



## **TASKS FOR INDEPENDENT STUDY COMPONENT OF SCIENTIFIC CONTENT IN COMPOSITION**

Sh. Abdurahmanov,  
Pedagogue, Associate Professor (NamMQI),

M. Mirzaabdullaev  
Graduate Students:, NamMQI,

D. Tursunalieva,  
QDPI

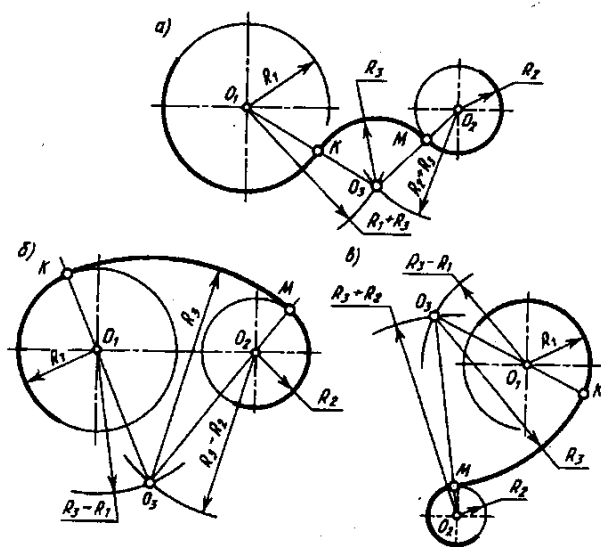
| <b>ABSTRACT</b>   | <b>KEYWORDS</b>   |
|---|---|
| The scientific article investigates the task of providing a component of the scientific content of the task of independent education on the topic of "Conjugation" in the academic discipline engineering graphics. | didactic principles, the scientific principle, independent education, the task of independent education, engineering graphics, the theme of "conjugation", geometric tangent, the Apollonius problem. |

### **INTRODUCTION**

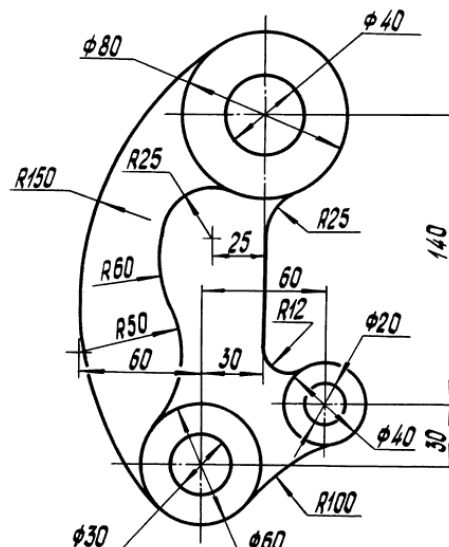
In order to ensure that engineering graphics is always attractive as an important subject of engineering education, the creation of modern, interesting (useful) and meaningful (scientific) independent educational assignments by students is becoming one of the most important scientific and methodological tasks.

Below we want to dwell on how this idea is implemented in our experiments.

The subject of "Connections" is located in the main part of the study program for the subject of engineering graphics. It is pointed out that the connections are actually problems of the intersection of a straight line with a circle, internal, external and mixed intersections of a circle with a circle (Figure 1), and the task is to draw some kind of connection diagram similar to the one in Figure 2, using drawing tools at home. From the methodical literature on engineering graphics, probably in order to ensure the interest of tasks related to connections, there are also those of various complexity, which require other types of geometric constructions in their drawing [3]. In this regard, Professor U.I. Roziev's educational-methodical manual entitled "Connections" is especially noteworthy. In the manual, various fascinating fragments of plant-like ornamentation, dozens of copper sand profiles in the original form are graphically interpreted as interesting figures of connections.[7].



1-figure.



2-figure.

If we evaluate based on the criteria of "modernity", "interestingness" ("usefulness") and "meaningfulness" ("scientificity"), which are set before the independent educational tasks performed by students in science, then the "meaningfulness" ("scientificity") of the graphic tasks related to "Tutashmal" ( ), he notices that he does not meet the criteria. The research is a theory that ensures the scientificity of the tasks in this topic, and it has shown that the geometric analysis and research of the Apollonian problem can serve the content of the topic.

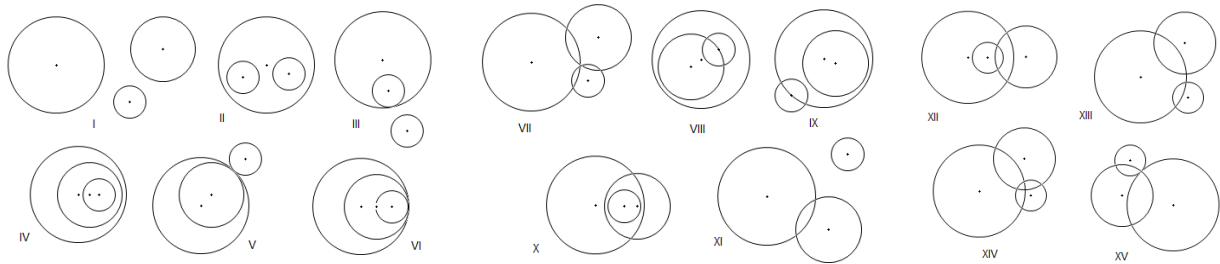
The issue of Apollonius[5]. Describe a circle that intersects three given circles. In general, these circles can be of any radius, in particular in the form of a point or a straight line. Then the Apollonian question will be of the following types.

Using a circle and a ruler:

- 1) describe a circle passing through **three points**;
- 2) represent a circle that intersects **two points** and a **straight line** (Here there are **two different cases**: the straight line passing through the points intersects with the given straight line; the straight line passing through the points is parallel to the given straight line);
- 3) describe a circle passing through a point and **two straight lines** (Here there are two different cases: the case where the given straight lines intersect; the given straight lines are parallel to each other);
- 4) describe a circle passing through **three straight lines** (There are three different cases here: three straight lines intersect and give **three points**; two straight lines are parallel to each other, the third intersects them; all three straight lines are parallel to each other);
- 5) describe a circle passing through a circle and **two points** (here there are three **different cases**: none of the points lies on the circle; one of the points lies on the circle and the other does not; both points lie on the circle);
- 6) describe a circle passing through a point and **two circles**;
- 7) describe a circle trying to **two straight lines and a circle**;
- 8) describe a circle trying to a **straight line and two circles**;
- 9) describe a circle trying to a point, a **straight line and a circle**;

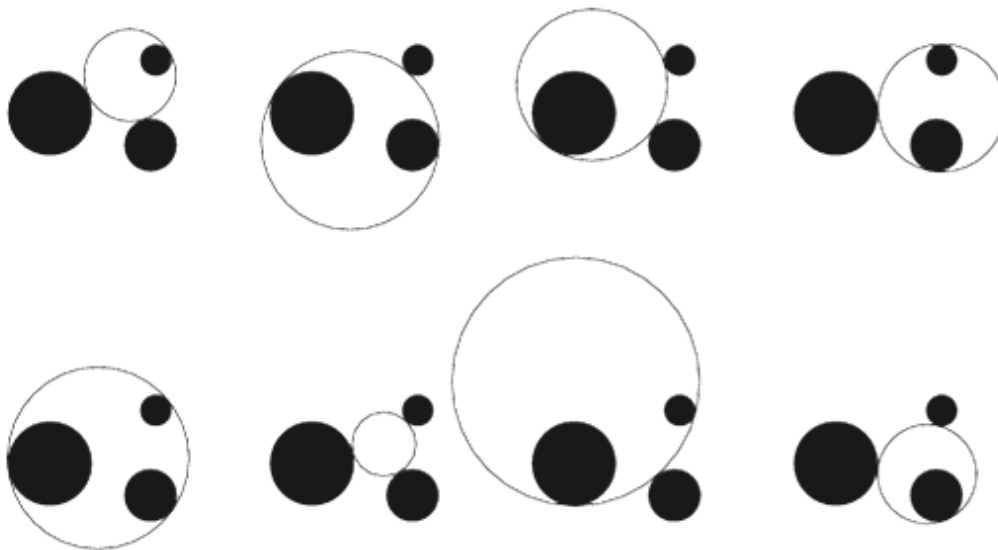
10) describe a circle that passes through **three circles**.

Professor R.K. In Otajonov's book, it is said that the last problem is illustrated in 15 different ways (Fig. 3). [6].



3-figure.

According to what is stated there, the problem of Apollonius, depending on the location of the given circles in relation to each other: 0; 2; Can have 4 or 8, or an infinite number of answers; all cases related to the presentation of this issue are presented in drawings I - XV of Figure 3 [6]. From the cases here, 8 circles are formed to meet the requirements of the problem by looking at each of I, II and XIV (Fig. 4).



4-figure.

## Summary

A specialist who has set himself the task of developing options for a student's independent task on the subject of "Connections" of engineering graphics should be well aware of the above-mentioned scientific information on this subject. Only then will the tasks compiled by him be provided with modern, interesting (useful) and meaningful (scientific) components.

## **Bibliography**

1. Абдурахмонов Ш. Чизмалар яратишда қўлланилган ҳандаса илми. – Т.: “Fan va texnologiya”, 2017.
2. Бакельман И.Я. Инверсия. – М., "Наука", 1966.
3. Боголюбов С.К. Индивидуальные задания по курсу черчения. Учеб-ное пособие. – Изд.-е 3.е, М.: «Альянс», 2007.
4. Жижилкин И.Д. Инверсия. – М.: Издательство Московского центра непрерывного математического образования, 2009.
5. “Задача Апполония” ИНТЕРНЕТ сайти.
6. Отажонов Р.К. Геометрик яшаш методлари. Тузат. ва тўлд. 2-нашри. Ўқув қўлланма. – Тошкент, “Ўқитувчи”, 1965.
7. Рўзиев Э.Л. Туташмалар. Ўқув-методик қўлланма. – Тошкент, ТМИ босмахонаси, 2005. – 64 б.