0.2153017181... < B$ (Correct value 0.21875)

No.12/26

In group One. The square with the side 3.95 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.95^2 * 2} / \ln 3.95)^2 * 2 = 3.136456429... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.95^2 * 2} / \ln 3.95)^2 / 2 = 0.7841141073... > M$ (Correct value 0.78125)

$2r = (\ln 3.95 / (\ln \sqrt{3.95^2 * 2})^2 * 2 = 1.275324587... < 2R$ (Correct value 1.28)

$r = (\ln 3.95 / (\ln \sqrt{3.95^2 * 2})^2 = 0.6376622935... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.95^2 * 2} / \ln 3.95)^2 / 2 = 0.2158858972... < B$ (Correct value 0.21875)

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No.13/26

In group One. The square with the side 3.96 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.96^2 * 2} / \ln 3.96)^2 * 2 = 3.134135076... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.96^2 * 2} / \ln 3.96)^2 / 2 = 0.7835337691... > M$ (Correct value 0.78125)

$2r = (\ln 3.96 / (\ln\sqrt{3.96^2 * 2})^2 * 2 = 1.276269179... < 2R$ (Correct value 1.28)

$r = (\ln 3.96 / (\ln\sqrt{3.96^2 * 2})^2 = 0.6381345894... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.96^2 * 2} / \ln 3.96)^2 / 2 = 0.2164662309... < B$ (Correct value 0.21875)

No.14/26

In group One. The square with the side 3.97 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.97^2 * 2} / \ln 3.97)^2 * 2 = 3.131828911... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.97^2 * 2} / \ln 3.97)^2 / 2 = 0.7829572278... > M$ (Correct value 0.78125)

$2r = (\ln 3.97 / (\ln\sqrt{3.97^2 * 2})^2 * 2 = 1.277208977... < 2R$ (Correct value 1.28)

$r = (\ln 3.97 / (\ln\sqrt{3.97^2 * 2})^2 = 0.6386044885... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.97^2 * 2} / \ln 3.97)^2 / 2 = 0.2170427722... < B$ (Correct value 0.21875)

No.15/26

In group One. The square with the side 3.98 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$4Q = (\ln\sqrt{3.98^2 * 2} / \ln 3.98)^2 * 2 = 3.12953779... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.98^2 * 2} / \ln 3.98)^2 / 2 = 0.7823844446... > M$ (Correct value 0.78125)

$2r = (\ln 3.98 / (\ln\sqrt{3.98^2 * 2})^2 * 2 = 1.278144021... < 2R$ (Correct value 1.28)

$r = (\ln 3.98 / (\ln\sqrt{3.98^2 * 2})^2 = 0.6390720105... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.98^2 * 2} / \ln 3.98)^2 / 2 = 0.2176155554... < B$ (Correct value 0.21875)

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No.16/26

In group One. The square with the side 3.99 u.l.

The gained value and its subordinated values$\neq$(Correct values for a circle)

$4Q = (\ln\sqrt{3.99^2 * 2} / \ln 3.99)^2 * 2 = 3.127261525... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.99^2 * 2} / \ln 3.99)^2 / 2 = 0.7818153813... > M$ (Correct value 0.78125)

$2r = (\ln 3.99 / (\ln\sqrt{3.99^2 * 2}\,)^2 * 2 = 1.279074349... < 2R$ (Correct value 1.28)

$r = (\ln 3.99 / (\ln\sqrt{3.99^2 * 2}\,)^2 = 0.6395371746... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.99^2 * 2} / \ln 3.99)^2 / 2 = 0.2181846187... < B$ (Correct value 0.21875)

No.17/26

In group One. The square with the side 3.999 u.l.

The gained value and its subordinated values$\neq$(Correct values for a circle)

$4Q = (\ln\sqrt{3.999^2 * 2} / \ln 3.999)^2 * 2 = 3.125225493... > 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{3.999^2 * 2} / \ln 3.999)^2 / 2 = 0.7813062735... > M$ (Correct value 0.78125)

$2r = (\ln 3.999 / (\ln\sqrt{3.999^2 * 2}\,)^2 * 2 = 1.2799076... < 2R$ (Correct value 1.28)

$r = (\ln 3.999 / (\ln\sqrt{3.999^2 * 2}\,)^2 = 0.6399538222... < R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{3.999^2 * 2} / \ln 3.999)^2 / 2 = 0.2186936265... < B$ (Correct value 0.21875)

No.18/26

Correct values:

Group Two. There is only one square in group two with the side og 4 u.l.

This square forms the Square squaring form.

The gained value and its subordinated values=The Correct values for a circle.

$4Q = (\ln\sqrt{4^2 * 2} / \ln 4)^2 * 2 = 3.125 = 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.78125 = M$ (Correct value 0.78125)

$2r = (\ln 4 / (\ln\sqrt{4^2 * 2}\,)^2 * 2 = 1.28 = 2R$ (Correct value 1.28)

$r = (\ln 4 / (\ln\sqrt{4^2 * 2}\,)^2 = 0.64 = R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.21875 = B$ (Correct value 0.21875)

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No.19/26

In group Three. The square with the side 4.1 u.l.

The gained value and its subordinated values ≠ (Correct values for a circle)

$4Q = (\ln\sqrt{4.1^2 * 2} / \ln 4.1)^2 * 2 = 3.103162981... = 4Q < 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{4.1^2 * 2} / \ln 4.1)^2 / 2 = 0.7757907452... = Q < M$ (Correct value 0.78125)

$2r = (\ln 4.1 / (\ln\sqrt{4.1^2 * 2})^2 * 2 = 1.289007385... = 2r > 2R$ (Correct value 1.28)

$r = (\ln 4.1 / (\ln\sqrt{4.1^2 * 2})^2 = 0.6445036927... = r > R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{4.1^2 * 2} / \ln 4.1)^2 / 2 = 0.2242092548... = b > B$ (Correct value 0.21875)

No. 20/26

In group Three. The square with the side 4.5 u.l.

The gained value and its subordinated values ≠ (Correct values for a circle)

$4Q = (\ln\sqrt{4.5^2 * 2} / \ln 4.5)^2 * 2 = 3.027880092... = 4Q < 4M$ (Correct value 3.125)

$Q = (\ln\sqrt{4.5^2 * 2} / \ln 4.5)^2 / 2 = 0.756970023... = Q < M$ (Correct value 0.78125)

$2r = (\ln 4.5 / (\ln\sqrt{4.5^2 * 2})^2 * 2 = 1.321056276... = 2r > 2R$ (Correct value 1.28)

$r = (\ln 4.5 / (\ln\sqrt{4.5^2 * 2})^2 = 0.6605281382... = r > R$ (Correct value 0.64)

$b = 1 - (\ln\sqrt{4.5^2 * 2} / \ln 4.5)^2 / 2 = 0.243029977... = b > B$ (Correct value 0.21875)

No. 21/26

In group Three. The square with the side 5 u.l.

The gained value and its subordinated values ≠ (Correct values for a circle)

$(\ln\sqrt{5^2 * 2} / \ln 5)^2 * 2 = 2.95409426... = 4Q < 4M$ (Correct value 3.125)

$(\ln\sqrt{5^2 * 2} / \ln 5)^2 / 2 = 0.73852355662... = Q < M$ (Correct value 0.78125)

$(\ln 5 / (\ln\sqrt{5^2 * 2})^2 * 2 = 1.354052932... = 2r > 2R$ (Correct value 1.28)

$(\ln 5 / (\ln\sqrt{5^2 * 2})^2 = 0.6770264658... = r > R$ (Correct value 0.64)

$1 - (\ln\sqrt{5^2 * 2} / \ln 5)^2 / 2 = 0.2614764338... = b > B$ (Correct value 0.21875)

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No. 22/26

In group Three. The square with the side 6 u.l.

The gained value and its subordinated values ≠ (Correct values for a circle)

$(\ln\sqrt{6^2 * 2} / \ln 6)^2 * 2 = 2.84853316... = 4Q < 4M$ (Correct value 3.125)

$(\ln\sqrt{6^2 * 2} / \ln 6)^2 / 2 = 0.7121333329... = Q < M$ (Correct value 0.78125)

$(\ln 6 / (\ln\sqrt{6^2 * 2})^2 * 2 = 1.404231502... = 2r > 2R$ (Correct value 1.28)

$(\ln 6 / (\ln\sqrt{6^2 * 2})^2 = 0.702115751... = r > R$ (Correct value 0.64)

$1 - (\ln\sqrt{6^2 * 2} / \ln 6)^2 / 2 = 0.2878667096... = b > B$ (Correct value 0.21875)

No. 23/26

In group Three. The square with the side 7 u.l.

The gained value and its subordinated values ≠ (Correct values for a circle)

$(\ln\sqrt{7^2 * 2} / \ln 7)^2 * 2 = 2.77585615... = 4Q < 4M$ (Correct value 3.125)

$(\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.6939640386... = Q < M$ (Correct value 0.78125)

$(\ln 7 / (\ln\sqrt{7^2 * 2})^2 * 2 = 1.440996859... = 2r > 2R$ (Correct value 1.28)

$(\ln 7 / (\ln\sqrt{7^2 * 2})^2 = 0.7204984296... = r > R$ (Correct value 0.64)

$1 - (\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.3060359614... = b > B$ (Correct value 0.21875)

No. 24/26

In group Three. The square with the side 8 u.l.

The gained value and its subordinated values ≠ (Correct values for a circle)

$(\ln\sqrt{8^2 * 2} / \ln 8)^2 * 2 = 2.7222... = 4Q < 4M$ (Correct value 3.125)

$(\ln\sqrt{8^2 * 2} / \ln 8)^2 / 2 = 0.680555... = Q < M$ (Correct value 0.78125)

$(\ln 8 / (\ln\sqrt{8^2 * 2})^2 * 2 = 1.469387755... = 2r > 2R$ (Correct value 1.28)

$(\ln 8 / (\ln\sqrt{8^2 * 2})^2 = 0.7346938776... = r > R$ (Correct value 0.64)

$1 - (\ln\sqrt{8^2 * 2} / \ln 8)^2 / 2 = 0.3194444... = b > B$ (Correct value 0.21875)

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No. 25/26

In group Three. The square with the side 9 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$(\ln\sqrt{9^2 * 2} / \ln 9)^2 * 2 = 2.68068879... = 4Q < 4M$ (Correct value 3.125)

$(\ln\sqrt{9^2 * 2} / \ln 9)^2 / 2 = 0.6701721995... = Q < M$ (Correct value 0.78125)

$(\ln 9 / (\ln \sqrt{9^2 * 2})^2 * 2 = 1.492153809... = 2r > 2R$ (Correct value 1.28)

$(\ln 9 / (\ln \sqrt{9^2 * 2})^2 = 0.7460769044... = r > R$ (Correct value 0.64)

$1 - (\ln\sqrt{9^2 * 2} / \ln 9)^2 / 2 = 0.3298278005... = b > B$ (Correct value 0.21875)

No. 26/26

In group Three. The square with the side 10 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$(\ln\sqrt{10^2 * 2} / \ln 10)^2 * 2 = 2.6473695... = 4Q < 4M$ (Correct value 3.125)

$(\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.6618423801... = Q < M$ (Correct value 0.78125)

$(\ln 10 / (\ln \sqrt{10^2 * 2})^2 * 2 = 1.510933766... = 2r > 2R$ (Correct value 1.28)

$(\ln 10 / (\ln \sqrt{10^2 * 2})^2 = 0.7554668831... = r > R$ (Correct value 0.64)

$1 - (\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.3381576199... = b > B$ (Correct value 0.218725)

No. 26/26

In group Three. The square with the side 10 u.l.

The gained value and its subordinated values $\neq$ (Correct values for a circle)

$(\ln\sqrt{1000^2 * 2} / \ln 1000)^2 * 2 = 2.20572105... = 4Q < 4M$ (Correct value 3.125)

$(\ln\sqrt{1000^2 * 2} / \ln 1000)^2 / 2 = 0.55143026... = Q < M$ (Correct value 0.78125)

$(\ln 1000 / (\ln \sqrt{1000^2 * 2})^2 * 2 = 1.81346593... = 2r > 2R$ (Correct value 1.28)

$(\ln 1000 / (\ln \sqrt{1000^2 * 2})^2 = 0.906732968... = r > R$ (Correct value 0.64)

$1 - (\ln\sqrt{1000^2 * 2} / \ln 1000)^2 / 2 = 0.44856973... = b > B$ (Correct value 0.218725)

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No.	$M=(\ln\sqrt{(e^{\ln S})^2*2}/\ln e^{\ln S})^2*2.$ Relationship between diameter, circumference & area
1	$(\ln\sqrt{10^2*2}/\ln 10)^2*2=2.6473695...=4Q<4M$
2	$(\ln\sqrt{9^2*2}/\ln 9)^2*2=2.68068879...=4Q<4M$
3	$(\ln\sqrt{8^2*2}/\ln 8)^2*2=2.7222...=4Q<4M$
4	$(\ln\sqrt{7^2*2}/\ln 7)^2*2=2.77585615...=4Q<4M$
5	$(\ln\sqrt{6^2*2}/\ln 6)^2*2=2.84853316...=4Q<4M$
6	$(\ln\sqrt{5^2*2}/\ln 5)^2*2=2.95409426...=4Q<4M$
7	$(\ln\sqrt{4.5^2*2}/\ln 4.5)^2*2=3.027880092...=4Q<4M$
8	$(\ln\sqrt{4.1^2*2}/\ln 4.1)^2*2=3.103162981...=4Q<4M$
9	$(\ln\sqrt{4^2*2}/\ln 4)^2*2=3.125=4M$
10	$(\ln\sqrt{3.999^2*2}/\ln 3.999)^2*2=3.125225493...=4Q>4M$
11	$(\ln\sqrt{3.99^2*2}/\ln 3.99)^2*2=3.127261525...=4Q>4M$
12	$(\ln\sqrt{3.98^2*2}/\ln 3.98)^2*2=3.129537779...=4Q>4M$
13	$(\ln\sqrt{3.97^2*2}/\ln 3.97)^2*2=3.131828911...=4Q>4M$
14	$(\ln\sqrt{3.96^2*2}/\ln 3.96)^2*2=3.134135076...=4Q>4M$
15	$(\ln\sqrt{3.95^2*2}/\ln 3.95)^2*2=3.136456429...=4Q>4M$
16	$(\ln\sqrt{3.94^2*2}/\ln 3.94)^2*2=3.138793128...=4Q>4M$
17	$(\ln\sqrt{3.93^2*2}/\ln 3.93)^2*2=3.141145331...=4Q>4M$
18	$(\ln\sqrt{3.929^2*2}/\ln 3.929)^2*2=3.141381410...=4Q>4M$
19	$(\ln\sqrt{3.928105767^2*2}/\ln 3.928105767)^2*2=3.141592653...=(\pi)=4Q>4M$
20	$(\ln\sqrt{3.92^2*2}/\ln 3.92)^2*2=3.143513202...=4Q>4M$
21	$(\ln\sqrt{3.9^2*2}/\ln 3.9)^2*2=3.1482966603...=4Q>4M$
22	$(\ln\sqrt{3.5^2*2}/\ln 3.5)^2*2=3.259657005...=4Q>4M$
23	$(\ln\sqrt{3^2*2}/\ln 3)^2*2=3.46089568...=4Q>4M$
24	$(\ln\sqrt{2.5^2*2}/\ln 2.5)^2*2=3.799065628...=4Q>4M$
25	$(\ln\sqrt{2^2*2}/\ln 2)^2*2=4.5=4Q>4M$
26	$(\ln\sqrt{1.5^2*2}/\ln 1.5)^2*2=6.8802370...=4Q>4M$
27	$(\ln\sqrt{1.4^2*2}/\ln 1.4)^2*2=8.24197343...=4Q>4M$

Relevant formulae

Group three

Group two only

Group one

No.	$M = (\ln\sqrt{(e^{\ln S})^2 * 2} / \ln e^{\ln S})^2 / 2.$ Percentage relationship between square & circle
1	$(\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.6618423801...Q < M$
2	$(\ln\sqrt{9^2 * 2} / \ln 9)^2 / 2 = 0.6701721995...Q < M$
3	$(\ln\sqrt{8^2 * 2} / \ln 8)^2 / 2 = 0.6805555556...Q < M$
4	$(\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.6939640386...Q < M$
5	$(\ln\sqrt{6^2 * 2} / \ln 6)^2 / 2 = 0.712133332904...Q < M$
6	$(\ln\sqrt{5^2 * 2} / \ln 5)^2 / 2 = 0.73852355662..Q < M$
7	$(\ln\sqrt{4.5^2 * 2} / \ln 4.5)^2 / 2 = 0.756970023...Q < M$
8	$(\ln\sqrt{4.1^2 * 2} / \ln 4.1)^2 / 2 = 0.7757907452...Q < M$
9	$(\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.78125 = M$
10	$(\ln\sqrt{3.999^2 * 2} / \ln 3.999)^2 / 2 = 0.7813062735...Q > M$
11	$(\ln\sqrt{3.99^2 * 2} / \ln 3.99)^2 / 2 = 0.7818153813...Q > M$
12	$(\ln\sqrt{3.98^2 * 2} / \ln 3.98)^2 / 2 = 0.7823844446...Q > M$
13	$(\ln\sqrt{3.97^2 * 2} / \ln 3.97)^2 / 2 = 0.7829572278...Q > M$
14	$(\ln\sqrt{3.96^2 * 2} / \ln 3.96)^2 / 2 = 0.7835337691...Q > M$
15	$(\ln\sqrt{3.95^2 * 2} / \ln 3.95)^2 / 2 = 0.7841141073...Q > M$
16	$(\ln\sqrt{3.94^2 * 2} / \ln 3.94)^2 / 2 = 0.7846982819...Q > M$
17	$(\ln\sqrt{3.93^2 * 2} / \ln 3.93)^2 / 2 = 0.7852863328...Q > M$
18	$(\ln\sqrt{3.929^2 * 2} / \ln 3.929)^2 / 2 = 0.7853453526...Q > M$
19	$(\ln\sqrt{3.928105767^2 * 2} / \ln 3.928105767)^2 / 2 = 0.785398163... = (\pi / 4) = Q > M$
20	$(\ln\sqrt{3.92^2 * 2} / \ln 3.92)^2 / 2 = 0.7858783005...Q > M$
21	$(\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 / 2 = 0.7870741511...Q > M$
22	$(\ln\sqrt{3.5^2 * 2} / \ln 3.5)^2 / 2 = 0.8149142637...Q > M$
23	$(\ln\sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.865223921...Q > M$
24	$(\ln\sqrt{2.5^2 * 2} / \ln 2.5)^2 / 2 = 0.9497664071...Q > M$
25	$(\ln\sqrt{2^2 * 2} / \ln 2)^2 / 2 = 1.125Q > M$
26	$(\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 / 2 = 1.720059253...Q > M$
27	$(\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 / 2 = 2.060493358...Q > M$

Percentage formulae
Subordinate value one

Group three

Group two only

Group one

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$$M = (\ln e^{\ln S} / \ln\sqrt{(e^{\ln S})^2 * 2})^2 * 2.$$

Relationship between diameter, circumference and area

Inclusive formulae
Subordinate value two

Group three

Group two only

Group one

No.	
1	$(\ln 10 / \ln\sqrt{10^2 * 2})^2 * 2 = 1.510933766... = 2r > 2R$
2	$(\ln 9 / \ln\sqrt{9^2 * 2})^2 * 2 = 1.492153809... = 2r > 2R$
3	$(\ln 8 / \ln\sqrt{8^2 * 2})^2 * 2 = 1.469387755... = 2r > 2R$
4	$(\ln 7 / \ln\sqrt{7^2 * 2})^2 * 2 = 1.440996859... = 2r > 2R$
5	$(\ln 6 / \ln\sqrt{6^2 * 2})^2 * 2 = 1.404231502... = 2r > 2R$
6	$(\ln 5 / \ln\sqrt{5^2 * 2})^2 * 2 = 1.354052932... = 2r > 2R$
7	$(\ln 4.5 / \ln\sqrt{4.5^2 * 2})^2 * 2 = 1.321056276... = 2r > 2R$
8	$(\ln 4.1 / \ln\sqrt{4.1^2 * 2})^2 * 2 = 1.289007385... = 2r > 2R$
9	$(\ln 4 / \ln\sqrt{4^2 * 2})^2 * 2 = 1.28 = 2R$
10	$(\ln 3.999 / \ln\sqrt{3.999^2 * 2})^2 * 2 = 1.2799076... = 2r < 2R$
11	$(\ln 3.99 / \ln\sqrt{3.99^2 * 2})^2 * 2 = 1.279074349... = 2r < 2R$
12	$(\ln 3.98 / \ln\sqrt{3.98^2 * 2})^2 * 2 = 1.278144021... = 2r < 2R$
13	$(\ln 3.97 / \ln\sqrt{3.97^2 * 2})^2 * 2 = 1.277208977... = 2r < 2R$
14	$(\ln 3.96 / \ln\sqrt{3.96^2 * 2})^2 * 2 = 1.276269179... = 2r < 2R$
15	$(\ln 3.95 / \ln\sqrt{3.95^2 * 2})^2 * 2 = 1.275324587... = 2r < 2R$
16	$(\ln 3.94 / \ln\sqrt{3.94^2 * 2})^2 * 2 = 1.274375162... = 2r < 2R$
17	$(\ln 3.93 / \ln\sqrt{3.93^2 * 2})^2 * 2 = 1.273420863... = 2r < 2R$
18	$(\ln 3.929 / \ln\sqrt{3.929^2 * 2})^2 * 2 = 1.273325164... = 2r < 2R$
19	$(\ln 3.928105767 / \ln\sqrt{3.928105767^2 * 2})^2 * 2 = 1.273239545...(2r \text{ of } \pi) < 2R$
20	$(\ln 3.92 / \ln\sqrt{3.92^2 * 2})^2 * 2 = 1.272461651... = 2r < 2R$
21	$(\ln 3.9 / \ln\sqrt{3.9^2 * 2})^2 * 2 = 1.270528321... = 2r < 2R$
22	$(\ln 3.5 / \ln\sqrt{3.5^2 * 2})^2 * 2 = 1.227122956... = 2r < 2R$
23	$(\ln 3 / \ln\sqrt{3^2 * 2})^2 * 2 = 1.155770172... = 2r < 2R$
24	$(\ln 2.5 / \ln\sqrt{2.5^2 * 2})^2 * 2 = 1.052890471... = 2r < 2R$
25	$(\ln 2 / \ln\sqrt{2^2 * 2})^2 * 2 = 0.88888888888... = 2r < 2R$
26	$(\ln 1.5 / \ln\sqrt{1.5^2 * 2})^2 * 2 = 0.5813753209... = 2r < 2R$
27	$(\ln 1.4 / \ln\sqrt{1.4^2 * 2})^2 * 2 = 0.4853206617... = 2r < 2R$

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No.	$R = (\ln e^{\ln S} / \ln\sqrt{(e^{\ln S})^2 * 2})^2$ Relationship between radius and side
1	$(\ln 10 / \ln\sqrt{10^2 * 2}\ )^2 = 0.7554668831... = r > R$
2	$(\ln 9 / \ln\sqrt{9^2 * 2}\ )^2 = 0.7460769044... = r > R$
3	$(\ln 8 / \ln\sqrt{8^2 * 2}\ )^2 = 0.7346938776... = r > R$
4	$(\ln 7 / \ln\sqrt{7^2 * 2}\ )^2 = 0.7204984296... = r > R$
5	$(\ln 6 / \ln\sqrt{6^2 * 2}\ )^2 = 0.702115751... = r > R$
6	$(\ln 5 / \ln\sqrt{5^2 * 2}\ )^2 = 0.6770264658... = r > R$
7	$(\ln 4.5 / \ln\sqrt{4.5^2 * 2}\ )^2 = 0.6605281382... = r > R$
8	$(\ln 4.1 / \ln\sqrt{4.1^2 * 2}\ )^2 = 0.6445036927... = r > R$
9	$(\ln 4 / \ln\sqrt{4^2 * 2}\ )^2 = 0.64 = R$
10	$(\ln 3.999 / \ln\sqrt{3.999^2 * 2}\ )^2 = 0.6399538222... = r < R$
11	$(\ln 3.99 / \ln\sqrt{3.99^2 * 2}\ )^2 = 0.6395371746... = r < R$
12	$(\ln 3.98 / \ln\sqrt{3.98^2 * 2}\ )^2 = 0.6390720105... = r < R$
13	$(\ln 3.97 / \ln\sqrt{3.97^2 * 2}\ )^2 = 0.6386044885... = r < R$
14	$(\ln 3.96 / \ln\sqrt{3.96^2 * 2}\ )^2 = 0.6381345894... = r < R$
15	$(\ln 3.95 / \ln\sqrt{3.95^2 * 2}\ )^2 = 0.6376622935... = r < R$
16	$(\ln 3.94 / \ln\sqrt{3.94^2 * 2}\ )^2 = 0.6371875809... = r < R$
17	$(\ln 3.93 / \ln\sqrt{3.93^2 * 2}\ )^2 = 0.6367104317... = r < R$
18	$(\ln 3.929 / \ln\sqrt{3.929^2 * 2}\ )^2 = 0.636662582... = r < R$
19	$(\ln 3.928105767 / \ln\sqrt{3.928105767^2 * 2}\ )^2 = 0.636619772 4...(r \text{ of } \pi) < R$
20	$(\ln 3.92 / \ln\sqrt{3.92^2 * 2}\ )^2 = 0.6362308257... = r < R$
21	$(\ln 3.9 / \ln\sqrt{3.9^2 * 2}\ )^2 = 0.6352641607... = r < R$
22	$(\ln 3.5 / \ln\sqrt{3.5^2 * 2}\ )^2 = 0.6135614779... = r < R$
23	$(\ln 3 / \ln\sqrt{3^2 * 2}\ )^2 = 0.577885086... = r < R$
24	$(\ln 2.5 / \ln\sqrt{2.5^2 * 2}\ )^2 = 0.5264452357... = r < R$
25	$(\ln 2 / \ln\sqrt{2^2 * 2}\ )^2 = 0.4444444444... = r < R$
26	$(\ln 1.5 / \ln\sqrt{1.5^2 * 2}\ )^2 = 0.2906876605... = r < R$
27	$(\ln 1.4 / \ln\sqrt{1.4^2 * 2}\ )^2 = 0.2526603309... = r < R$

Executive formulae
Subordinate value three

Group three

Group two only

Group one

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No.	$M = (\ln\sqrt{(e^{\ln S})^2} * 2 / \ln e^{\ln S})^2 / 2$ Value for shaded area and shaded circumference
1	$1-(\ln\sqrt{10^2 * 2} / \ln 10)^2 / 2 = 0.3381576199...$ b of $10 > B$ of 4
2	$1-(\ln\sqrt{9^2 * 2} / \ln 9)^2 / 2 = 0.3298278005...$ b of $9 > B$
3	$1-(\ln\sqrt{8^2 * 2} / \ln 8)^2 / 2 = 0.3194444444...$ b of $8 > B$
4	$1-(\ln\sqrt{7^2 * 2} / \ln 7)^2 / 2 = 0.3060359614...$ b of $7 > B$
5	$1-(\ln\sqrt{6^2 * 2} / \ln 6)^2 / 2 = 0.2878667096...$ b of $6 > B$
6	$1-(\ln\sqrt{5^2 * 2} / \ln 5)^2 / 2 = 0.2614764338...$ b of $5 > B$
7	$1-(\ln\sqrt{4.5^2 * 2} / \ln 4.5)^2 / 2 = 0.243029977...$ b of $4.5 > B$
8	$1-(\ln\sqrt{4.1^2 * 2} / \ln 4.1)^2 / 2 = 0.2242092548...$ b of $4.1 > B$
9	$1-(\ln\sqrt{4^2 * 2} / \ln 4)^2 / 2 = 0.21875 = \boxed{B}$ B of 4
10	$1-(\ln\sqrt{3.999^2 * 2} / \ln 3.999)^2 / 2 = 0.2186936265...$ b of $3.999 < B$ of 4
11	$1-(\ln\sqrt{3.99^2 * 2} / \ln 3.99)^2 / 2 = 0.2181846187...$ b of $3.99 < B$
12	$1-(\ln\sqrt{3.98^2 * 2} / \ln 3.98)^2 / 2 = 0.2176155554...$ b of $3.98 < B$
13	$1-(\ln\sqrt{3.97^2 * 2} / \ln 3.97)^2 / 2 = 0.2170427722...$ b of $3.97 < B$
14	$1-(\ln\sqrt{3.96^2 * 2} / \ln 3.96)^2 / 2 = 0.2164662309...$ b of $3.96 < B$
15	$1-(\ln\sqrt{3.95^2 * 2} / \ln 3.95)^2 / 2 = 0.2158858927...$ b of $3.95 < B$
16	$1-(\ln\sqrt{3.94^2 * 2} / \ln 3.94)^2 / 2 = 0.2153017181...$ b of $3.94 < B$
17	$1-(\ln\sqrt{3.93^2 * 2} / \ln 3.93)^2 / 2 = 0.2147136672...$ b of $3.93 < B$
18	$1-(\ln\sqrt{3.929^2 * 2} / \ln 3.929)^2 / 2 = 0.2146546474...$ b of $3.929 < B$
19	$1-(\ln\sqrt{3.928...^2 * 2} / \ln 3.928...)^2 / 2 = 0.2146018367$ b of 3.928105767 of $\pi < B$
20	$1-(\ln\sqrt{3.92^2 * 2} / \ln 3.92)^2 / 2 = 0.2141216995...$ b of $3.92 < B$
21	$1-(\ln\sqrt{3.9^2 * 2} / \ln 3.9)^2 / 2 = 0.2129258489...$ b of $3.9 < B$
22	$1-(\ln\sqrt{3.5^2 * 2} / \ln 3.5)^2 / 2 = 0.1850857363...$ b of $3.5 < B$
23	$1-(\ln\sqrt{3^2 * 2} / \ln 3)^2 / 2 = 0.134776079...$ b of $3 < B$
24	$1-(\ln\sqrt{2.5^2 * 2} / \ln 2.5)^2 / 2 = 0.1850857363...$ b of $2.5 < B$
25	$1-(\ln\sqrt{2^2 * 2} / \ln 2)^2 / 2 = -0.125$ b of $2 < B$
26	$1-(\ln\sqrt{1.5^2 * 2} / \ln 1.5)^2 / 2 = -0.7200592526...$ b of $1.5 < B$
27	$1-(\ln\sqrt{1.4^2 * 2} / \ln 1.4)^2 / 2 = -1.060493358$ b of $1.4 < B$

Shadow formulae
Subordinate value four

Group three

Group two only

Group one