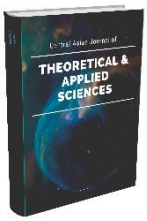

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Fundamentals Of Designing Triangles Into Sections Equal 5, 7, 9, 11, 13, 15, 17 And 19

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Abstract: *In this article designed two kinds of triangles to divide the circles into equal odd parts, with almost high accuracy. The design based on an arbitrary triangle with two sides of integers and with a third side of integers in the accuracy of 0.000001 mm.*

Keywords: *The Circumference, uneven, equal, a part, fission, triangle, designing, practically exact, cathartics, hypotenuse, theoretically, segment, practically, chord, length, scholastic instrument.*

Based on the design of triangles with angles (in degrees) 30x60 and 45x45, which are widely used in practice, the ratio of the angles 30x60 between the opposite or lateral catheter and hypotenuse of the right triangle is Sin300 = Cos600 = 1/2, while in the 45x45 right-angled triangle Is 1, i.e. tg450 = 1 [1] .

Using these triangles, it is common knowledge to divide the circle into 2, 3, 4, 6, 8, and 12 equal parts. We have conducted research to advance the idea that “it is also possible to design triangles” that are practically clear to equal odd parts of a circle that are easy to use, such as triangles.

This article aims to find arbitrary triangles in AutoCAD that correspond to the central angles of segments 5, 7, 9, 11, 13, 15, 17, and 19, and to design triangles based on them.

To do this, a mathematical calculation program was developed to construct a triangle with two sides and a third side attached to a given central angle to the nearest 0.000001 [3], and the following results were obtained[2]:

The value of the sides of an arbitrary triangle whose two sides are an integer and the third side is an integer with an accuracy of 0.000001 mm:

- ✓ dividing the circle into five: 199 mm / 534 mm / 509 mm;
- ✓ dividing the circle into seven: 127 mm / 131 mm / 112 mm;
- ✓ dividing the circle into nine: 241 mm / 377 mm / 247 mm;
- ✓ dividing the circle by eleven: 166 mm / 601 mm / 470 mm;
- ✓ dividing the circle into thirteen: 369 mm / 568 mm / 296 mm;
- ✓ dividing the circle into fifteen: 418 mm / 779 mm / 432 mm;
- ✓ dividing the circle into seventeen: 234 mm / 602 mm / 393 mm;
- ✓ dividing the circle into nineteen: 371 mm / 555 mm / 237 mm.

In order to reduce the number of triangles in the design, they designed in two. While the first triangular circle divides the circle into practically equal 5, 11, 15, and 19, the second will divide the circle into 7, 9, 13, and 17.

Design work done in AutoCAD. The first and second of arbitrary triangles with sides of an integer made as follows:

1. The dimensions of the teaching aids for teachers analyzed and the long side of the projected triangles taken to be 560 mm;

2. To design the first triangle, from the first end of this side, the left sides of the triangles (as in Fig. 1, a) are drawn, the sides of which are mathematically calculated and the left angles are 360/5 and 360/15. From the other end, the right sides of triangles with right angles 360/11 and 360/19 are drawn, as in Fig. B, Fig. 2.

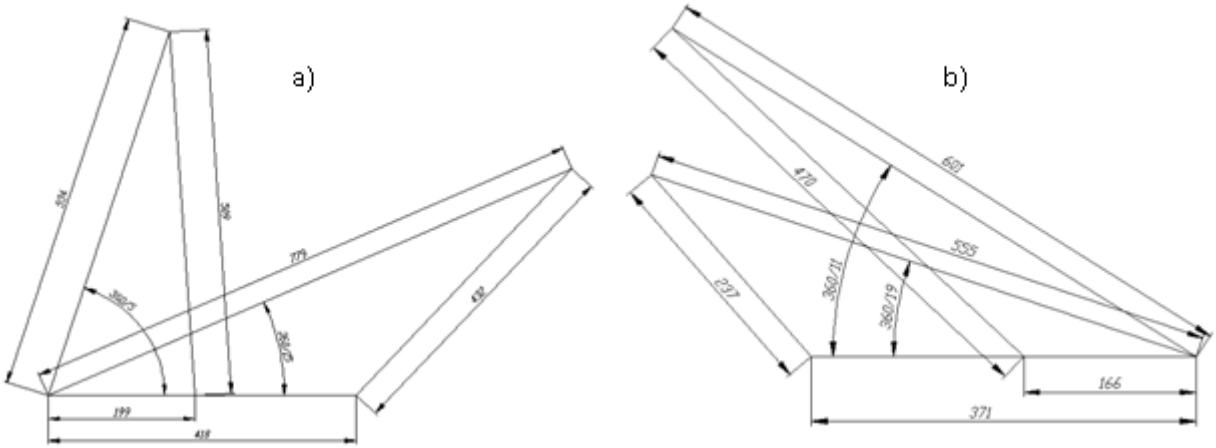

Figure 1

3. The transferred sides intersect to form the base points to form a triangle. As it is made of a wooden rail with dimensions 4x30 mm, the first triangle is designed by drawing straight lines parallel to the sides of the triangle, at a distance of 30 mm from it.

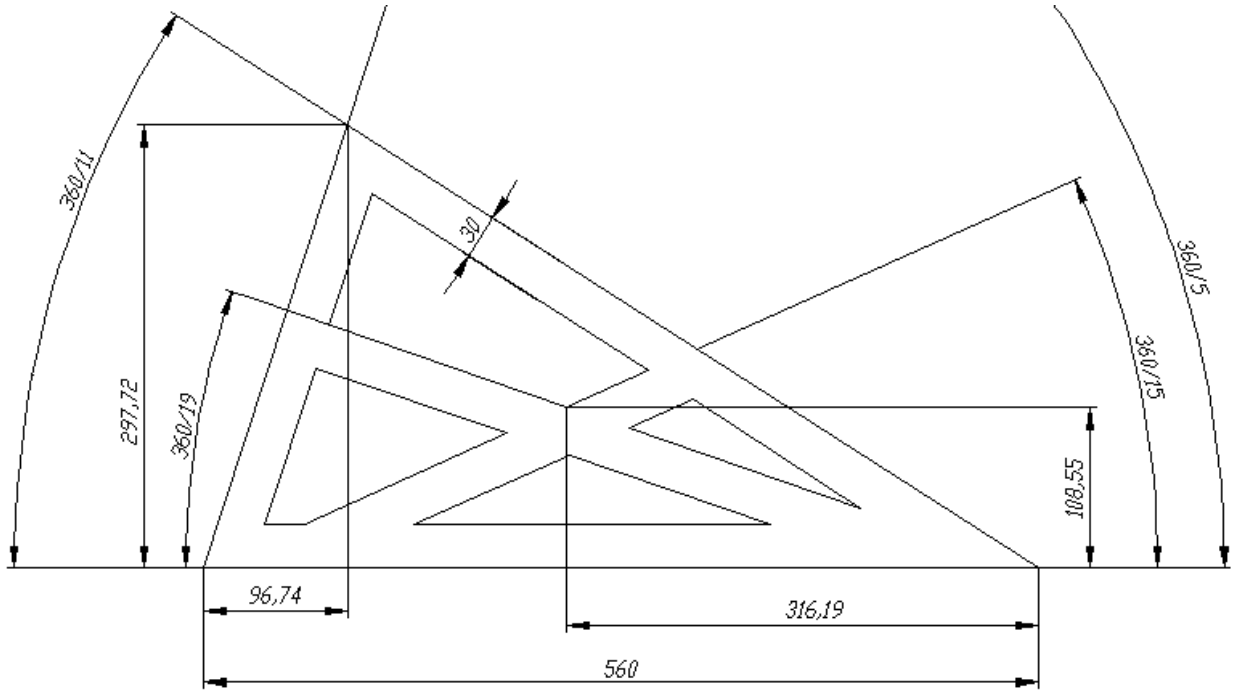

Figure 2

The second triangle with the left end angle 360/7, 360/17 and the right end angle 360/9, 360/17 is also projected as the first triangle is made, Fig. 3.

Their ready-made clear images are shown in Figure 4.

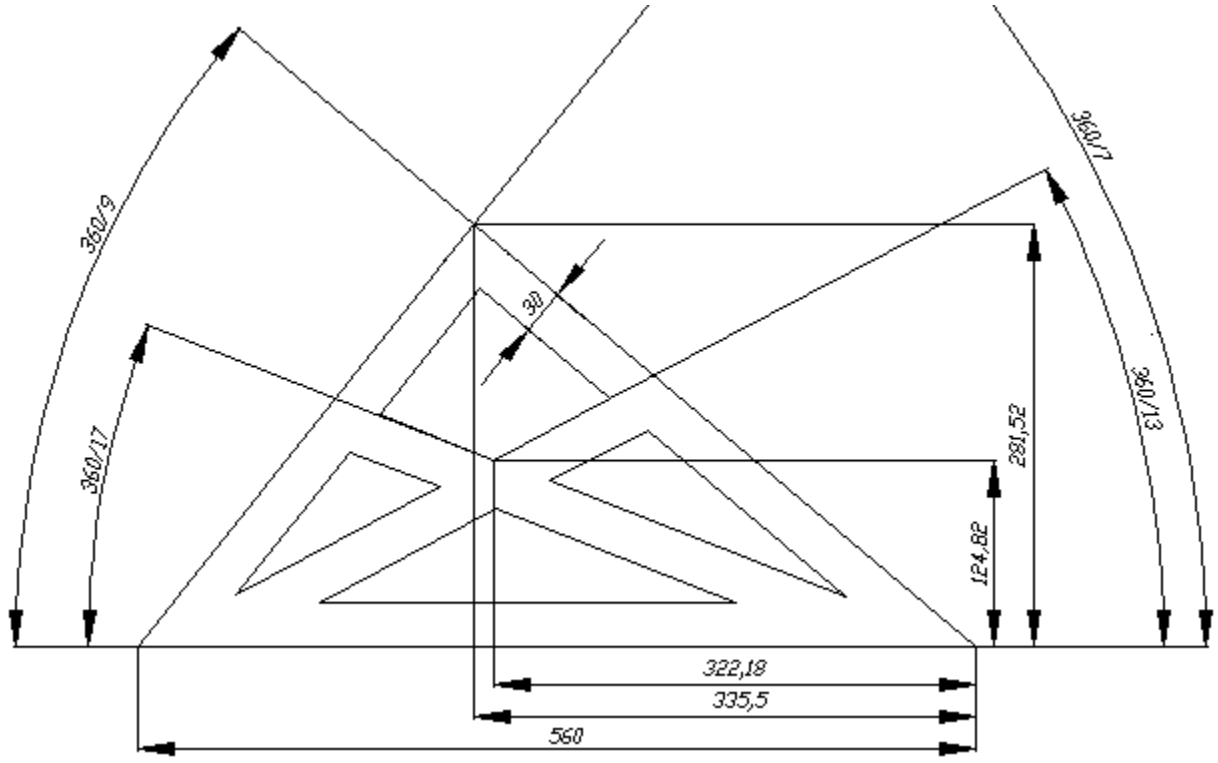

Figure 3

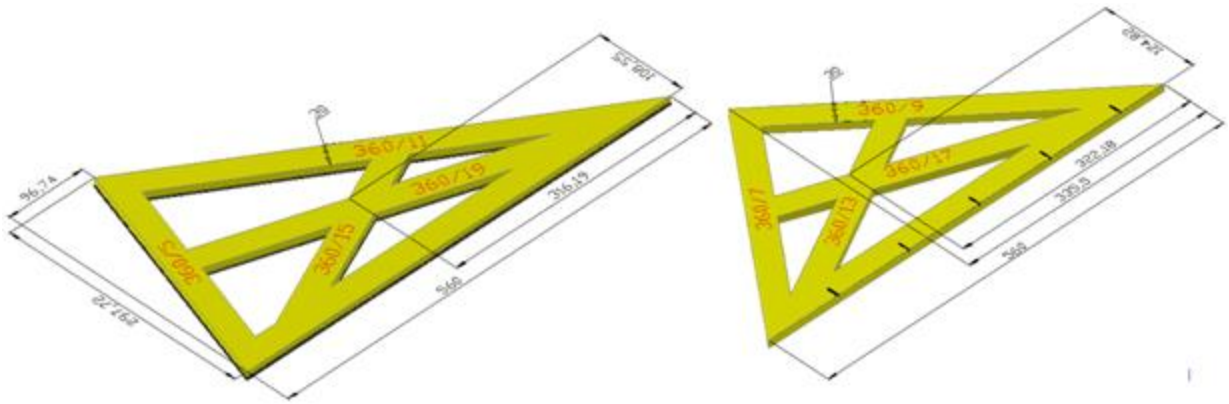

Figure 4

The drawings were designed to be made on paper, i.e., for the reader, student, and designer, by reducing such triangles to two times, Figures 5 and 6.

They can also be made of materials such as wood, plastic, or organic glass.

Let us now consider the use of these triangles in dividing the circle into equal odd parts. For example, let us say the condition is “Divide a circle with a diameter of 200 mm by 13”, Figure 7.

To the center of the given circle, place a second projected triangle with angles 360/7, 360/13 and 360/9, 360/17 as shown in Figure 7, from which a straight line is drawn along the 360/13 edge of the triangle.

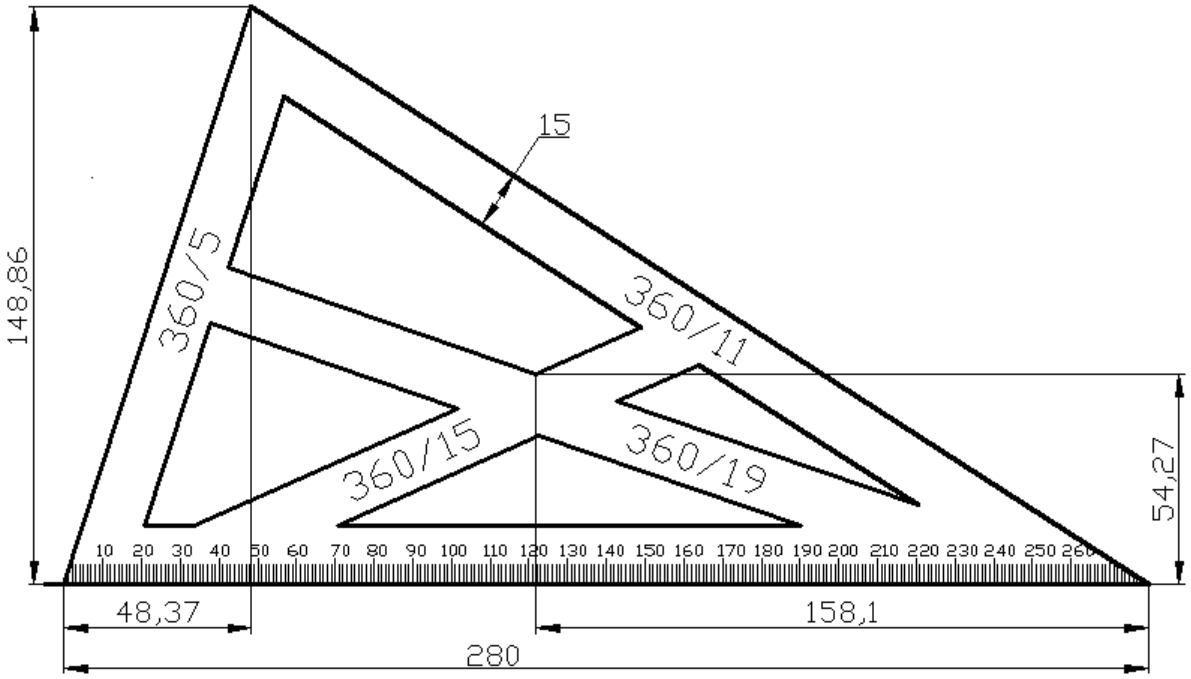

Figure 5

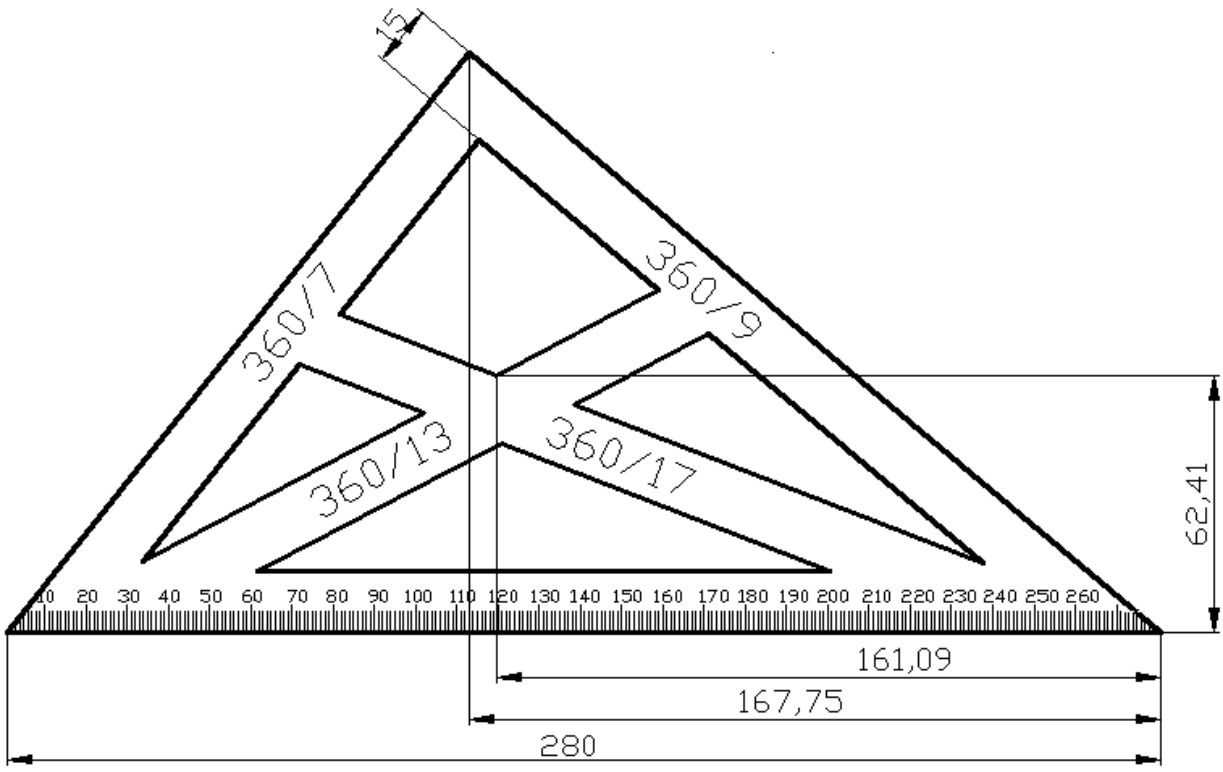

Figure 6

The converted OV intersects the circle with a straight line, forming a watt length AV that divides the given circle by 13. When it placed around the circle twelve times using a compass, it observed that the last point merged with point A, i.e., the given circle divided into 13 equal parts. In order to verify that this was indeed the case, the manual graphical operations analyzed by performing them on a computer, Fig. 8.

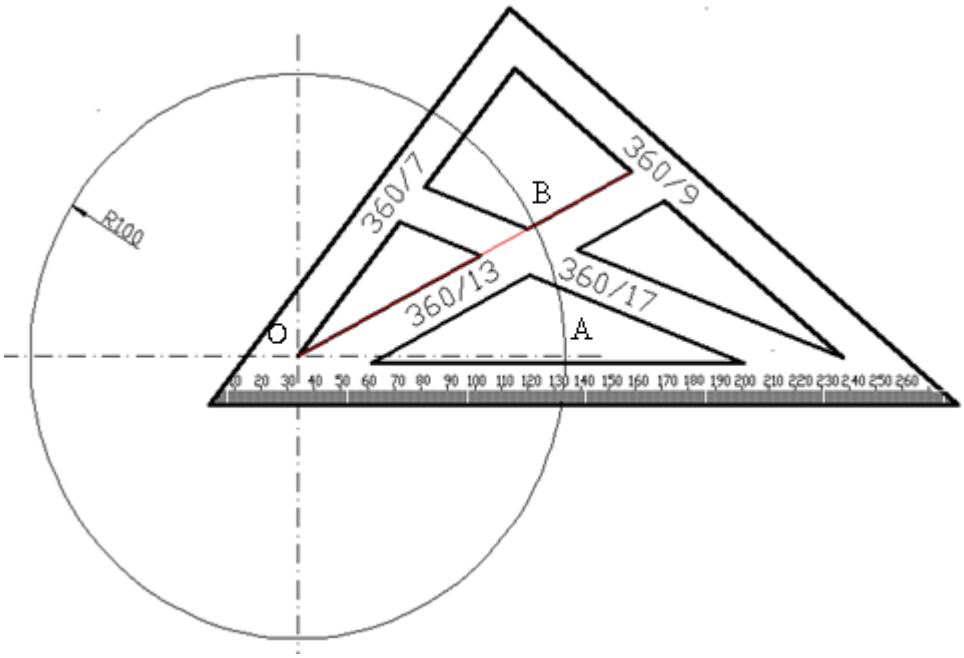

Figure 7

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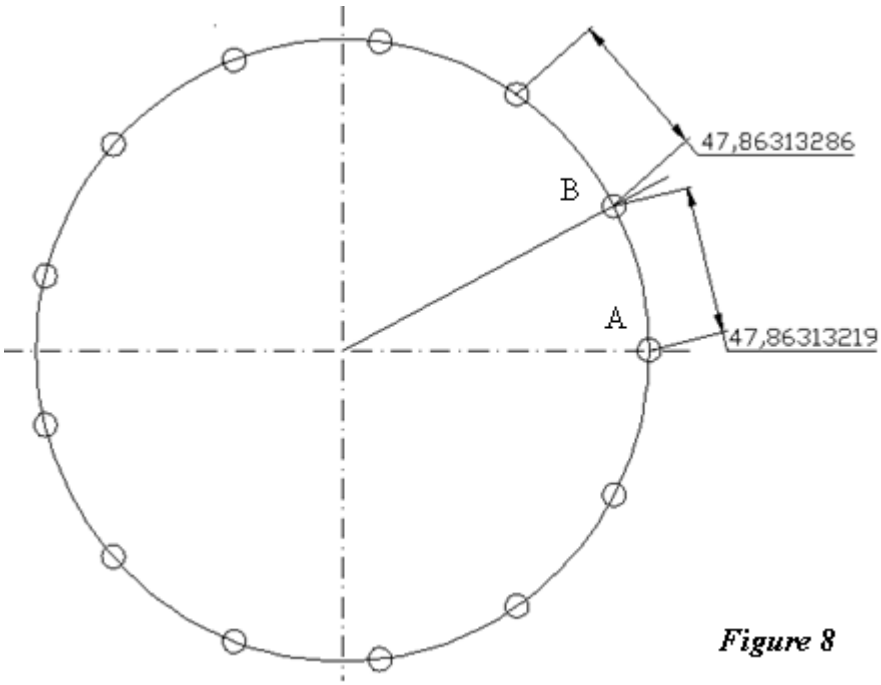

Figure 8

The analysis showed that the applied vatar length was equal to the theoretical vatar length. Since their difference was 0.0000006 mm, it was assumed to be practically equal. This means that the designed triangles can be widely used in practice.

Thus, based on the design of triangles that divide a circle into evenly spaced 5, 7, 9, 11, 13, 15, 17, and 19 parts, the values of the sides of an arbitrary triangle found with very high accuracy using a computational program are practical and true. showed that. The triangles were designed as a teaching tool in two rounds, for teaching on the classroom board, i.e. for teachers, and for drawing on paper, i.e. for the reader, the student, and all users. It is used to divide the circle into 5, 11, 15, 19 equal to the first and 7, 9, 13 and 17 from the second.

The mass development of these two types of triangles will remain one of the next tasks before us.

References:

1. Alimova N. and others. Some theoretical and practical aspects of dividing the circle into equal parts 5, 7, 9, 11, 13, 15, 17 and 19 [Aylanani 5, 7, 9, 11, 13, 15, 17 va 19 ga teng qismlarga bo'lishning ba'zi nazariy va amaliy jihatlari] //Conference materials of IA, Tashkent State Pedagogical University named after Nizami, 2013.
2. Aripov M. Information technology [Axborot texnologiyalari]. Study guide. T .: Noshir 2009.
3. Otojonov R.K. Methods of geometric construction [Geometric yasash metodlari], T. Teacher, 1978.