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DIVIDING AN ARBITRARY OBTUSE ANGLE INTO THREE AND SIX EQUAL PARTS

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ABSTRACT

The article deals with the division of an arbitrary obtuse angle into three and six equal parts. The authors of the article believe that knowledge of the methods used in geometric constructions allows drawing the outline of any product correctly, accurately execute the frame of the drawing format and mark the inscriptions. The techniques of geometric constructions are the basis for drawing, which greatly speeds up its implementation. The authors of the article suggested dividing an arbitrary obtuse angle into three and six equal parts which doesn't have any prototype.

KEY WORDS: *draw, contour, part, geometric, line, radius, circular, segment, point, arc, circle, serif, intersection.*

DISCUSSION

By geometric constructions are understood elementary planes based on the basic provisions of geometry. These include drawing perpendicular and parallel lines, division of segments, angles, etc. Knowledge of the techniques used in geometric constructions, allows to draw correctly any product, execute accurately the format frame drawing and mark inscriptions. Thus, the techniques of geometric constructions are the basis for drawing, which greatly accelerates its implementation, as it allows in each case to choose the most rational methods of construction to master the correct methods of working with drawing tools [1].

Graphic constructions are always imprecise, but the degree of imprecision can be different. Construction is more exact if it contains few operations (an operation means drawing a straight line, drawing an arc of a circle, postponing a line segment, etc.). Therefore, when solving graphical problems, constructions with the least number of operations should be chosen.

The accuracy of geometric constructions depends largely on the accuracy and attention of the worker. It is necessary to keep in mind the following:

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the drawn lines should be thin and they should be drawn with a hard pencil; the point in the drawing should be set as the point of intersection of two lines - straight lines, arcs of circles or straight line and the arc of a circle. In all cases the angle between these lines must be straight or close to it (Fig. 1). It is desirable to draw a line through two points located farther away from each other, as the possibility of deviation of the line from its true direction increases when the points get closer to each other.

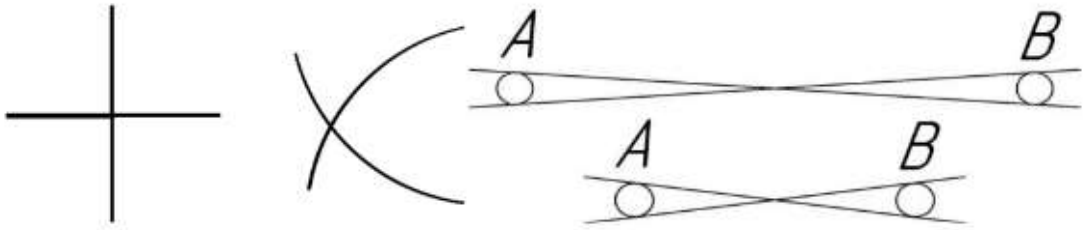

Figure 1. Angle between lines

Figure 2 shows the developed method of dividing an arbitrary angle into three and six equal parts:

- taking α as vertex A of a given angle, draw an arc of arbitrary radius R to cross the sides of the angle at points B and S;
- divide arc BS in half in the same way as in the line segment. The line of arc division will pass through vertex A and will be the bisector of the angle, i.e. it will divide it into two equal parts, the bisector will intersect with arc BS in point D;
- using points S, D, and S as centers, draw arcs of radius R = AS to extend line AS in point E, also on line AG in point E, also on line AB in point G;
- taking points E, F and G as centers, draw arcs of radius R = SE through line AE in point E, also on line AE in point I, and on line AG in point Y;
- points N, I and Y are connected by a straight line, the line NI intersects the arcs of the circle in the points K and L, also connect the points I and Y by a straight line, the line YI intersects the arcs of the circle in the points M and N;
- from vertex A draw rays through points K, L, M and N - we obtain the angle SL = LAM = MAY = 1/3 of the given angle α; the angle SL = SAL = LAI = IAM = MAN = NAY = 1/6 (Fig. 2).

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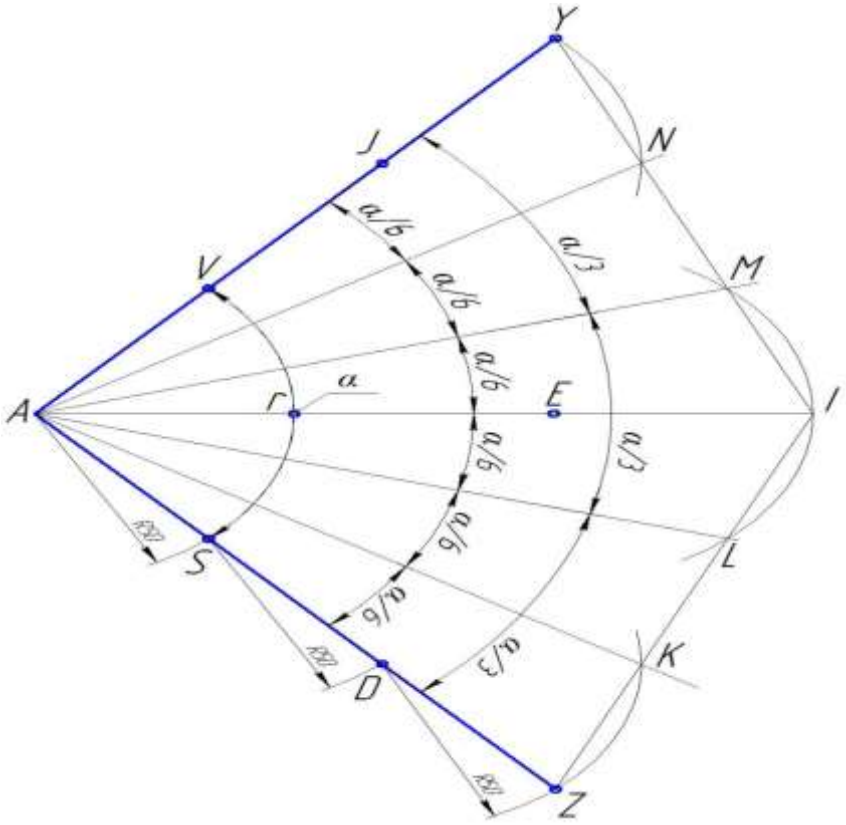

Thus, we can conclude that the division of an obtuse angle into three and six equal parts, is acceptable for accurate graphical construction and making gear sector machine parts.

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