Mathematics of the Golden Pyramid

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CIP- gegevens Koninklijke Bibliotheek, Den Haag

ISBN: 978-90-9035269-5

NUR: 921

Trefwoord: fundamentele wiskunde

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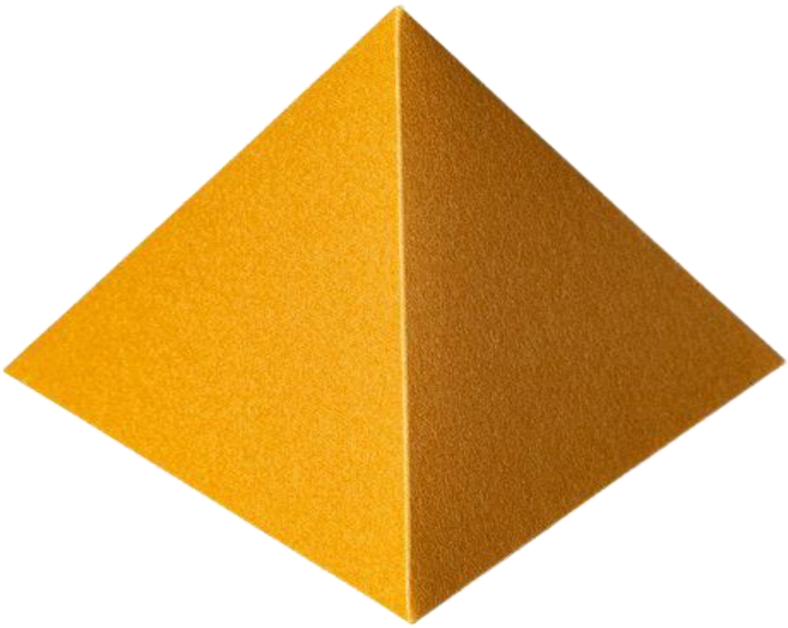
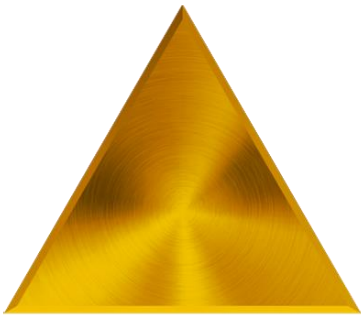
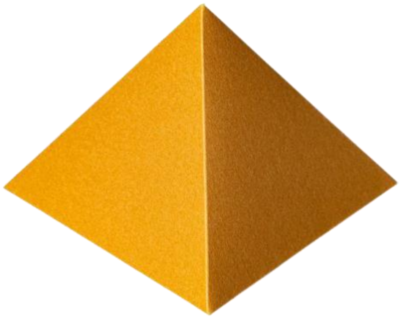


Wim van Es

Preface

Mathematics of the Golden Pyramid is a summary of previous publications supplemented with new calculations. It describes the unique mathematical value of the equilateral triangle.





In 2020 the writer Wim van Es (Dutch self-taught mathematician) started writing down his mathematical discoveries. First in small publications, after which this small complete work was created.

Everything described in this booklet is hitherto unknown in mathematics.

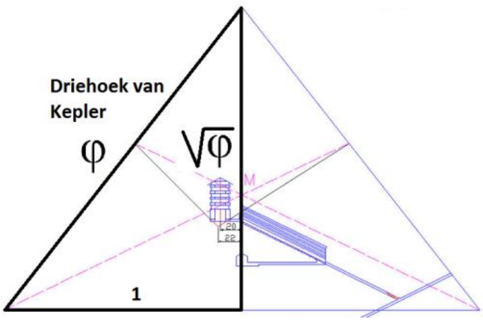
It describes some new ways to calculate a circumference, where the number pi comes from, where the origin of the Pythagorean theorem comes from and how to calculate it as a variant with negative numbers, how to calculate a missing side of any triangle (no right triangle), how the complete trigonometry can be calculated differently without sine, cosine and tangent, what is the mathematical value of two pyramids on Earth, how a new triangle in the ratio √1-√2-√ 3 is being designed, and how to use numbers to understand 'creation'.

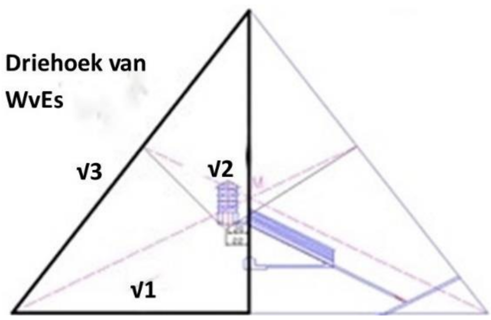
Everyone is free to use and learn the knowledge, provided the source (WvEs) is mentioned.

Wim van Es

Introduction

If you claim that everything in this booklet is new and unknown in mathematics, then you must be sure of what you are claiming. I have often wanted to compare my calculations with the current knowledge of fundamental mathematics. This testing framework could not be found. What I could find was Kepler's triangle.





Kepler triangle ***My own triangle***

You may wonder where the difference lies. You then come to the conclusion that the dimensions of the Pyramid on which these triangles are based are not proportional to each other. It is stated that the pyramid of Cheops is almost a triangle of Kepler. How do I get my triangle and what is the link to the Pyramid of Cheops.

It is stated that the pyramid of Cheops has a base of 230 x 230 meters. Its height was originally 146.59 meters and is today 138.75 meters high. If you look at the Pyramid, you will notice that it is composed of 4 triangles and a square base.

If we project the dimensions stated, it is noticeable that the sides of the triangles are as follows (rounded off): 230 m x 219 m x 219 m. See figure 1. What also seems logical to me, is that there is always a construction plan, precedes construction.

An architectural building plan.

I am now going to put myself in the shoes of an architect who wants to design a geometric showpiece. Is this architect now going to build a pyramid with sides of 230 m x 219 m x 219 m?

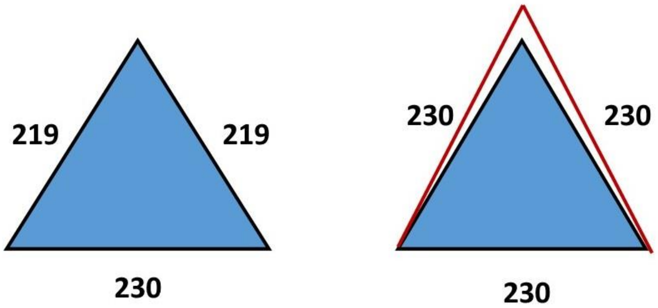
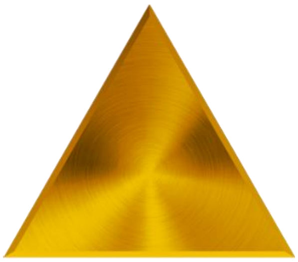


Figure 1

Or is he going to build a Pyramid with sides of 230 m x 230 m x 230 m? The latter seems plausible to me. I have always taken the architectural building plan as a starting point for myself when I was going to build a house. The fact that this house of immense dimensions is not built perfectly according to the building plan or has fallen into disrepair over the centuries due to crumbling and subsidence does not mean that the building plan was not right.

I can't imagine an architect making a building plan where the sides of the triangles are 230 x 219 x 219. Then the building would not be able to acquire the meaning that I give it with the dimensions 230 x 230 x 230.



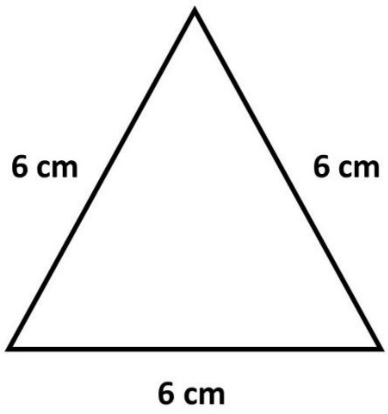
The equilateral triangle

It is this equilateral triangle that everything in this booklet is based on.

If you assume that the Pyramid of Cheops is built according to the architectural plan of the equilateral triangle with a base of 230 x 230, then the height of the pyramid is 162.63 meters.

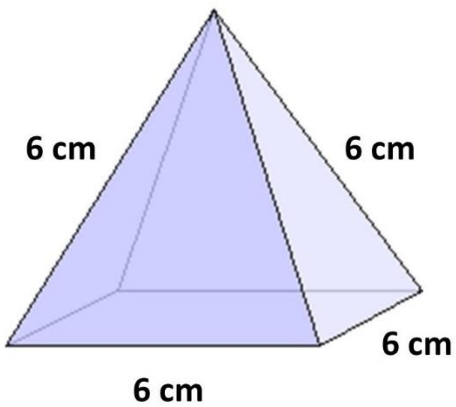
If you are now going to make mathematical calculations with the equilateral triangle, you have to reduce it to a workable model. This workable model (chosen by me) is the basis on which I turn the entire trigonometric knowledge of today into calculation.

The workable model I have chosen is an equilateral triangle of 6 cm x 6 cm x 6 cm.



And this works wonders, you could say symbolically.

Equal to this workable equilateral triangle measuring 6 cm x 6 cm x 6 cm is the workable pyramid measuring 6 cm x 6 cm x 6 cm.



The 6 cm equals 60 mm, which in turn equals 60 degrees.

Chapter 1

The Great Pyramid

What can we bring back in this modern age in relation to the Great Pyramid? To do that, you need to understand the core of the Pyramid Building.

If you look closely, the Great Pyramid is made up of 4 sides (4 equilateral triangles with angles of 60°) and a square base.

We are now going to bring the pyramid back to a workable level of 6 cm (60 mm – 60 degrees) and dissect it.

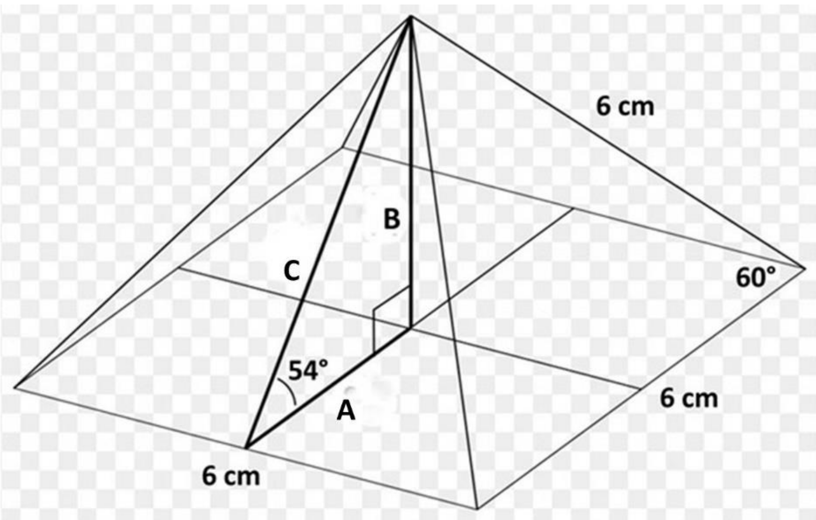


Figure 2

If we simplify it to 6 cm, you get figure 2. A base with 4 sides of 6 cm (60 mm) and 4 equilateral triangles with 3 sides of 6 cm (60 mm) and 3 angles of 60°.

If we now divide it into pieces, you will see the following: figure 3.

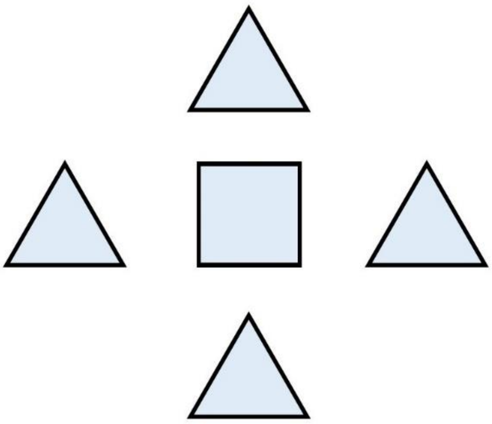


Figure 3

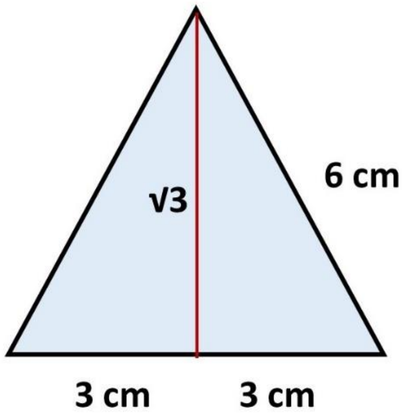


Figure 4

Figure 4 shows the equilateral triangle. If we divide this triangle in two, you get a right-angled triangle with the dimensions 6 cm x 3 cm x (√3 x 3 cm) 5.19 cm.

Now, if we put the points of the four triangles together, you get the Pyramid. What are the dimensions of the converging straight lines? These are the lines √3, in this case 5.19 cm, see figure 5.

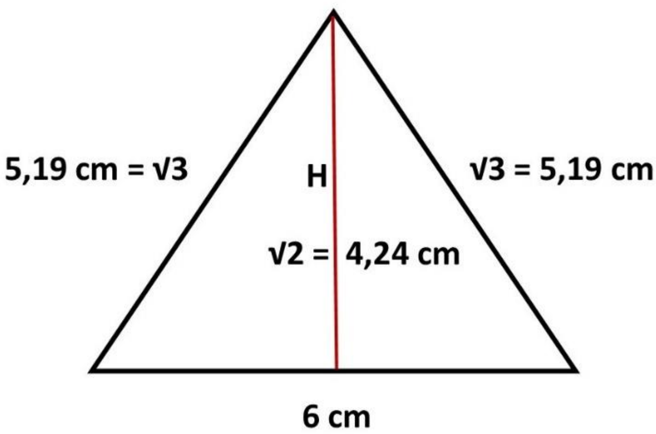


Figure 5

The height can then be quickly measured and calculated: this is 4.24 cm = $3\sqrt{2}$.

The Pyramid is largely built in the ratio $\sqrt{2}$: $\sqrt{3}$.

It is then important to investigate how $\sqrt{2}$ and $\sqrt{3}$ are formed.

How is the square root $\sqrt{2}$ constructed?

The square root $\sqrt{2}$ is equal to $\sqrt{}$ $(1 + 1)^2 / (1 + 1)$.

This amounts to $2^2 = 4 / 2 = 2$. The square root of $2 = \sqrt{2} = 1.414$

If we project this in a triangle of 90°, 45° and 45°, you can say:

C (hypotenuse) is the square root of $(A + B)^2 / (A + B)$.

<u>This comes with a warning.</u>

The above only applies in the ratio 1:1.

Because suppose you set A and B to 2, then you will see that it is not correct. Then it says $(2 + 2)^2 / (2+2)$ and that makes $\sqrt{4}$. And $\sqrt{4}$ is 2 and that doesn't match with the hypotenuse.

Therefore, you need to apply the following formula: $C = \sqrt{}\ (A + B)^2 / 2$. C is the square root of $(A + B)^2 / 2$.

Suppose now I have a triangle with sides A and B of 5 cm. Then the $\sqrt{2}$ approximation is: $(A + B)^2 / 2 = (5 + 5)^2 = 10^2 = 100 / 2 = 50 = \sqrt{50} =$ 7.07 cm.

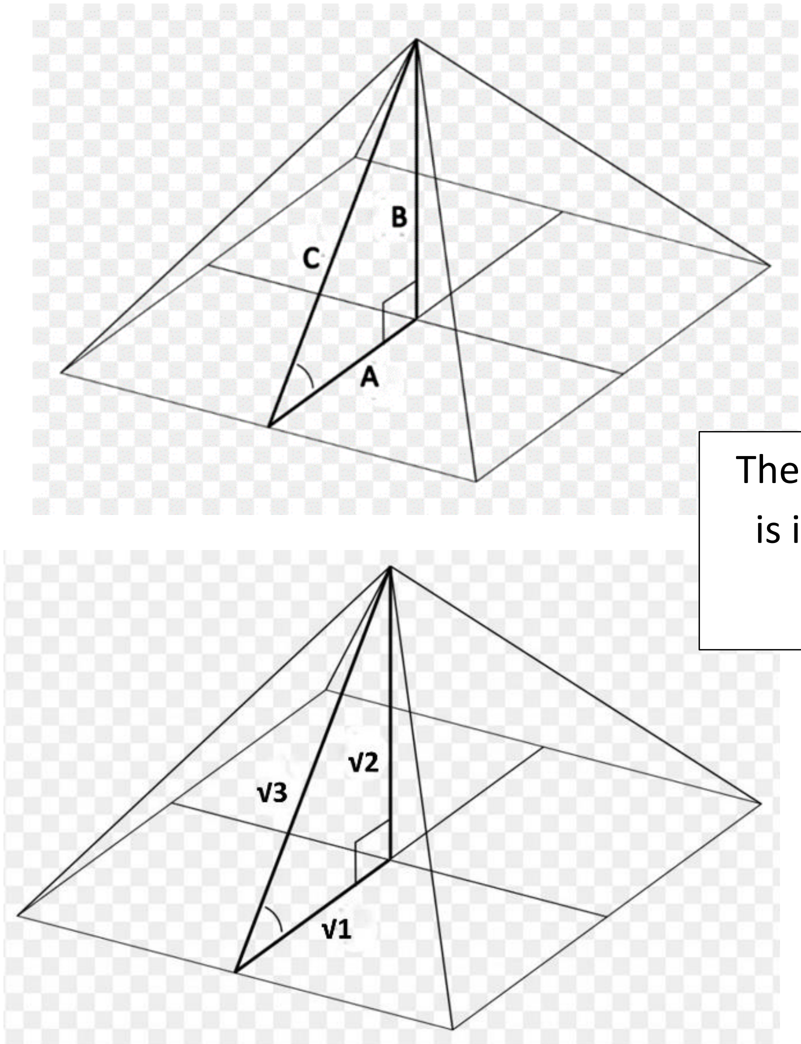
The same goes for the $\sqrt{3}$ calculation.

For this, you use the ratio 1:2. $\sqrt{3}$ is equal to the square root of $(1 + 2)^2 / (1 + 2)$.

Suppose I have a right triangle of 90°, 60° and 30° then the ratio is A: C = 1: 2. If we now calculate the straight side B of this right triangle, then B is the square root of $(1 + 2)^2 / (1 + 2) = 9 / 3$ is 3. The square root of 3 = $\sqrt{3}$ = 1.732 cm.

Now suppose I have a right triangle with side A = 4 cm and side C = 8 cm. Then the $\sqrt{3}$ approximation is: $(A + C)^2 / 3 = (4 + 8)^2 = 12^2 = 144 / 3 = 48 = \sqrt{48} = 6.92$ cm (side B).

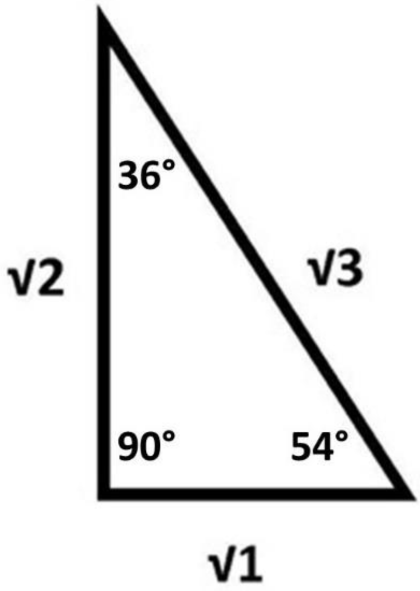
If you now know how one arrives at √2 and √3, we can discuss its significance in the Great Pyramid.



The inside of the Pyramid is in the ratio A√1: B√2: C√3 (figure 6).

Figure 6

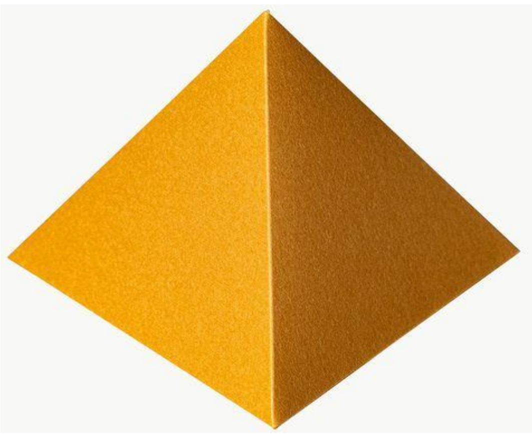
The inside of the Pyramid is then related in the angular ratio: 36°: 54°: 90° (figure 7).



The inner triangle is in the angles of 36°: 54°: 90°.

Figure 7

Knowing this, it symbolically makes the Pyramid a "golden Pyramid." I'm going to explain this.



The inner right triangle of the Pyramid is in the angles of 36°: 54°: 90°. This stands for the sides √1: √2: √3.

The outer right triangle of the Pyramid is in the angles 30°: 60°: 90°. This stands for sides 1: 2: √3.

What can we do with it? To begin with, we will make a comparison with the triangle 3: 4: 5. See figure 8. This triangle is seen as the basis for determining the Pythagorean theorem.

$A^2 + B^2 = C^2$ ($3^2 + 4^2 = 5^2$), ($9 + 16 = 25$), ($\sqrt{25} = 5$).

What is striking is that the square ratio is 9: 16: 25. One looks for evidence in area determination.

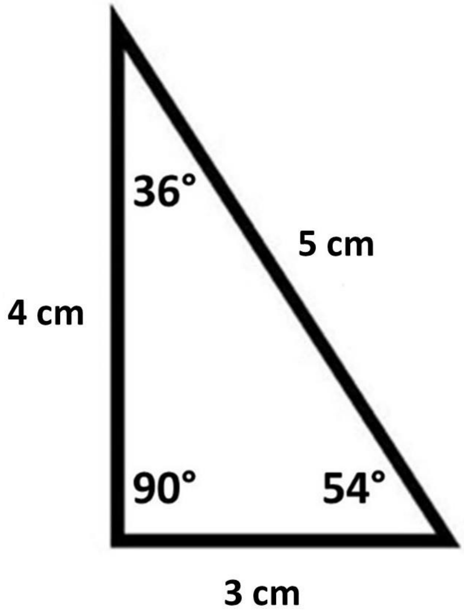


Figure 8

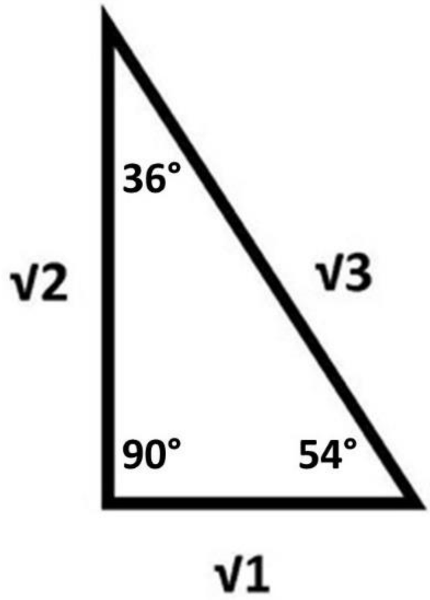


Figure 9

Figure 9 shows that it can be reduced to the square ratio, which is 1:2:3.

$A^2 + B^2 = C^2$ ($\sqrt{1}^2 + \sqrt{2}^2 = \sqrt{3}^2$), ($1 + 2 = 3$), ($\sqrt{3} = \sqrt{3}$).

What is striking is that the angles of both triangles are equal, 36°: 54°: 90° (minuscule deviations).

Since the triangle in figure 9 in the ratio √1: √2: √3 is derived from the Pyramid of Cheops, you can conclude that the ratio $A^2 + B^2 = C^2$ originated with the Egyptians, more than 4,500 years ago.

If we attribute the theorem $A^2 + B^2 = C^2$ to Pythagoras 2000 years later, it is important to maintain it in this booklet. The theorem $A^2 + B^2 = C^2$ can be regarded as a calculation method for which no further proof is required, if you keep the ratio $\sqrt{1}: \sqrt{2}: \sqrt{3}$, 1: 2: 3.

Pythagorean theorem with negative numbers?

As you read the last chapter of this booklet, you will encounter a philosophical moment about numbers. It shows that you can go in two directions. The addition side in the plus and the subtraction side in the minus. The minus numbers are referred to in mathematics as negative numbers, numbers less than zero.

Suppose I have a triangle consisting of negative numbers. I then take the familiar triangle again in the ratio 3: 4: 5. However, now in the negative ratio -3: -4: -5. See figure 10.

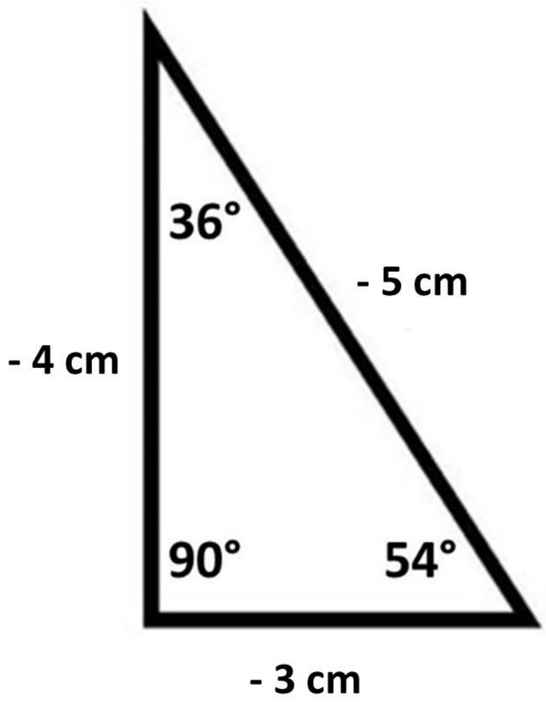


Figure 10

How do you calculate the hypotenuse now?

You will notice that the theorem $A^2 + B^2 = C^2$ does not hold.

Suppose you are going to apply $A^2 + B^2 = C^2$ then you will see that $A^2 = -3 \times -3 = +9$, $B^2 = -4 \times -4 = +16$ and $C^2 = -5 \times -5 = +25$ ($\sqrt{-25}$ is not possible anyway). So, you see that the theorem $A^2 + B^2 = C^2$ is not possible with negative numbers. The proposition is therefore limited.

How then?

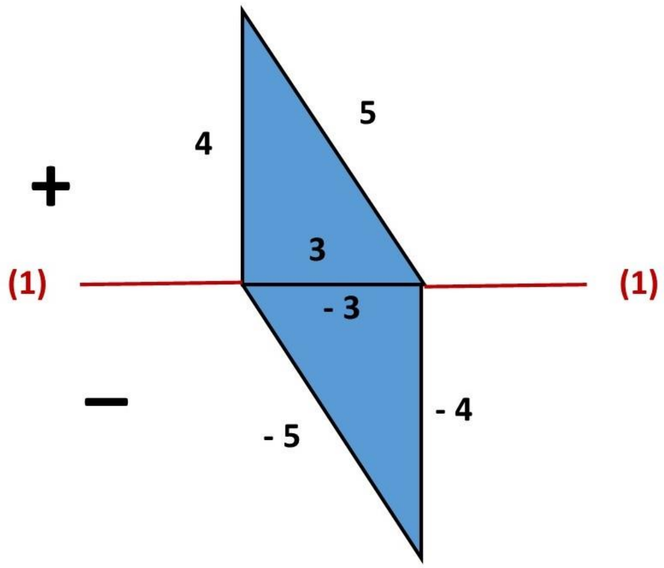


Figure 11

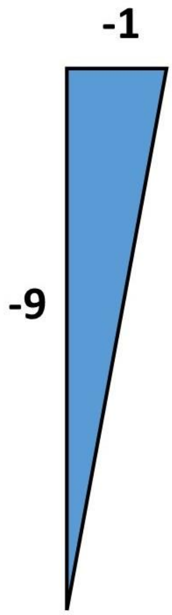


Figure 12

To calculate the triangle in figure 11 in the minus side, we need to apply another theorem.

$A^2 + B^2 = C^2 = (A \times A) + (B \times B) = (C \times C)$ does not work.

To calculate both sides, both in the plus side and the minus side, you need to take the following statement.

$(A \times -A) + (B \times -B) = (C \times -C)$.

$(A \times -A) + (B \times -B) = (C \times -C)$, $(3 \times -3) + (4 \times -4) = (5 \times -5) = (-9 + -16 = -25)$

(-25 should be reduced to + and - = $\sqrt{25} = +5 \times -5$).

You now have the exact measurements of the sides in the plus and the minus in one position.

If you now want to calculate the hypotenuse of the triangle in figure 12, that is (A x - A) + (B x - B) = (C x - C).

This is (1 x - 1 = - 1) + (9 x - 9 = - 81) = (-82 = $\sqrt{82}$ = 9.055 x – 9.055).

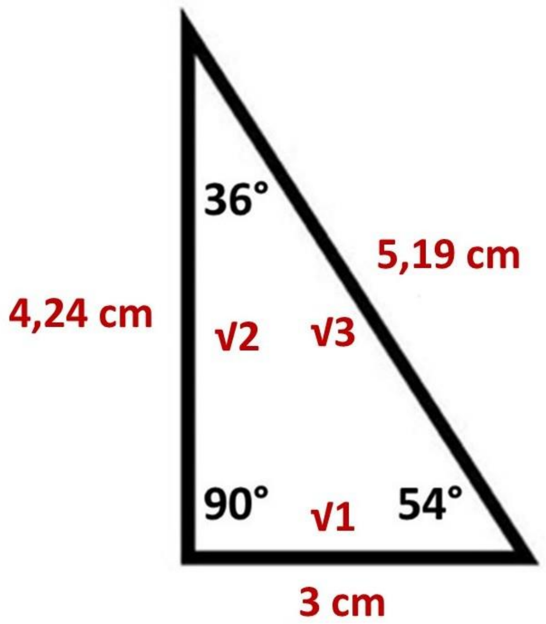
This theorem shows that both the positive and negative numbers are readable and mathematically correct.

So, you cannot say that if you put a minus everywhere in front of the positive numbers, you then have a (minus) mirror image of the triangle in the plus. You will then have to make it arithmetically correct with $A^2 + B^2 = C^2$, and that doesn't work.

The advantage of the calculation method (A x - A) + (B x - B) = (C x - C) is that both sides plus and minus in the calculation can be read simultaneously.

What else can you do with the triangle in the ratio $\sqrt{1}$: $\sqrt{2}$: $\sqrt{3}$?

The number pi (π).



$$\pi = \frac{\sqrt{2}+\sqrt{3}}{\sqrt{1}}$$

Figure 13

The number pi **(π)** comes from the Pyramid Triangle **$\sqrt{1}$: $\sqrt{2}$: $\sqrt{3}$.**

If you look at figure 13 you can see how the inner triangle of the Pyramid compares. It's perfection. If side A ($\sqrt{1}$) is 3 cm, then side B is 3 x $\sqrt{2}$ = 4.24 … cm and side C is 3 x $\sqrt{3}$ = 5.19 … cm. Side B + C = 9.43 … cm / side A 3 cm = 3.14 … cm.

You can see that a triangle in the ratio 3:4:5 does not represent a number pi (π). It is precisely the minuscule deviations from each other that lead to perfection.

If you were to represent the square ratio on the triangle in figure 13, you would get the result: $A^2 + B^2 = C^2$ = 9 + 18 = 27. In the triangle in the ratio 3: 4: 5 this is 9 + 16 = 25.

What else does this indicate?

You can now project any circle in the triangle $\sqrt{1}$: $\sqrt{2}$: $\sqrt{3}$. In that case, $\sqrt{1}$ is the diameter and $\sqrt{2}$ + $\sqrt{3}$ the circumference, see example figure 14.

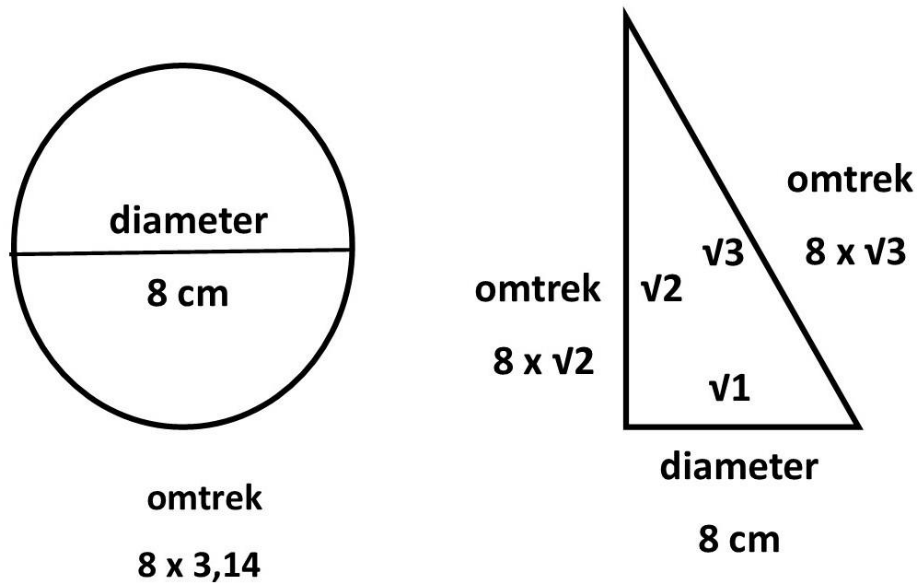


Figure 14

The circumference of the circle is 8 x 3.14 = 25.1. In the triangle, the perimeter is (8 x $\sqrt{2}$) = 11.3 + (8 x $\sqrt{3}$) = 13.8 = 25.1. (tiny deviations).

I'll show you in another chapter at the 40° triangle yet another ratio where the number pi (π) is in the correct ratio with the diameter.

We have now described the inner triangle of the Pyramid in the ratio √1: √2: √3 in all its mathematical aspects.

We are now going to the outside.

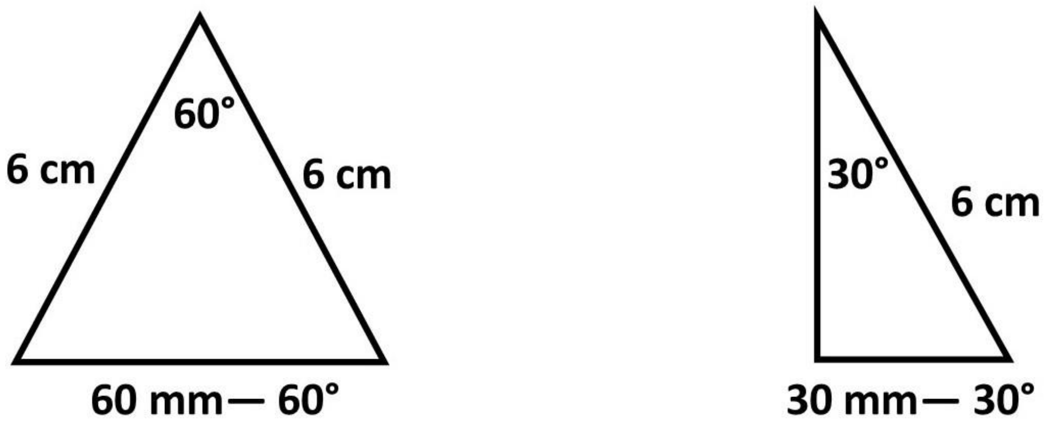
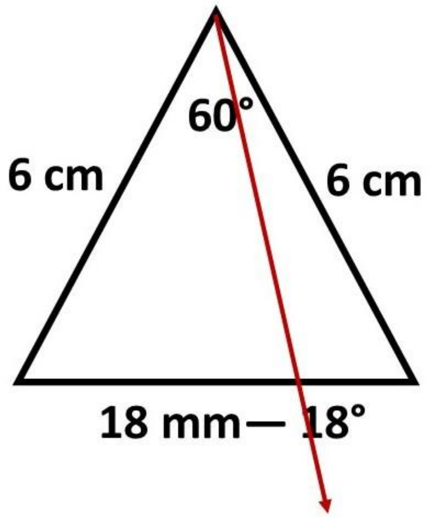


Figure 15

In figure 15 you see the equilateral triangle from the outside of the Pyramid. The sides of 6 cm are equal to the 60 degrees of the circle in terms of angle determination. The ratio 6:6:6 is essential here. Any other ratio will not work.



If we draw a line from the 60° top angle (figure 16) and we set off 18 mm from right to left on the bottom baseline, we have an angle of 18°.

Figure 16

If we make the triangle smaller so that it becomes an isosceles triangle whose apex angle is less than 60° and the isosceles sides are always 6 cm, then the baseline is equal to the angle in mm, see figure 17.

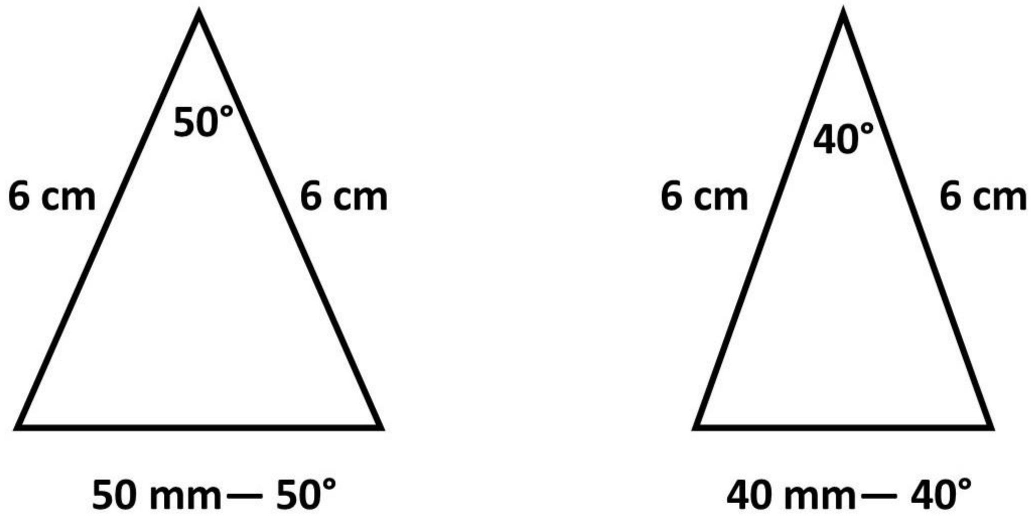


Figure 17

In figure 17 I have chosen measures in tens. It can also be any apex angle of, for example, 53° or 47° or 34°. As long as you keep the isosceles sides at 6 cm, the base side will be equal to the angle in mm. And it can be at an apex angle of 29° or 20° or 15°. However, with these last measures, we use the right triangle in figure 15. The apex angle is then below 30°, and that is easier to do the calculations that I show in the next chapter. I will come back to the link with the Pyramid in another chapter.

With the triangles in figure 15 and 17 you change the entire current known trigonometry.

Trigonometry stands for trigonometry. This is a part of geometry that deals with the relations between sides and angles in planar and spatial triangles.

Chapter 2

Trigonometry

A few years ago, I read a question from a math student. He asked if you could calculate the angles and sides of a right triangle without using the sine, cosine, and tangent table or the pre-programmed calculator. The answer was a clear no. I don't know if the student was happy with that. I'll show you now that it is possible.

Furthermore, I also show you that you can calculate the sides of any triangle (not a right triangle).

All you need is a knowledge of the triangles in figure 15 and 17.

I now show several examples, from easy to difficult.

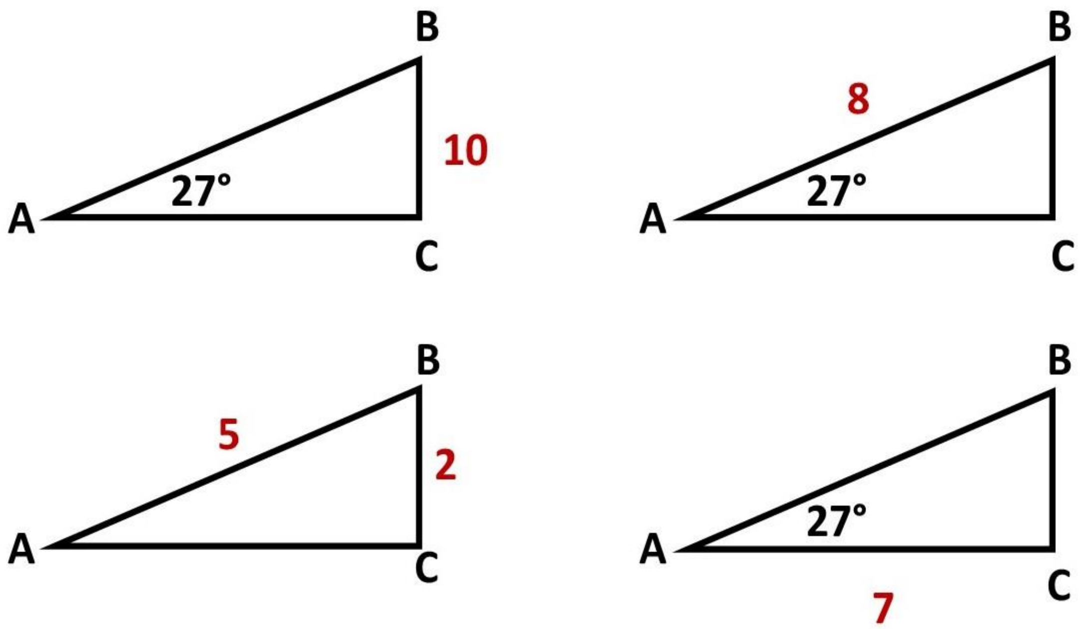


Figure 18

How do you calculate the sides and angles in figure 18?

For the sake of convenience and overview, I have set angle A at 27° for three triangles. So, this can be anything below 30°. The starting point should always be the smallest angle from which the calculations take place.

We start with **the first triangle** in figure 18. Angle A = 27° and side B-C = 10 cm. How big are sides A-B and A-C?

You know that if side A-B were 6 cm, then B-C would be 2.7 cm. However, B-C is 10 cm. That is (10/2.7) a factor of 3.7 higher. Side A-B is therefore factor 3.7 higher, is 3.7 x 6 = 22.2 cm. Side A-C can then be calculated with $A^2 + B^2 = C^2$ = 19.8 cm.

The second triangle. Angle A = 27° and side A-B = 8 cm. How big are sides A-C and B-C? Then the same again. If side A-B were 6 cm, B-C would be 2.7 cm. However, A-B is 8 cm (8/6) factor 1.33 higher. B-C is therefore also a factor of 1.33 higher (2.7 x 1.33) = 3.59 cm. Side A-C can then be calculated with $A^2 + B^2 = C^2$.

We're going to **the third triangle**. Angle A = 27° and side A-C = 7 cm. How big are sides A-B and B-C? This is something different. If side A-B was 6 cm, then side B-C was 2.7 cm. In that case, side A-C would be calculated as follows: $C^2 - A^2 = B^2$, ($6^2 - 2.7^2 = 28.7^2$) √28.7 = 5.358 cm. However, A-C is 7 cm which is (7/5,358) factor 1.3 higher. A-B is then 6 x 1.3 = 7.8 cm and B-C = 2.7 x 1.3 = 3.51 cm

Then we go to **the fourth triangle.** What are the angles if side A-B = 5 cm and side B-C = 2 cm. Then calculate the factor of A-B. This is 6/5 = 1.2 less than 6. B-C is then 1.2 greater than 2 cm to get equal to 6 cm. B-C is then 1.2 x 2 is 2.4 cm = 24 mm = equal to 24°. Angle A is therefore 24°. Angle C is 90°, so angle B is 66°.

So much for the easiest calculations. It gets a bit more difficult when we cross the 30° limit of the smallest angle.

Below are some examples of triangles.

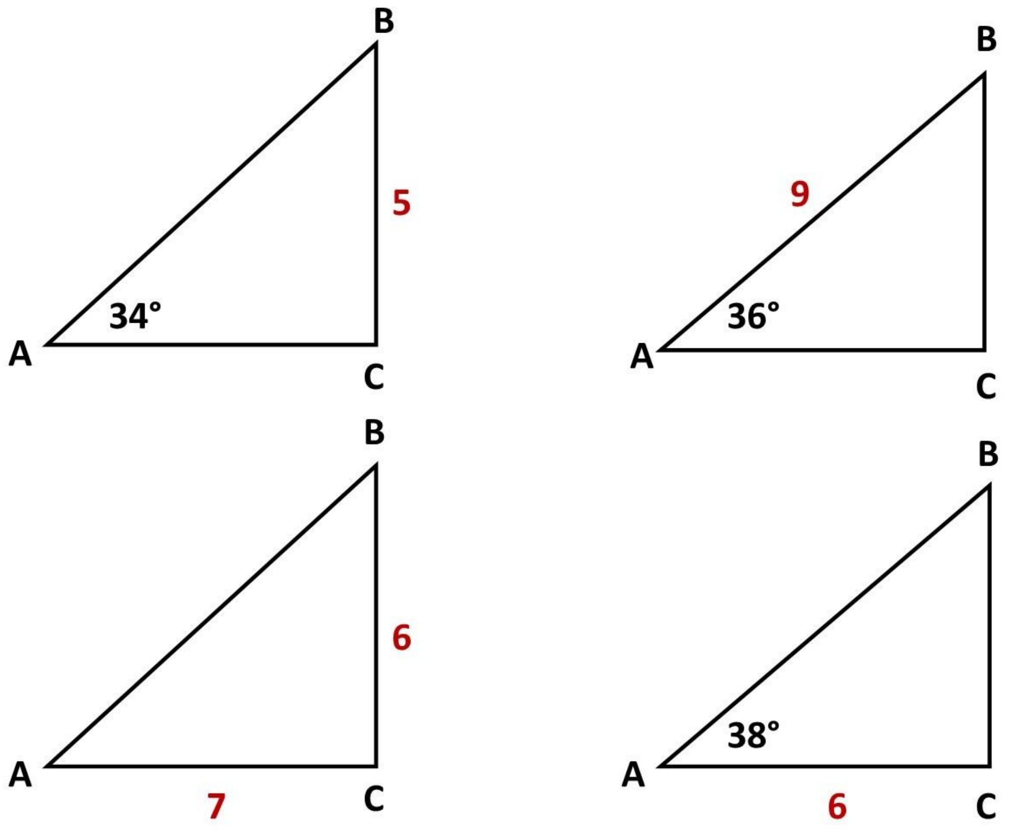


Figure 19

We will calculate the four triangles in figure 19, with figure 20 being the yardstick of the calculation.

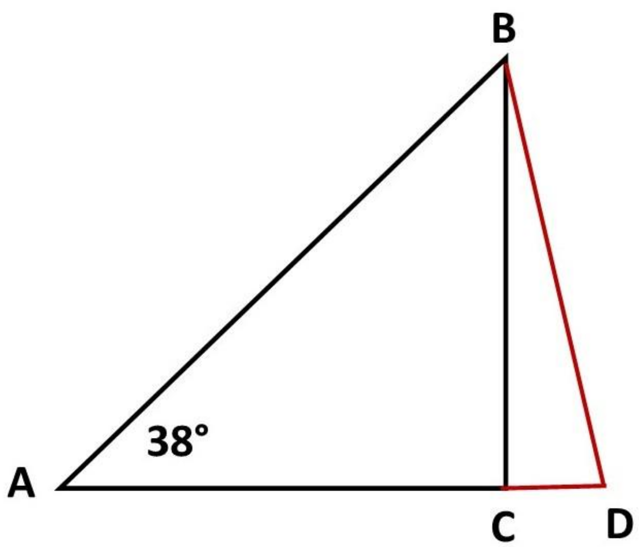


Figure 20

What you know is that if A-B and A-D are 6 cm, that B-D is equal in mm than the opposite angle in degrees.

I'm going to calculate the first triangle in figure 19.

Angle A = 34°. Side B-C = 5 cm. How big are sides A-C and A-B?

If we make the long sides equal, then A-B equals A-C + C-D. I am now going to calculate the side B-D and C-D.

We know that angle A is 34°. The other angles are then equal to (146/2) 73°. Knowing this, you can determine the angles of the smaller triangle B-C-D. These are 90° - 73° - 17°.

I am now going to determine side C-D. Determine the divide/multiplication factor by reducing the side B-D to 6 cm.

Suppose side B-D was 6 cm, then side C-D was 1.7 cm (opposite of angle B 17°). In that case, side B-C ($C^2 - A^2 = B^2 = 6^2 - 1.7^2 = \sqrt{33.11^2}$) = 5.75 cm. However, side B-C is 5 cm. Now apply the divide/multiplication factor again. 5.75/5 = 1.15. That means side C-D = 1.7/1.5 = 1.13 cm.

Side B-D is then ($A^2 + B^2 = C^2 = 1.13^2 + 5^2 = \sqrt{26.27}$) = 5.12 cm.

If you now know that the following statement belongs to the angle of 34°.

If the longest sides are equal to 6 cm, then the smallest side is the opposite angle in mm.

What you see now is that the smallest side (B-D) in the example is 5.12 cm. This corresponds to an opposite angle of 51.2°. However, the angle is 34°. This means that side (B-D) is a factor of 1.5 greater.

The sides A-B and A-D are then 6 x 1.5 = 9 cm. Side A-B is therefore 9 cm. If you now calculate side A-C, then that is $C^2 + A^2 = B^2 = 9^2 - 5^2 = \sqrt{56} = 7.48$ cm.

I'm going to calculate the second triangle in figure 19.

Angle A = 36°. Side A-B is 9 cm. How big are sides A-C and B-C?

To get the right proportion, you have to make the two long sides equal. Side A-B equals side A-C + C-D.

If you now want to calculate side B-D, you need to convert 9 cm to 6 cm.

9/6 = 1.5. Side B-D is then 36 x 1.5 = 5.4 cm.

So, you also see that if the smallest top angle is 36 degrees, the other two are 72 degrees, angle D. If you now determine the degrees in the smallest triangle B-C-D, you see a triangle of 90, 72 and 18 degrees.

We are now going to determine side C-D.

We need to reduce B-D to 6 cm again.

6/5.4 = 1.11 cm. Angle B = 18/1.11 = 16.21 mm = 1.62 cm. Side C-D is therefore 1.62 cm.

Side B-C can now be calculated. $C^2 - A^2 = B^2$. $5.4^2 - 1.62^2 = 29.16 – 2.62 = \sqrt{26.54} = 5.15$ cm.

Side A-C is $C^2 - A^2 = B^2$. $9^2 – 5.15^2 = 81 – 26.52 = \sqrt{54.48} = 7.38$ cm.

I'm going to calculate the third triangle in figure 19.

Angle A = 38°. Side A-C = 6 cm. How big are sides A-B and B-C?

With this triangle you have to do something different and that only if you have given side A-C.

We are now going to equalize the longest sides. See figure 21.

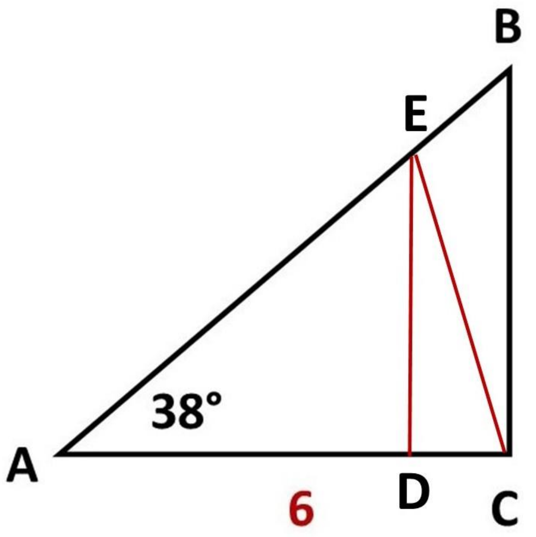


Figure 21

You do this by calculating the side E-C. Because side A-C is 6 cm, you do not have to reduce this side to 6 cm. In all other cases, yes. The side A-E is therefore 6 cm. Side E-C is equal to the angle of 38° in mm = 3.8 cm.

I'm going to calculate side E-D now. For this you need to know angle E. If you know that angle A is 38° then angles E and C (142/2) are 71°. The angles of smallest triangle C-D-E are 90°-71°-19°.

If E-C is 6 cm, then D-C is 1.7 cm. However, E-C is 3.8 cm. In order to determine D-C, we need to reduce E-C to 6 cm. The divide/multiplication factor is then 6/3.8 = 1.57. D-C is then 19 (angle A)/1.57 = 12.1 mm is 1.21 cm.

Now you need to determine side E-D. This is $C^2 - A^2 = B^2$, $3.8^2 – 1.21^2 = 14.44 – 1.46 = \sqrt{12.98} = 3.6$ cm.

You now know that side D-C is 1.7 cm. Side A-D is then 6-1.7 = 4.3 cm.

Side A-C is larger than side A-D in proportion to a factor of 6/4.3 = 1.39.

Side B-C is then 1.39 larger in relation to side E-D.

Side E-D = 3.6 cm. Side B-C is then 3.6 x 1.39 = 5.00 cm.

Side A-C is given = 6 cm.

Side A-B is $A^2 + B^2 = C^2$. $5^2 + 6^2 = \sqrt{61} = 7.81$ cm

I'm going to calculate the fourth triangle in figure 19.

How do you determine the angles of a right triangle if given two sides, A-C and B-C.

Side A-C = 7 cm and side B-C = 6 cm.

First you have to calculate the third side with $A^2 + B^2 = C^2$.

Side A-B is then 9.21 cm.

Now make the longest sides equal. A-B equals A-D. In that case, side C-D is 2.21 cm. Side B-D (figure 20) is now easy to calculate. $A^2 + B^2 = C^2$, $2.21^2 + 6^2 = \sqrt{40.88} = 6.39$ cm.

You know that the opposite side of angle A is equal in mm as its degrees, with two equal long sides of 6 cm.

Then I will determine the divide/multiplication factor. That's 9.21/6 = 1.53. I am now going to reduce side B-D by a factor of 1.53. That brings us to 6.39/1.53 = 4.17 cm. This is rounded off 41 mm. And this is again equal to the degrees of angle A = 41°.

The other angles are then easy to determine, 90° - 41° - 49°.

What you notice in the calculations is that a lot of work is done with tenths and hundredths after the decimal point. This can sometimes lead to minuscule (in my opinion negligible) deviations.

If we now determine this fourth triangle according to the sine table, then the sine, dividing the opposite side (6 cm) by the hypotenuse (9.2 cm) = 0.652. And sine 0.652 is near 41°.

How do you calculate the sides of any triangle?

An important factor is the determination of the missing side of an arbitrary triangle (not a right triangle), if two sides and an angle (and two angles) are known. So, how do you determine (and calculate) the third missing side of any triangle that is not a right triangle?

Let's take the right triangle as an example. The theorem $A^2 + B^2 = C^2$ determines the hypotenuse, and the angle of 90° is always given. This means that in this calculation, 2 sides and an angle must be known.

Knowing this, I'm going to compare this to an arbitrary (not right-angled) triangle. How will you perform this calculation? See the example in figure 22 and 23,

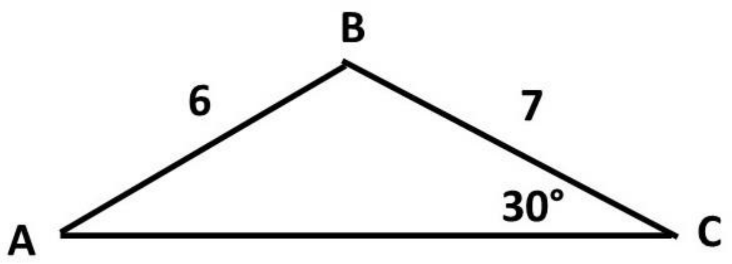


Figure 22

Determine the size of side A-C in figure 22.

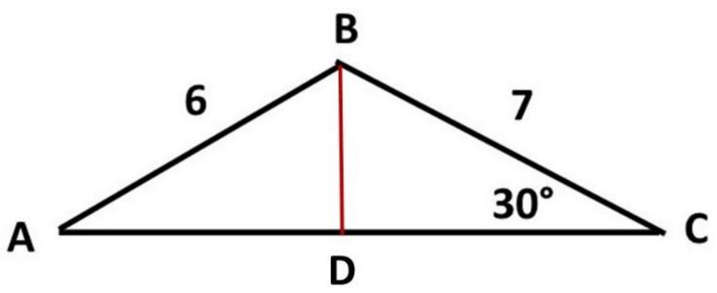


Figure 23

How do you calculate this?

You start with an imaginary line B-D, figure 23. Angle D is then 90°. Angle B of the right triangle is then 60°. We are now going to calculate sides B-D and D-C. Since angle C is 30°, side C can be easily calculated. Side B-C is 7 cm. If it was 6 cm, then B-D would be 30 mm - 3 cm. We calculate the factor again. 7/6 is 1.16. So, B-D is 1.16 x 30 = 34.8 mm = 3.48 cm. Sides D-C are then $C^2 - A^2 = B^2$, $7^2 - 3.48^2 = \sqrt{36.89} = 6.07$ cm.

What you now know is that the left triangle is also a right triangle. Side A-B = 6 cm and side B-D we calculated = 3.38 cm. Then it is easy to calculate side A-D. That is, $C^2 - A^2 = B^2$, $6^2 - 3.48^2 = \sqrt{23.89} = 4.88$ cm.

Side A-C (figure 22) is then A-D + D-C = 4.88 + 6.07 = 10.95 cm.

You see that if there is any triangle (not a right triangle) whose angle A or angle B and side A-B and B-C are known, then you can calculate side A-C.

For all other arbitrary triangles (not a right triangle), <u>two angles</u> must be known to determine the missing side. For example, if side A-C and A-B are known. Then calculate side B-C.

If you have studied the calculation of figure 18 and figure 19, you can test your own creativity in this.

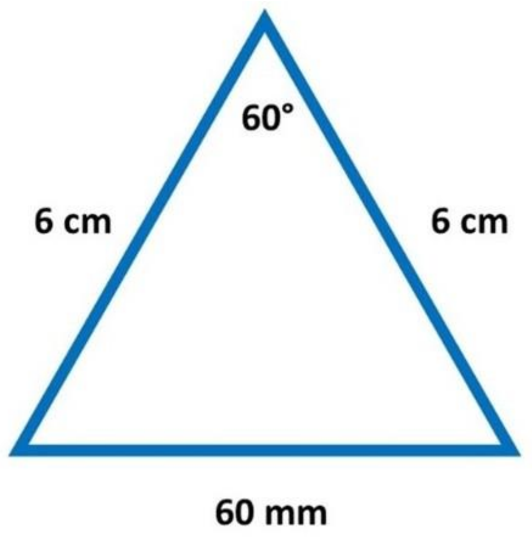
So, it indicates that with the knowledge of the equilateral triangle you can calculate all angles and sides.

I show that without sine, cosine, and tangent you can calculate the sides and angles of a triangle.

Chapter 3

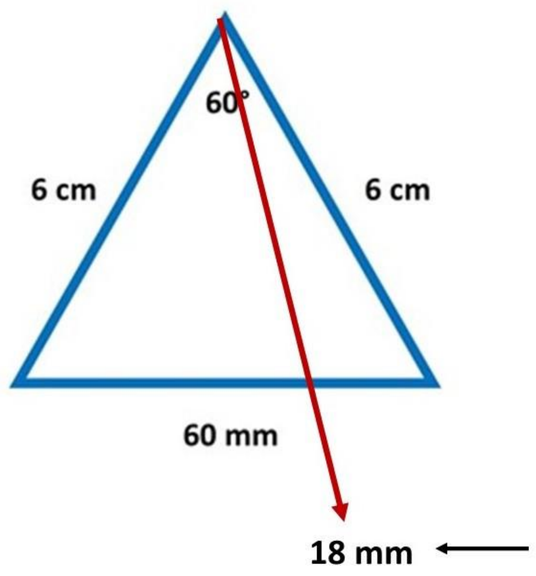
The equilateral triangle and the circle

What else can you do with the equilateral triangle?



You can define and draw any angle up to 60 degrees. Each side is equal to the equal angles of a circle. You should always use the standard 6:6:6 ratio.

As I already showed in figure 16, on the baseline you set out 18 mm from right to left. You then have an angle of 18 degrees.



If we connect 6 of these equilateral triangles, you get figure 24.

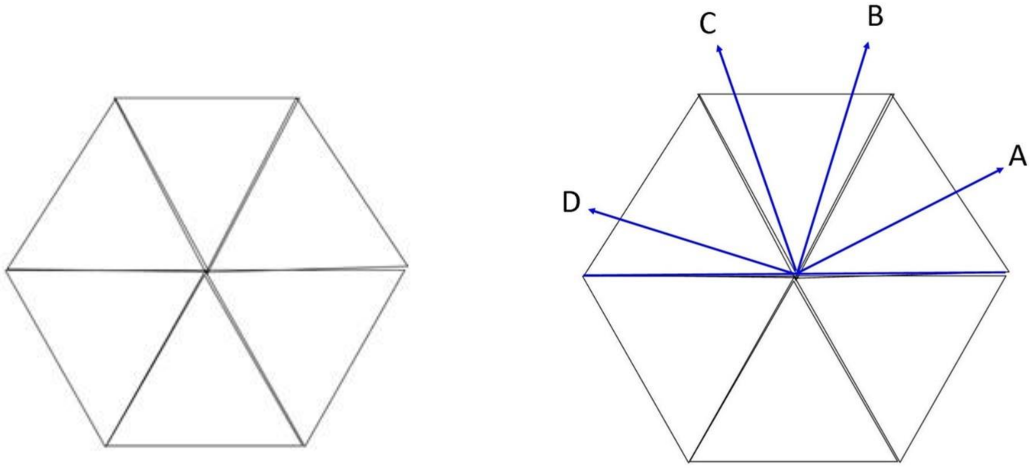


Figure 24

Working up one direction (in this case from right to left) you can measure any angle you want.

If you want an angle of 24 degrees (A), you measure 24 mm on the side. If you want to measure an angle of 70 degrees (B), you measure 10 mm in the second connected triangle. At C (112°) that is 52 degrees in the second connected triangle (60 + 52 = 112). At an angle (D) of 160 degrees, that is 40 degrees off in the connected third triangle.

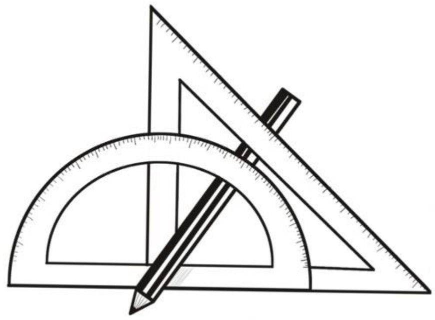
So, you don't need a protractor to determine the angles, although that is of course easy. Three connected equilateral triangles in the ratio 6:6:6 replace the protractor.

Now if you think it's easier to take the protractor instead of putting three equilateral triangles together, you're right.

There is another difference, and I will come back to that in a moment.

The protractor is a mold, made of plastic, wood or metal. Almost every math package in modern times contains a protractor, a right-angled and isosceles triangle, a ruler and a compass.

All tools to make things easier for us.



In earlier times also had this kind of molds (tools). For example, they had a Hexagram (a six-pointed star).

What could you do with this? See figure 25.

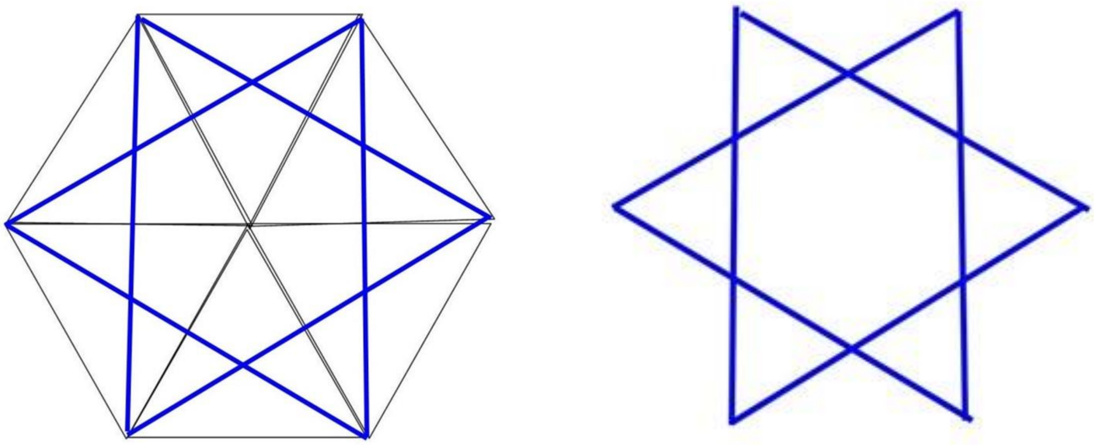


Figure 25

So, without having to draw the 6 triangles, you could use the Hexagram whose points are 60 mm (60°) apart in the correct proportion.

How did that work?

They picked up a Hexagram that was possible in arbitrary sizes. A Hexagram that, what with regard to the correct size, did not have to be size bound. The Hexagram was placed on, for example, paper, see figure 26.

You put a dot on each point of the Hexagram. Then you connect the lines. You can make the lines as big (long) as you want. You have the center. It is now important to take the standard 6:6:6 ratio as a benchmark. Suppose your move is 18 cm out on the lines. Then the measure of angle determination (dashed line) is 18/6. In that case, you should measure 3 mm per degree.

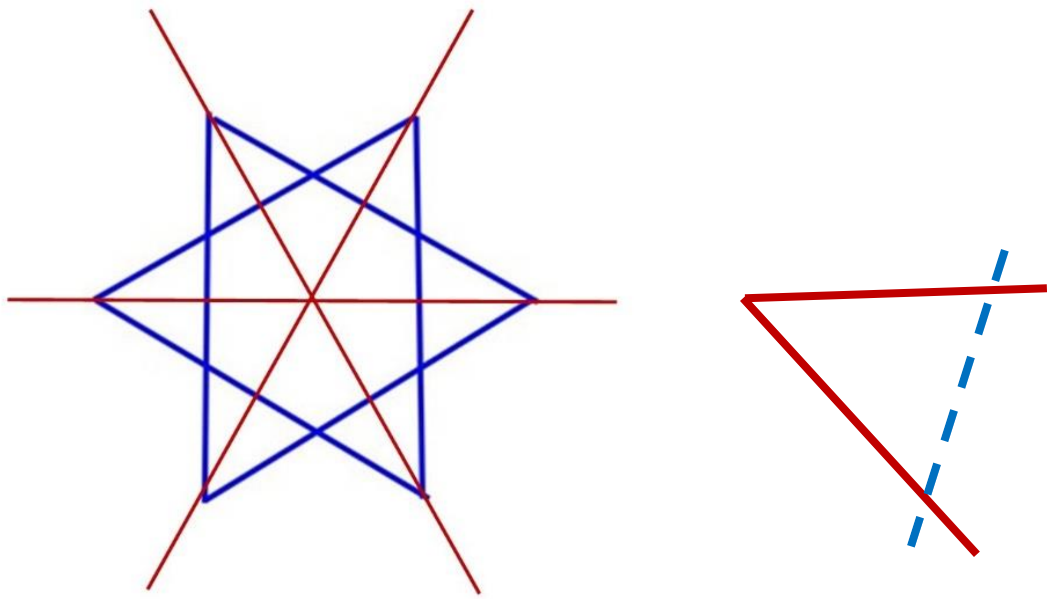


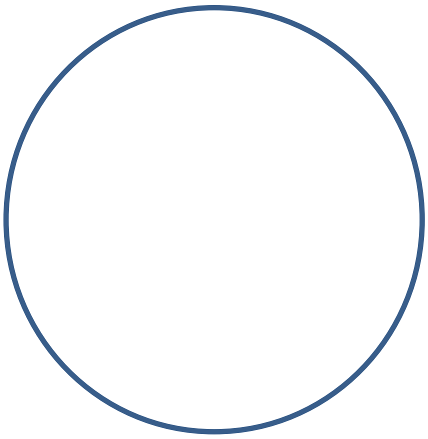
Figure 26

Just as the protractor is used as a standard mold in our mathematics package in modern times, so in the pyramid building an equilateral triangle of 60 cm (1 cm for each degree) was used as a standard mold. You have to ask yourself, which is easier, plotting degrees on a curved line or on a straight line?

There is one more thing you should know. The protractor as a standard mold was only created after the degrees of the circle were known. Because suppose you have a protractor without lines and numbers (blank). Can you measure 360 equal parts on a circle with this?

Suppose you have a blank circle. How do you divide this blank circle into 360 equal parts? And then make it a standard circle. How do you do that? You won't succeed with a blank protractor and a ruler.

Well, with a ruler and an equilateral triangle of 60° in the ratio 6: 6: 6. The predecessor of the Hexagram.



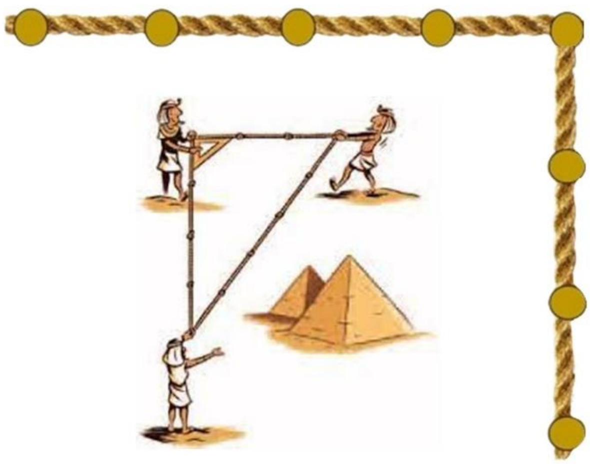
The cord with 9 knots proves the old craft.

In fact, in the old days, a 9-knot cord was enough to make every angle.

Nine knots in an equidistant cord

We know that with the cord of nine knots we can make a right angle.

However, you don't need nine knots to make a right angle with the rope. Eight knots are enough. Make a rope with nine equally spaced knots. Fasten the first knot in one place. Then take the sixth knot and fasten (mark) it in a tight line. Then take the eighth knot and exchange it with the (marking) attachment point of the sixth knot, and then pull the line taut in the ratio 4:5. You then have a right angle.



What we don't know is that with a cord of nine knots we can also make a hexagon, which, when properly laid, can determine the angles of the circle as indicated in advance. If you make nine equally spaced knots in a rope, you can make figure 27.

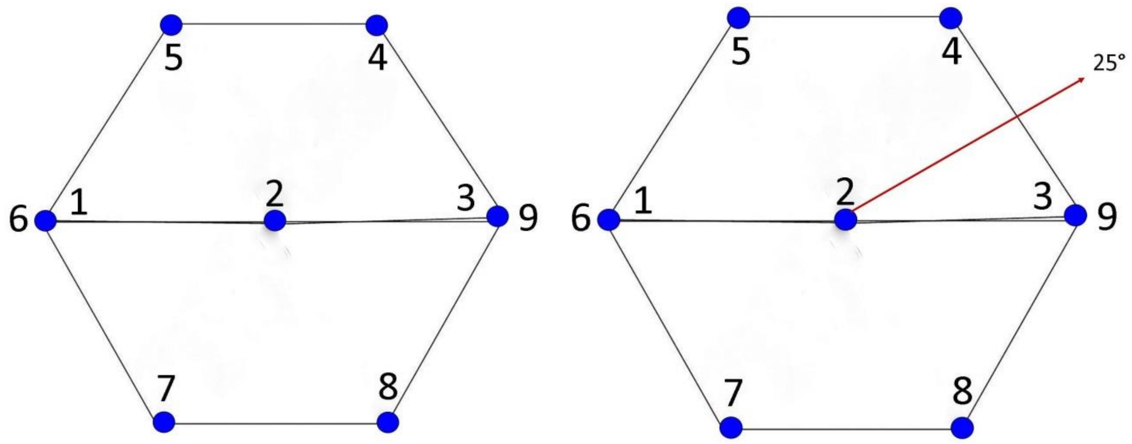


Figure 27

If you want to enlarge the angles 10 x to centimeters then you need 360 cm for the circumference (3 - 9) and for the diameter (1 - 2 - 3) 120 cm, making a length of 480 cm.

So far, you can say that we have discussed everything regarding the equilateral triangle. He forms the Pyramid. He gives an 'inner' expression to the triangle √1-√2-√3, determines the number pi (π) and the circumference, and the angle of 36° and 54°.

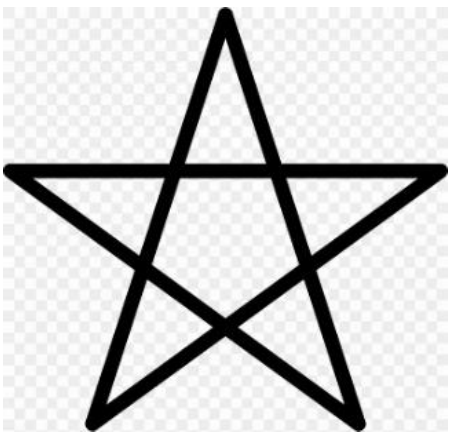
The angles of 36° and 54° degrees are of great importance to show a different variation of the circle on the one hand, and on the other hand to introduce a new standard triangle that we already know, but do not use effectively.

Chapter 4

The Pentagram and the Circle.

What can we do with the angle of 36°?

The Pentagram is composed of the angle of 36°.



Five angles connected correctly make a Pentagram.

This Pentagram is used as a variant for making a circle. Suppose you want to make a circle with a circumference of 60 cm. Then draw a Pentagram with 5 lines of 12 cm (60/5 = 12).

Then you draw a line of 12 cm in height (see figure 28).

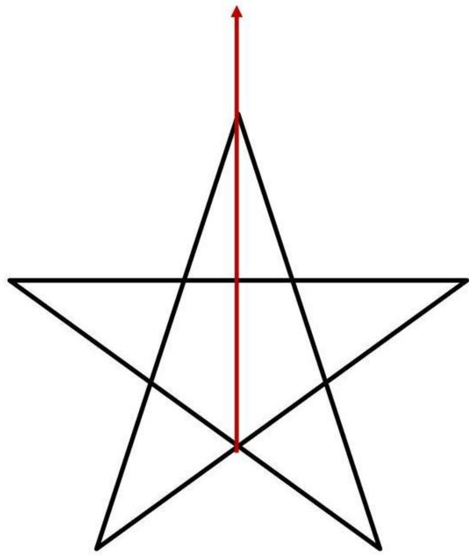


Figure 28

Determine the center (see figure 29).

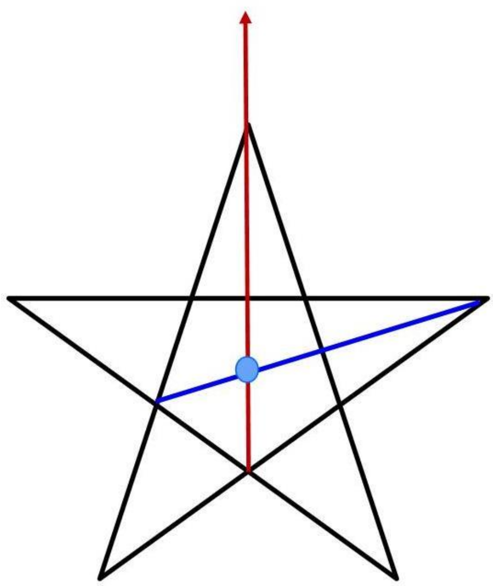


Figure 29

Now draw the circle from the center, as figure 30 shows. You now have a circumference of 60 cm.

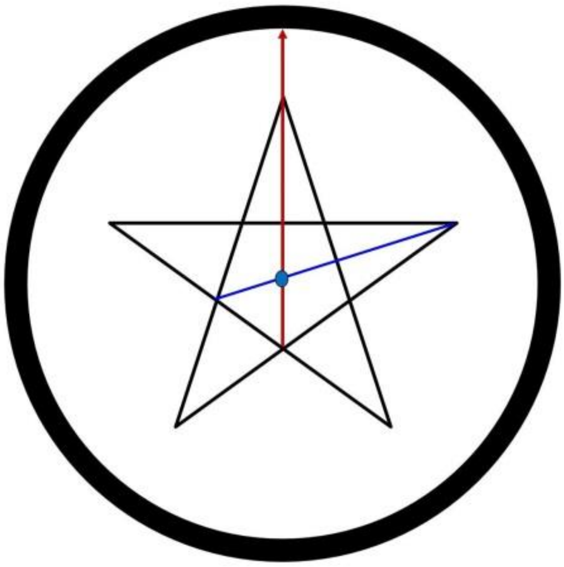


Figure 30

So, you see that you can determine a circle circumference with the Pentagram, and draw it.

Now you want to draw a circle circumference of 40 cm. Then divide 40 by 5 = 8 cm. Draw an 8 cm pentagram and follow the steps I show in figures 28, 29, and 30, and you have the circumference.

However, this is not all.

What do you see now when you look at figure 30?

You see that two lines intersect and form a perfect center.

What could be simpler than to take a look at the ratio of the upward pointing line.

Where is the intersection of that line?

Suppose I don't want to draw a Pentagram, but just a simple line. Then it's like everything. You need to simplify everything to the smallest level (to 1). That means I'm going to draw a circumference of 5 cm. Then I have to draw five lines of 1 cm.

If I now draw, as figure 28 shows, a line of 1 cm in height, then the other line, as shown in figure 29, intersects the straight line in the ratio 0.8 cm: 0.2 cm.

The intersection is then important. Suppose I want a circle circumference of 50 cm, how do you do that? You divide the circumference (50 cm) by 5 is 10 cm.

You draw a random line of 10 cm (A - B), see figure 31.

Then you use factor 0.8 to determine the intersection of 2 lines (C). The ratio is then 10 x 0.8 (A - C) = 8 cm.

This is the perfect center of the circle. Then draw the circle from C and you have a circle of 50 cm.

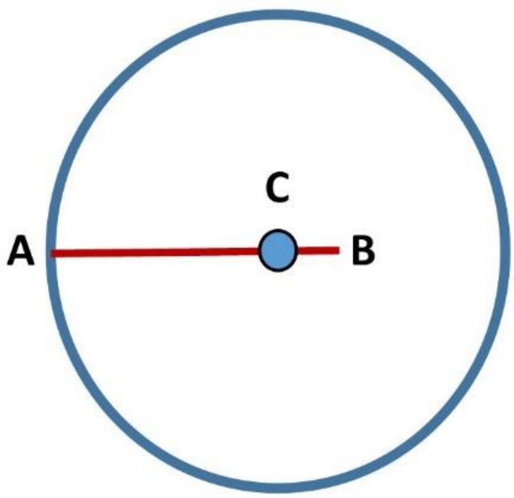


Figure 31

If you now compare this with pi π, then the circumference is $2r \times \pi = 16 \times 3.14 \ldots = 50$ cm rounded.

Suppose you have a circumference of 60 cm. How then do you calculate the diameter and radius according to the traditional method pi π that we know in our modern times? 60/3.14 … = 19.1 cm (diameter rounded) divided by 2 = 9.55 cm (radius 9.6 rounded).

The Pentagram method goes like this, (see figure 31) 60/5 = 12 x 0.8 = 9.6 cm (radius) x 2 = 19.2 cm (diameter).

This is what the pentagram teaches you.

<u>A simple line is enough.</u>

It can be even easier.

Suppose the radius is 8 cm, what is the circumference of the circle? Radius r x 10/8 x 5.

<u>The circumference is then 8 x 10/8 x 5 = 50 cm</u>

Chapter 5

The hidden triangles.

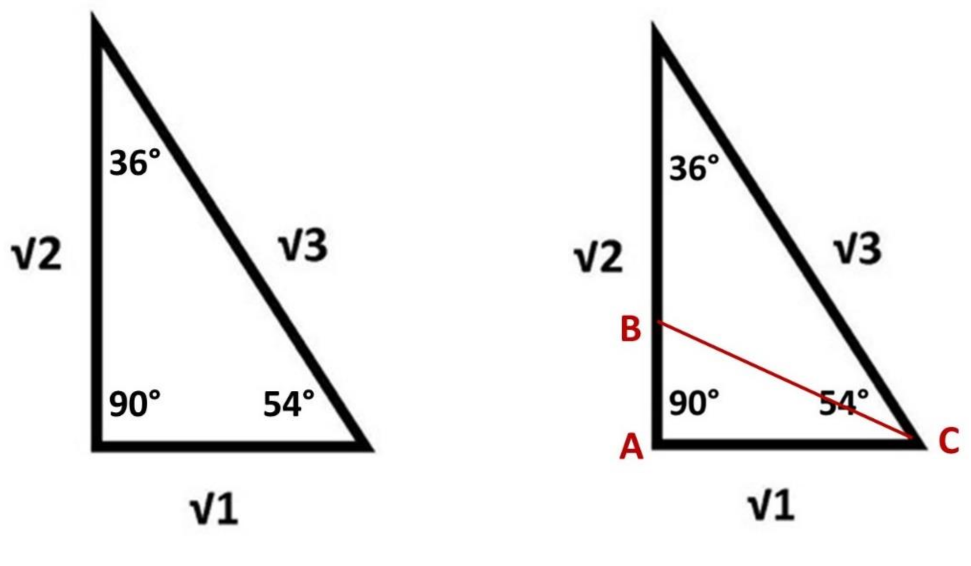


Figure 32

Inside the √1-√2-√3 triangle is triangle A-B-C. See figure 32. If you divide 54° in half, you get a triangle of 27°-90°-63°. This is a triangle in the ratio 1: 2: √5. This means that every right triangle whose straight sides are in 1:2 the hypotenuse is always √5.

Within the Pyramid of Cheops in Giza, there are several shafts that all have a unique (geometric) meaning. I am not going to present interpretations of it in this booklet, which are described in the publication 'Fundamental Mathematics of the Great Pyramid'. In this booklet, I am only concerned with the geometric facts.

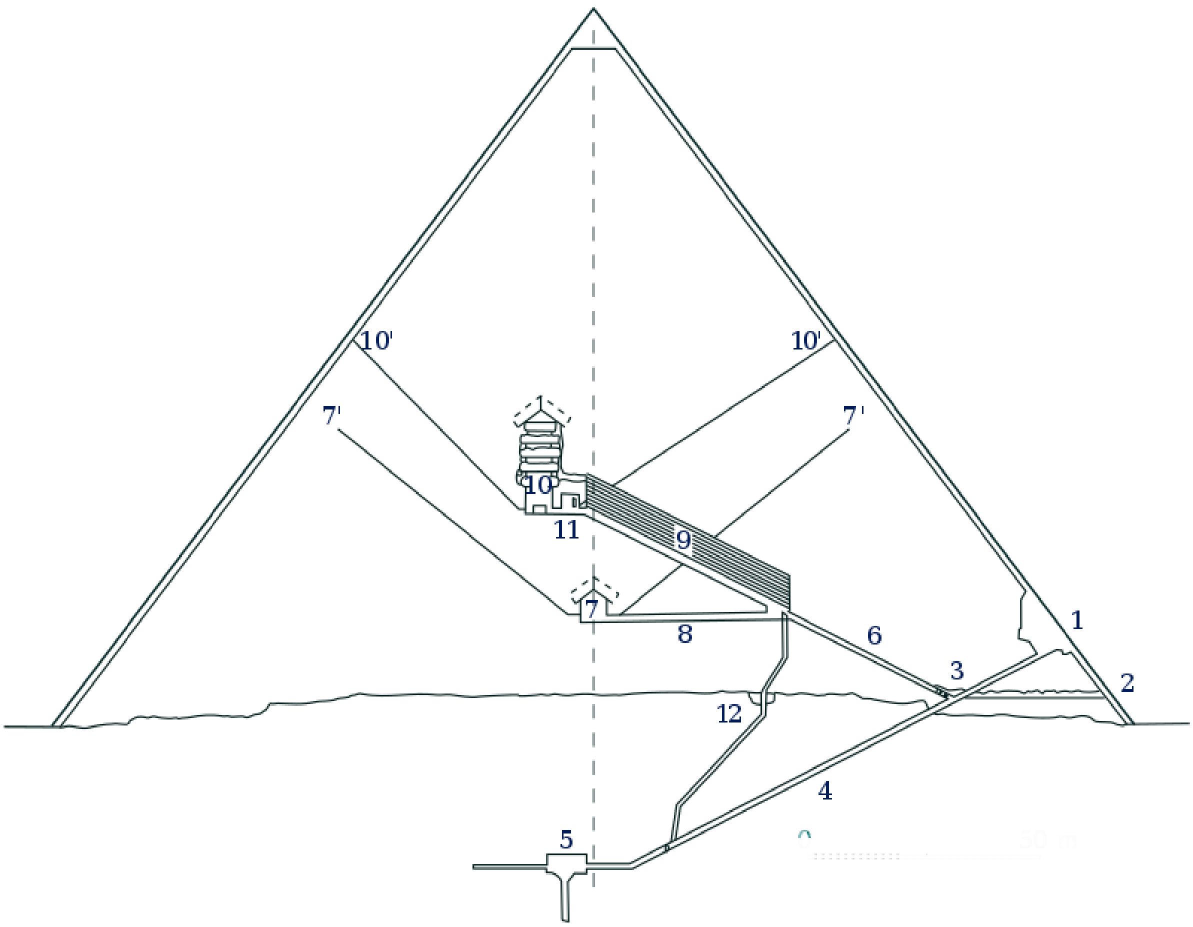


Figure 33

Three angles are observable. Angle 3-2-1, angle 3-4-6 and, angle 8-7. What is the geometric value of these (shaft) angles?

I try to work according to the architectural building plan and not to the rough construction itself, which may differ slightly in dimensions.

Angle 3-4-6 indicates that angle 3 = 54° and side 4 is in the proportion of 6 cm. If you now draw the triangle, you will get a drawing similar to figure 34. An apex angle of 54° with two long sides of 6 cm represents the opposite side of the angle 54° in 54 mm. This triangle gave me the knowledge to the determinations in figure 17 (page 21 of this booklet).

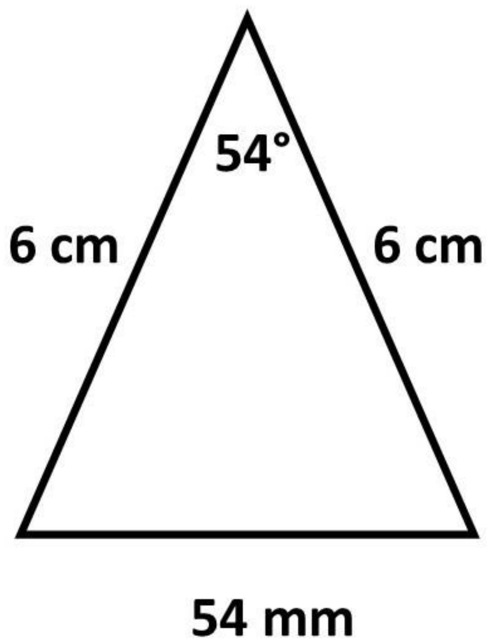


Figure 34

If you now divide the angle 54° in half, you get angle 3-2-1. Angle 3 in this case is 27°. And the sides 1-2 (1) and 1-3 (2) are related to 2-3 (√5). Angle 3-2-1 of the Pyramid shaft is equal to the triangle 1: 2: √5.

We know the ratio 1: 2: √3. We hardly ever use the ratio 1:2:√5.

In a right triangle whose side A has a ratio of 1 to 2 to side B, the hypotenuse C is always √5.

Let's take a moment to compare. See figure 34.

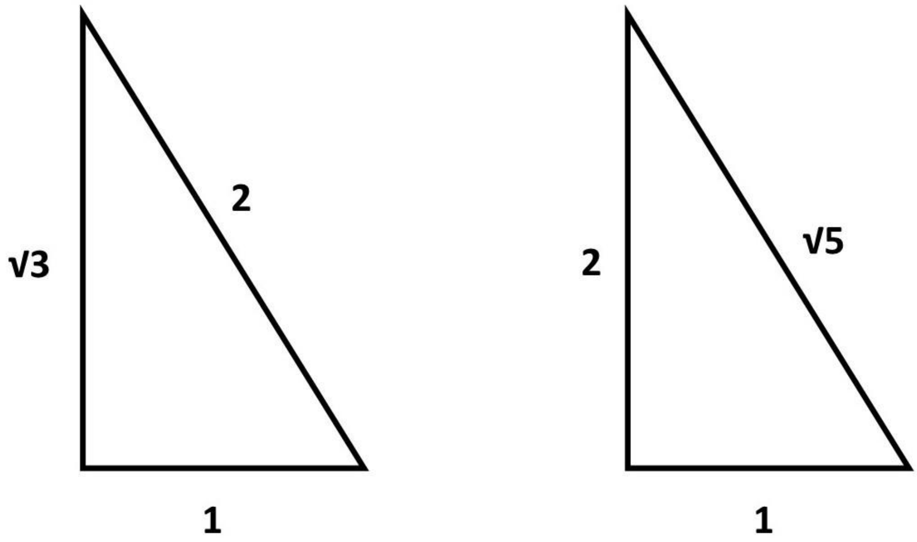


Figure 34

We have a right triangle (ratio 1:2) of which side A is 3 cm and side B is 6 cm, how big is the hypotenuse C. The calculation goes as follows, side B - side A = 6 - 3 = 3 x √5 = 6.7 cm.

Suppose side A is 4 cm and side B 8 cm, how large is the hypotenuse C. The calculation goes as follows: side B - side A = 8 - 4 = 4 x √5 = 8.94 cm.

<u>If you want it even easier, suppose side C is side A x √5.</u>

You also do this for the other triangle in the ratio 1: 2: √3. <u>Side B is side A x √3.</u>

Before we go to shaft angle 7-8, I would like to briefly discuss shafts 10, the extended version can be read in the publication 'fundamental mathematics of the Great Pyramid'. Shafts 10 indicate North and South. One shaft was oriented 4,500 years ago to the star Thuban (the then pole star) and the other shaft is aimed at Orion's Belt. With this shaft you can determine the time, days and years (sidereal time).

Now we are going to look at the angle 8-7 of the Pyramid shafts.

This is the 40° shaft that is located in the 'queen's chamber'.

It indicates an apex angle of 40°.

What can we do with this?

I am explaining this to you from the knowledge of the Great Pyramid on the Giza plateau in Egypt, and, then I move on to another unique Pyramid, that is located in Guatemala.

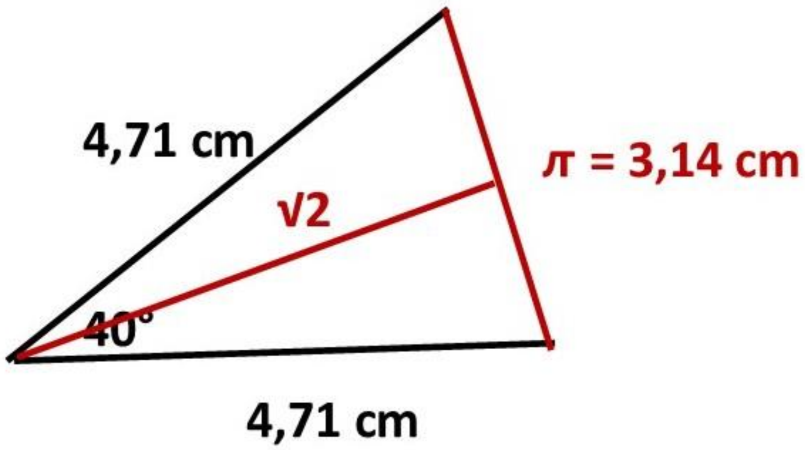


Figure 35

If I extend the long sides of the 40° triangle until the opposite side is 3.14 (the number π), then the height is (3.14) π x √2 = 4.44 cm. The long sides are then 4.71 cm. Together they are then 2 x 4.71 = 9.42 cm.

This indicates that the long sides (9.42) divided by (3.14) π = 3 cm.

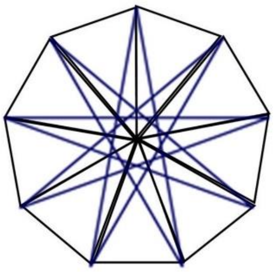
As you know, I have already stated that:

$$\pi = \frac{\sqrt{2}+\sqrt{3}}{\sqrt{1}}$$

Here, the sum of √2+√3 is the circumference and **√1 is the diameter**.

In the case of the 40° triangle, the long sides are the circumference, and the diameter is circumference divided by (3,14) π, so in this case is 3. So, it's reversed: diameter x (3.14) π = circumference

Then you can measure out a nine-pointed star on a circle from the 40° triangle and determine an Enneagram.



A nice side effect is if you draw the lines of the Enneagram 9 cm long, you get a nine-sided polygon of 9 x π (3.14 cm).

The knowledge of the 40° triangle was not discovered by me in the Great Pyramid, but the Enneagram was. An interpretation of this can be read in the publication 'Fundamental Mathematics of the Great Pyramid'.

The (deeper) knowledge of the 40° triangle has been given to me by studying the 'Pyramid of the Jaguar' in Tikal in Guatemala, figure 36.

Figure 36

Chapter 6

The number 444

Everything starts with the number 444. This number represents the height. From this number (height) everything is dissected.

Figure 37

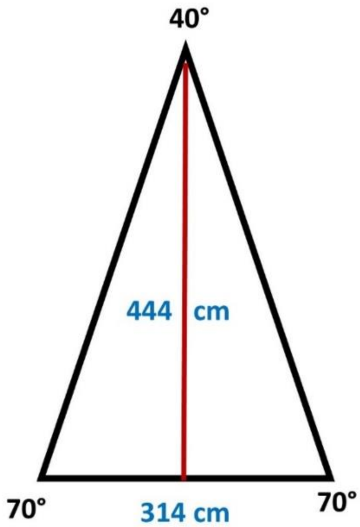


Figure 38

If you extend the imaginary lines to the top of the Pyramid, you get a top angle of 40°. The height of the 'Pyramid of the Jaguar' in Tikal is estimated at about 44 meters and between 30 and 34 meters wide. Now you have to take into account the construction, the subsidence over time and the inaccuracy in and during the building process at that time. An architectural building plan is therefore always available for the construction. By studying the Pyramid, you can trace back the building plan. Figure 38 shows the imaginary straight lines and angles of the Pyramid.

It is important that you realize that **this is the inside of the Pyramid** (similar to √1-√2-√3 at the Great Pyramid in Giza, Egypt, see booklet 'Fundamental mathematics of the Great Pyramid').

The Pyramid of the Jaguar is made up of 4 triangle faces and a base, see figure 39.

Figure 39

We'll start with the inside. If we divide the apex angle of 40° and make it a right triangle, you get a triangle of 20° - 90° - 70°. See figure 40 and figure 41.

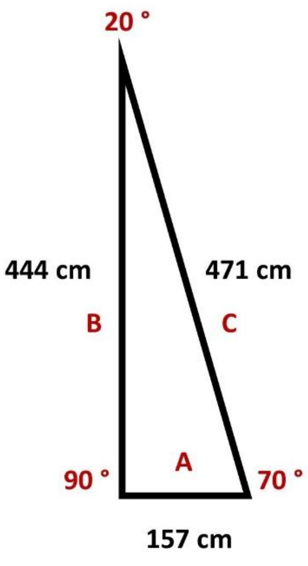


Figure 40

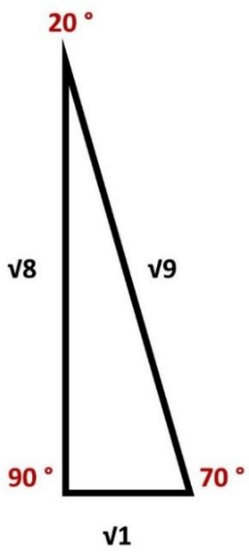


Figure 41

Side A = 157 cm, side B = 444 cm and side C = ($A^2 + B^2 = C^2$) 471 cm.

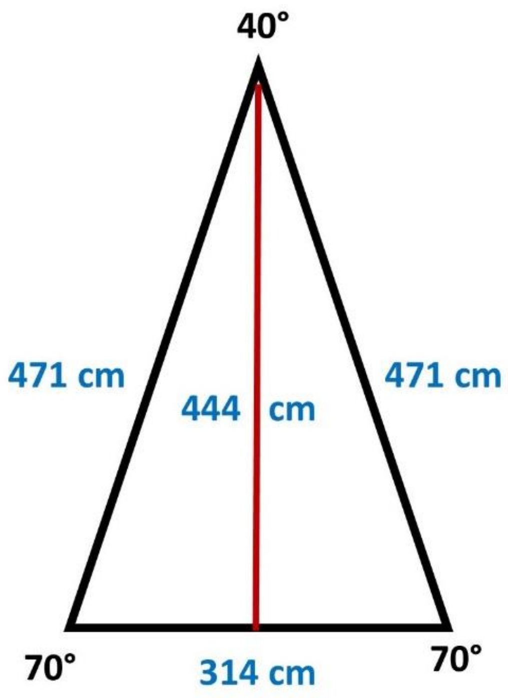
It is now important to study whether there is **a relationship**. That's why you divide 44.4 by 15.7. The result is then 2.83. This is squared 8.

You can then say that side B is $\sqrt{8}$ to side A, which is then $\sqrt{1}$. Then you divide side C by side A = 47.1/15.7 = 3. The square of 3 is 9. Side C is then $\sqrt{9}$ to side A, which is $\sqrt{1}$. The ratio is then complete, see figure 41, $\sqrt{1}$ - $\sqrt{8}$ - $\sqrt{9}$.

You do not need to be a scholar to realize that this ratio is essentially equal to the ratio of the Great Pyramid at Giza ($\sqrt{1} + \sqrt{2} = \sqrt{3}$), ($\sqrt{1}^2 + \sqrt{2}^2 = \sqrt{3}^2$) = ($A^2 + B^2 = C^2$).

The ratio of the 'Pyramid of the Jaguar' in Tikal is thus ($\sqrt{1} + \sqrt{8} = \sqrt{9}$), ($\sqrt{1}^2 + \sqrt{8}^2 = \sqrt{9}^2$) = ($A^2 + B^2 = C^2$).

What else do you see on the inside of the Pyramid? See figure 42.



If you divide the sum of hypotenuses C = 942 cm (circumference) by the base side A = 314 cm then the result is 3, then 3 x 3.14 equals the circumference. 3 is then the diameter.

Figure 42

If you add up the hypotenuses, you get 942 cm (2 x $\sqrt{9}$). If you then divide this again by 314, you get 3. If you now simplify everything by 100, you get 3.14 (π) x 3 (diameter) = 9.42 cm (circumference).

So, you now also see how within the 'Pyramid of the Jaguar' in Tikal the square ratio $A^2 + B^2 = C^2$ emerges and how the number π (3.14) gets its value.

In the Great Pyramid of Giza, the square ratio was made up of $\sqrt{1}^2 + \sqrt{2}^2 = \sqrt{3}^2$, and the number π was made up of $\sqrt{2} + \sqrt{3}$ divided by $\sqrt{1}$.

In the 'Pyramid of the Jaguar' the square ratio is made up of $\sqrt{1}^2 + \sqrt{8}^2 = \sqrt{9}^2$, and the circumference is determined from the 40° triangle in figure 42, $(2 \times \sqrt{9}) = (x) \times (3.14)$.

You can also say that the height (444) is everything. Knowing that the height is $\sqrt{8}$. This means that the base side A of the 40° triangle is equal to $(444 \text{ cm} \times \sqrt{8}) \times 2 = 314$ cm rounded.

We are now going to look at the outside of the Pyramid.

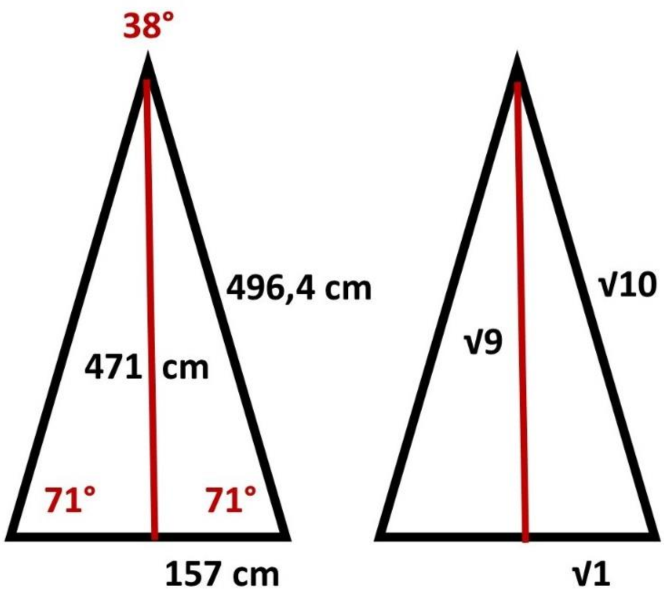


Figure 43

The hypotenuse C ($\sqrt{9}$) of the inside is 471 cm, now becomes side B ($\sqrt{9}$) on the outside because we always work with straight lines, see figure 43. The hypotenuse is then 496.4 cm on the outside.

If you now divide the hypotenuse C by side A 157 cm, you arrive at (√10). There are always (negligible) decimal deviations when working with decimals.

Side A 157 x side C (√10) = 496.4 cm (Figure 43).

You can see how perfectly the 'Pyramid of the Jaguar' in Tikal is built.

How do you know that the apex angle on the outside is 38°? I already explained this once in chapter 2 (Trigonometry).

You are going to return side C of the triangle to the standard 6. 496.4/6 = 82.73. Then you reduce side A by a factor of 82.73. 157/82.73 = 1.897. This x 2 = 3.795 x 10. Rounded off 38°.

Standard triangles.

With $A^2 + B^2 = C^2$ and the method described in Chapter 2 (Trigonometry), you can calculate all missing angles and sides. This can be intensive at times, so there are some standard triangles in this booklet that make it easier to calculate sides.

In our modern times we know the standard triangle 30° - 60° - 90°, in the ratio 1: 2: √3. If the hypotenuse C is to side A in the ratio 2:1 then side B is (A x √3).

That also applies vice versa. If the straight side B has a ratio of 2:1 to side A, then side C is (A x √5)

The 'Pyramid of the Jaguar' shows us two more standard triangles.

So, the first standard triangle is on the inside.

If the hypotenuse C is related to side A in the ratio of 3:1 then the straight side B is (A x √8)

Then the outside.

If the straight side B is to side A in the ratio of 3:1 then the hypotenuse is C (A x √10).

All four in a row, see figure 44.

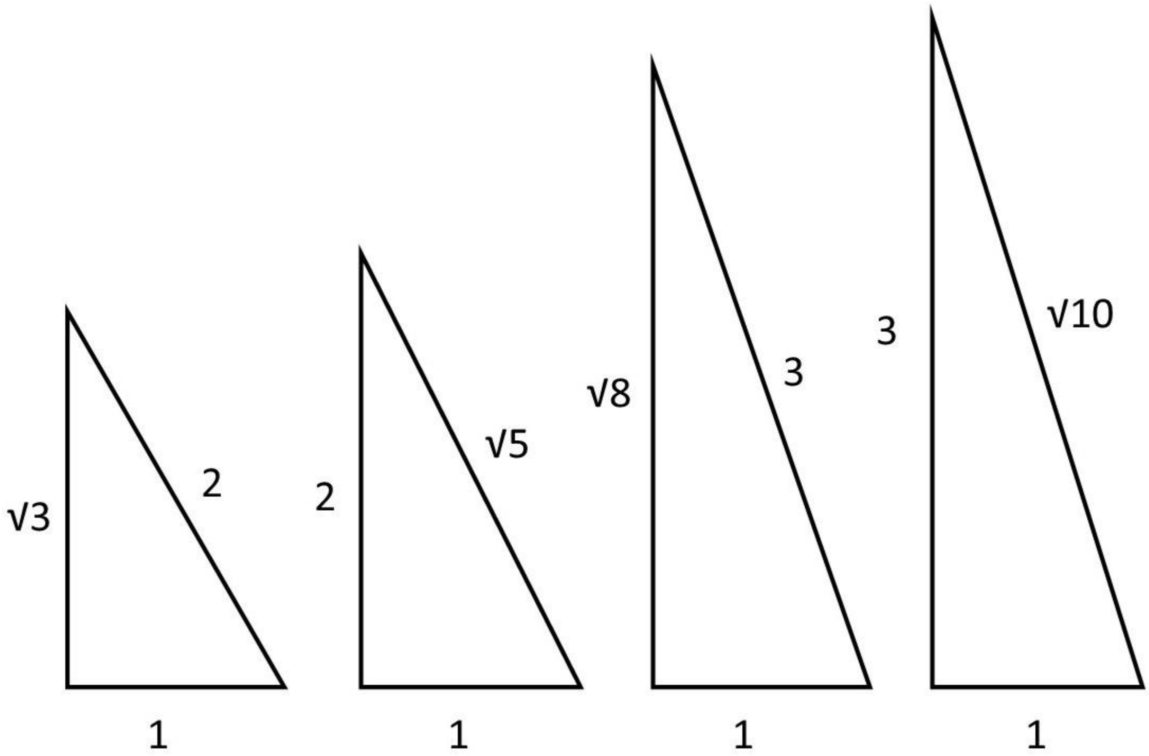


Figure 44

The first two proportions are based on the Great Pyramid of Giza and the last two on the 'Pyramid of the Jaguar' at Tikal.

All in all amazing, don't you think?

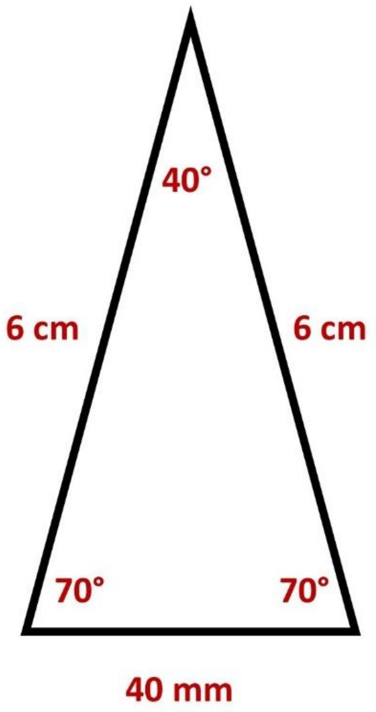
The Pyramid of the Jaguar exudes perfection. It is made up of a square base in the ratio of 4 x *π*, and triangle sides in the ratio √8 - √9 - √10.

What else can you find in the 'Pyramid of the Jaguar'?

As I mentioned earlier with the Great Pyramid of Giza, a circle is designed by means of an equilateral triangle in the ratio 6: 6: 6. If you put six equilateral triangles together, you get the perfect circle where the angles are equal to straight lines in proportion to the equal angles on the circle.

How are things at the 'Pyramid of the Jaguar' in Tikal?

So, you have given a triangle of 40° - 70° - 70°, see figure 45.



In a triangle in the ratio 40° - 70° - 70°, the opposite side of the 40° angle is 40 mm and equal to the angles of a circle, if the hypotenuses are 6 cm.

Figure 45

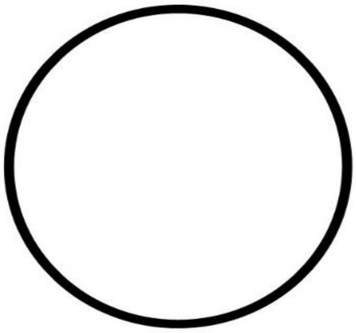
So, if you know this, you can easily determine the angles of a circle without needing a protractor. But even more important is how to design a 360° circle. How do you do that?

Imagine, you don't have a standard 360° circle yet.

How are you going to extend 360 equal lines on the circle from the center that are all 1 mm apart?

You also don't have a protractor because you can't design it until you've designed a circle, then you can only match a standard mold (protractor) to it.

See a (blank) circle below. How can you start plotting 360° from the center on this (blank) circle with a 40° top angle?



You do this by placing 9 triangles in the ratio 40°: 70°: 70° with hypotenuses of 6 cm next to each other, as shown in figure 46.

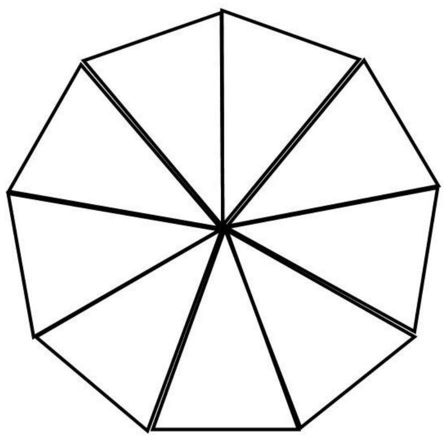


Figure 46

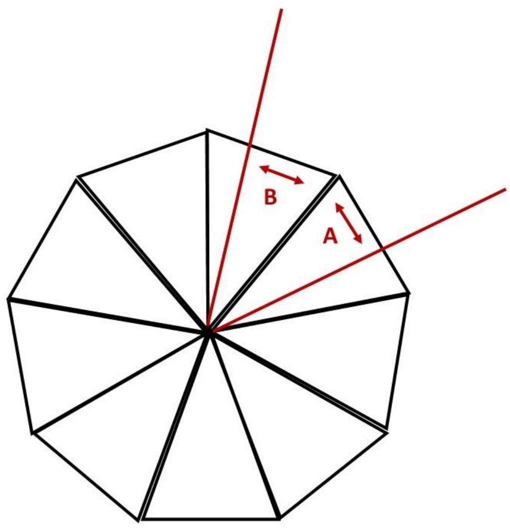


Figure 47

You now have a nine-sided polygon, 9 x 40 mm which is equal to 9 x 40°. You can then continue 360 lines on the circle. How do you determine the degrees in the nine-angle?

Suppose you want an angle of 55°. For example, you plot an arbitrary line to the right, see figure 47. Then determine 55 mm to the left or right (left or right) according to straight lines. Then you have an angle of 55° that is equal to the 55° angle of the circle.

An important fact about the 'Pyramid of the Jaguar' is that it is made up of nine layers on the outside. These nine layers have cosmic significance, as is the case with the Great Pyramid of Giza. I will not go into this in this book. The number 9 was an important number. It stands for the Enneagram, see figure 48.

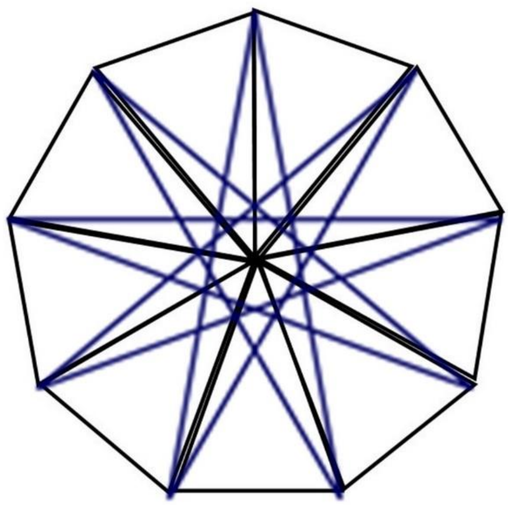


Figure 48

The Enneagram can again be determined from the nine angles of 40°.

Resume.

We are now almost at the end of this booklet. It describes everything I have discovered by studying the Great Pyramid of Giza (Egypt) and the Pyramid of the Jaguar at Tikal (Guatemala). I've asked myself how it is possible that two (very old) unique Pyramids (there is no third of their kind) on two different continents are essentially the same. America was not discovered until 1492.

Chapter 7

Philosophical moment

What inspired me during my research were the numbers. Math often shows you more than you think. We search for the origin and state that the Universe is 13.75 billion years old. We are looking for the absolute beginning of creation, when there can be no absolute beginning.

Calculating with numbers can be practical. It can also give you insight into the theory of existence, which I advocate.

Everything that exists can never not exist. And anything that doesn't exist will never exist.

Because you exist as a human being, you therefore live within existence. You are born within existence, and you will never be able to leave existence (at most you will change form). And everything that does not exist will never be able to exist within existence.

It may seem difficult to realize, however, every beginning precedes that which creates the beginning. It is like a series of numbers that does not begin and does not end. There is only 1 number as a base. And we do everything with this base number. This number is 1.

All other numbers are derived from 1. So, 3 equals 1 + 1 + 1. Without the awareness of 1 we would never be able to calculate or anything. So, the number 1 is the absolute beginning.

Now start adding: 1 + 1 = 2, + 1 = 3, + 1 = 4, and so on. When do you get to the final number? Now subtract: 1 - 1 = -1, - 1 = -2, - 1 = -3, - 1 = -4, and so on. When do you get to the starting number?

The images below are a cake and a rocket. Suppose you cut pieces of the cake. When do you cut off the last piece that can no longer be divided?

Suppose you step into a rocket, and you fly at the speed of light, 300,000 km per second, in one fixed direction (course). You fly forever, in the same direction. When do you encounter the end, or rather when do you encounter something that does not exist?

The Universe is like the number 1. And that's all there is. You can add all parts within the Universe to 1 or decompose from 1.

Whichever way you choose: Everything is 1 and 1 is Everything.

And if you know this, then you also know that man is a part of all this within the Universe (1) and wherever you go and stand, you will never be able to leave the Universe (1). You will always be within existence (1) and you will never be able to get out of it. Reason is because nothing exists outside of the 1 (Universe).

Is the number 0 a number?

Yes and no. There are 9 value numbers, and these 9 value numbers are all we have. 1,2,3,4,5,6,7,8,9. Every number has its value. The number 0 is not a value number, but a complement number. The 0 is needed to increment a number cycle, 10, 20, 30, etc.

Final summary.

This booklet is intended for anyone who wishes to acquire the knowledge described herein.

The booklet shows how you can look at things in a different way, if you don't see the traditional way as the only way and start investigating whether it can be done differently.

This was the starting point in everything.

Could it also be different from what we think and have established?

And if so, how?

By posing these two questions to me each time, I kept investigating and found more knowledge than I expected.

September 2021

We are looking for the treasures of the future and

do not see the gold of the past.

ISBN: 978-90-9035269-5