Modern American Journal of Linguistics, Education, and Pedagogy
ISSN (E): 3067-7874
Volume 2, Issue 5, May, 2026
Website: usajournals.org

CIRCLE EQUATION

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Abstract
to make an equilateral inner Pentagon that attempts a circle with radius R and center O in the article, the desired circle radiusiR is calculated by multiplying the coefficient K by the size of one side of the regular pentagonal Watar L distance, that is, the radius value R1 has been determined.

Keywords: Regular, radius, diameter, point, drawing, perpendicular, circle, rectangle, circle, equal, side, value, tangent.

Introduction

In engineering and construction, it is often necessary to divide a circle into equal parts. For example, it is used in the manufacture of gears, drilling holes in flanges, creating regular polygons, and creating geometric patterns in the form of a star, which are used in architecture. Any diameter, that is, a straight line passing through the center of a circle, divides it into two equal parts. Two diameters that are perpendicular to each other divide the circle into four parts. A circle can be divided into eight parts by dividing each part in half, then into 16 parts, and so on. If the points formed by dividing the circle are connected, the sides of a regular square (square), octagon, hexadecagon, etc. are formed. Now let's look at the practice of determining the length of a circle by spreading it into a straight line. For example, in practice: it is used to decorate boxes, vases, and other objects with a rotating surface. It is known that the length of an arc of a circle is found using the formula $2\pi R$. Below, we will consider the idea of determining the length of a circular arc graphically by constructing polygons internally tangent to the circle and extending their sides to a straight line to determine the actual length of the circle. To solve this problem, we will consider examples of determining the actual length of a circle by constructing regular polygons with internal tangents

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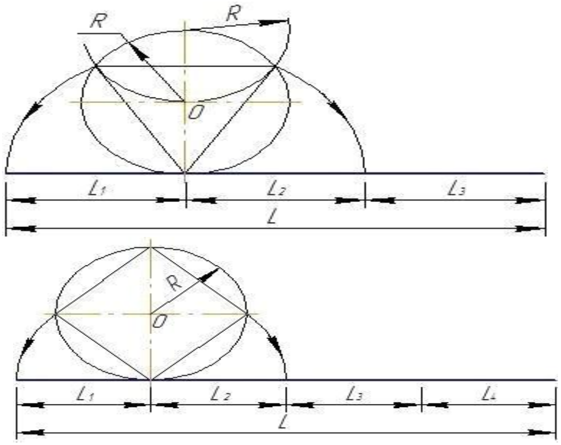
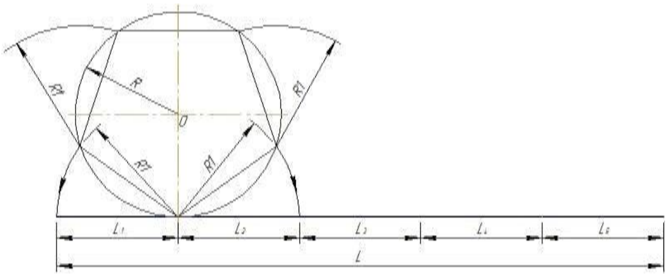
to the circles below. We will use regular polygons to determine the length of a circle graphically. • example. In a circle with a radius of *R*35 mm and a center at Point O, when the uriner made an equilateral triangle and spread its sides in a straight line, the length of the sides of the equilateral triangle was equal to 118.8 mm (Figure 1).



By making an inner urinating Square in a circle with radius *R*35 mm and center o at the tip, the length of the sides of the straight Four Corners was 181.2 mm when spreading its sides in a straight line (Figure 2).
(Form 2
• example. By making a regular pentagon internalizing into a circle with a radius of *R*35 mm and a center of 0 dots, and spreading the sides of the Pentagon in a straight line, its length was equal to 198 mm (Figure 3).



A regular hexagon was inscribed in a circle with a radius of *R*35 mm and a center at point O. The sides of the regular hexagon were extended to a straight

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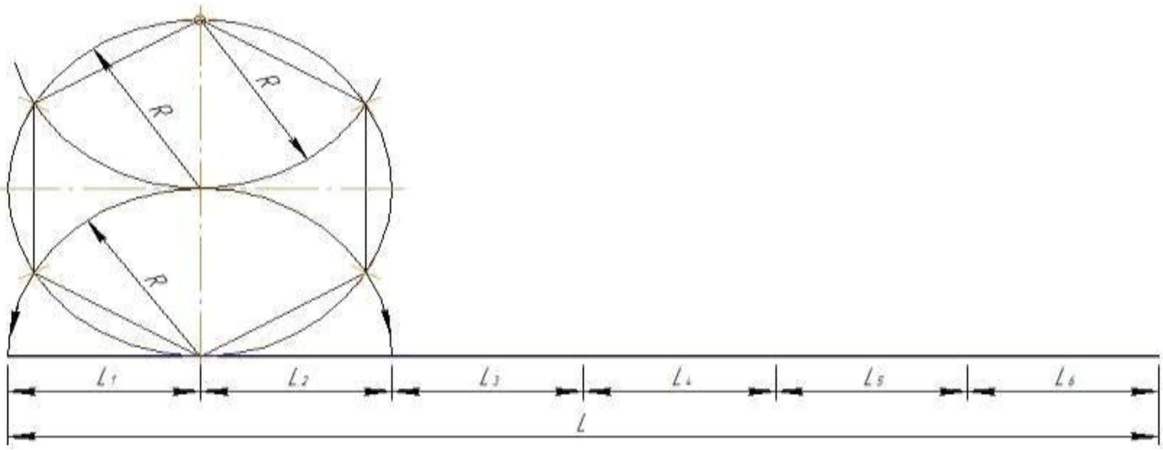
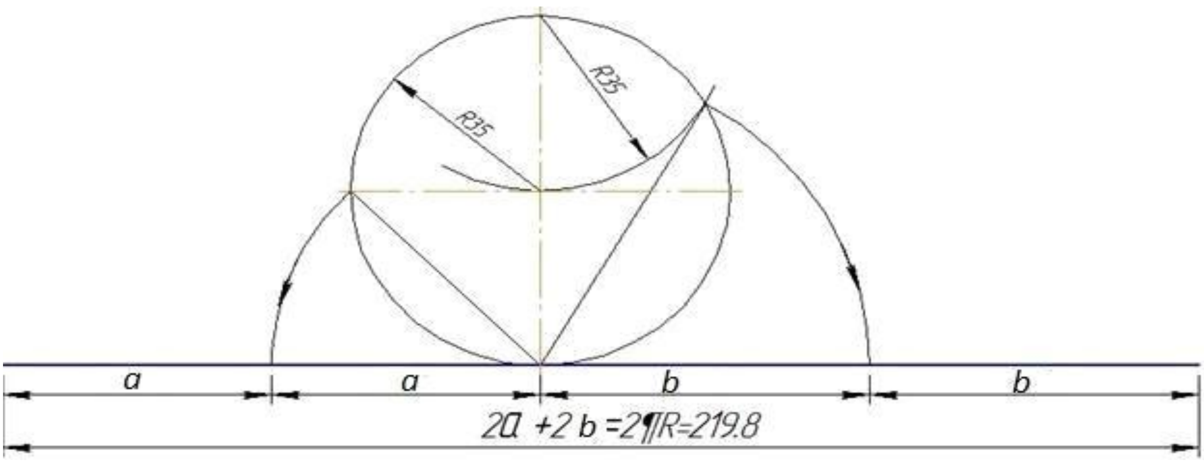
line, and the length of the sides of the inscribed hexagon was 213 mm (Figure 4).





Drawn on a circle with radius R35 mm and center at Point O, the individual uriner spread a quarter of the regular quadrilateral twice and the inner uriner drawn on that circle spread 1/3 of the regular triangle twice in a straight line. The length of the resulting arc was equal to 219.8 mm
(Form 5
The sum of these four sections is equal to the length of the circle, since, $2a + 2b = 2 \cdot 49{,}5 + 2 \cdot 60{,}4 = 99 + 120{,}8 = 219{,}8$ mm.

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The length of the circle with a radius of $R35$ mm and a center at point O, found graphically, is $L = 219.8$ mm. The length of the circle, defined by the formula $2\pi R$, is also equal to $2\pi R = 2 \cdot 3.14 \cdot 35 = 219.8$ mm.

Now, let's consider the length of an arc of a circle, its spread on a straight line, and its actual length, determined graphically, using the Pythagorean theorem. To do this, the side AV of a square inscribed in a circle with a radius of $R35$ mm and a center at point O and the side AS of an equilateral triangle inscribed in the same circle were determined by forming triangles (Figure 6).

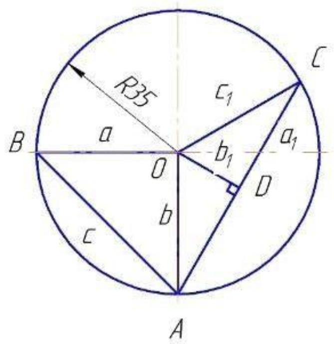

Figure- 6

The hypotenuse of a right triangle is defined as follows:

$$s2 = a2 + b2 = 352 + 352 = 1225 + 1225 = 2450$$

$$S = \sqrt{2450} = 49{,}497 \approx 49{,}5 \text{ we take that}$$

$$AV = S = 49{,}5 \text{ mm}$$

To determine the hypotenuse AS of the triangle AOS, we drop a perpendicular from point O of the triangle to side AV, resulting in two right-angled triangles AOD and SOD. The hypotenuse s1 of the triangle is known, the leg b1 is measured, it is equal to b1 = 17.6 mm, and the length of the leg a1 is determined from the formula.

$$1^2 = a\,1^2 + b\,1^2,\ 35^2 = a\,1^2 + 17{,}6^2$$

$$a\,1^2 = -\,35^2 + 17{,}6^2 = -\,1225 + 309{,}76 = 915{,}2$$

$$a1 = \sqrt{915{,}24} = 30{,}252533 \approx 30{,}2 \text{ deb we accept.}$$

$$AS = 2 \cdot a1, \qquad AS = 2 \cdot 30{,}2 = 60{,}4\ mm$$

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When the AV side of a regular quadrilateral is doubled and the AS side of an equilateral triangle is also doubled and added together,.

$AV + 2 \cdot AS) = 2 \cdot 49{,}5 + 2 \cdot 60{,}4 = 219{,}8$ mm is equal to.

In conclusion, it has been proven that the actual length of a circular arc determined graphically is equal to the length determined by the Pythagorean theorem.

Note. The error in the length of the circle determined graphically can be as much as 0.2 mm. This error can vary due to the shortcomings of the draftsman and the drawing instrument.

CONCLUSION

Determining the circumference of a circle graphically is intended for architects and people with artistic talent.

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