NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 6, ISSUE 10, Oct. -2020

SOLVING EXTREMINE PROBLEMS IN EXTRACURRICULAR ACTIVITIES

SOTVOLDIYEV AZAMJON OLIMOVICH,
Senior Teacher, ASU,

SATTAROV MUZAFFAR TOLIPOVICH,
Teacher, ASU.

ABSTRACT:

This article highlights the largest and smallest quantities values in a secondary school mathematics course in the maximum and minimum issues encountered in human practice and how to solve them.

KEYWORDS. Minimum, maximum, extreme, logic, perimeter, area, volume.

INTRODUCTION:

Nowadays, at a rapid development science time, personnel's training in line with modern requirements has become one of the urgent tasks. The today's educator's task is to educate students in secondary schools in a competent way to higher education and to ensure a high level of modern teaching technologies mastery. Therefore, it is necessary to organize lessons in secondary schools to the extent that they can solve problems in mathematics teaching.

The maximum and minimum problems are the main modern mathematics problems and have their place in high school mathematics. Due to the students' inability to cover some maximum and minimum problems and their solutions during the lesson, they have to see such materials in extracurricular activities or in math classes.

In the mathematics circle for 11th graders, we will discuss the following comments and issues on the topic of "Solving maximum and minimum problems".

Students are first reminded the theorems on the largest product and the smallest sum.

Theorem 1. If the sum of the positive variables x and y does not change, then when $x = y$, their product xy has the largest value.

Proof. Let be $x > y$, $x > 0$, $y > 0$ and $x + y = a$.

Itsknown,

$x = y$, $(x+y)^2 = x^2 + y^2 + 2xy$, $(x-y)^2 = x^2 + y^2 - 2xy$.

We divide these equations from the first to the second: $(x+y)^2 - (x-y)^2 = 4xy$

or $xy = \frac{1}{4}\left[(x+y)^2 - (x-y)^2\right]$. (*)

If $x + y = a$ $xy = \frac{1}{4}\left[a^2 - (x-y)^2\right]$

If the expression $(x-y)^2$ has the smallest value, that is, if $(x-y)^2 = 0$

or $x = y$, then the middle bracket to the right of equation (*) has the largest value. The middle bracket on the right side of the equation has the largest value.

Problem. There are a number of building materials available to build house. Using these materials, you should build a house with the largest rectangular face possible.

Solution. U The base y is a rectangle whose sides we denote by x and y. Conditionally, $2x + 2y = 2p$, the perimeter of the rectangle does not change. The face of a rectangle is $S = xy$.

According to the above theorem, if $x + y = p$ is $2x + 2y = 2p$, that is, if the

rectangle is square, then the product xy has the largest value.
This means that when the base of a house is square, its area is the largest.

Theorem 2. If the product of the positive variables x and y is $xy = a$-, then when $x = y$, their sum $x + y$ is the smallest.

Proof. (*) from equality: $(x+y)^2 = 4xy + (x-y)^2$ or $(x+y)^2 = 4a + (x-y)^2$ (**)

If $x > 0$ and $y > 0$ $x + y$ with $(x+y)^2$ at the lowest value at a time, that is, at the smallest value of $(x-y)^2$ to the right of the equation, or when $x = y$.

Problem. Is the perimeter of the square the smallest of rectangles with the same face?

Solution. Let x and y be the sides of a rectangle. Conditionally its face xy-is not changed.
Based on theorem 2 $2x + 2y = 4S$ – if it does not change, $2x = 2y$ or $x = y$ the perimeter of a rectangle $2(x+y) = 2x + 2y$ will have the smallest value. This value belongs to the square. Let's look at cases where the number of variables is 3 and 4. Let's imagine x1, x_2, x_3, x_4 given positive variables. Their sum $x_1 + x_2 + x_3 + x_4 = 4a$ is constant. Their sum $x_1 \cdot x_2 \cdot x_3 \cdot x_4$ is the largest.
If $x_1 = x_2 = x_3 = x_4$ $x_1 \cdot x_2 \cdot x_3 \cdot x_4$ we prove that the product has the greatest value.
Proof.
If $x_1 + x_2 + x_3 + x_4 = 4a$ $x_1 + x_2 \geq 2a$, it will be $x_3 + x_4 \leq 2a$ $x_3+x_4 \leq 2a$, i.e. if $x_1 + x_2 = 2a + 2b$ is $x_3 + x_4 = 2a - 2b$, here $a > b \geq 0$.

Based on Theorem 1, if $x_1 + x_2 = 2(a+b)$ if it does not change, if $x_1 = x_2 = a + b$ $x_1 \cdot x_2 = (a+b)^2$ is the largest. As same, if $x_3 = x_4 = a - b$ $x_3=x_4=a-b$
$x_3 \cdot x_4 = (a-b)^2$
is the largest.
Therefore,
$x_1 \cdot x_2 \leq (a+b)^2$, $x_3 \cdot x_4 \leq (a-b)^2$
From that
$x_1 \cdot x_2 \cdot x_3 \cdot x_4 \leq (a+b)^2$.
$(a-b)^2 = (a^2 - b^2)^2 \leq a^4$, i.e.
if $x_1 \cdot x_2 \cdot x_3 \cdot x_4 \leq a^4$. $x_1 = x_2 = x_3 = x_4$
is $x_1 \cdot x_2 \cdot x_3 \cdot x_4 = a^4$. So
if $x_1 = x_2 = x_3 = x_4$, $x_1 \cdot x_2 \cdot x_3 \cdot x_4 = a^4$ is the largest.
Let the number of variables be 3: if $x_1 + x_2 + x_3 = 3a$
and $x_4 \cdot a$ $x_1 + x_2 + x_3 + x_4 = 4a$
$x_1 = x_2 = x_3 = a$
and $x_1 \cdot x_2 \cdot x_3 \cdot x_4 = a^4$
or $x_1 \cdot x_2 \cdot x_3 = a^3$ is the largest.

3rd problem. Determine the largest volume between right-angled parallelepipeds of the same full surface.

Solution. Let x, y, z be the sides of a parallelepiped. In this case, the face of its full surface is $S = 2(xy + xz + yz)$ and the volume is $V = xyz$. Therefore, when S is constant, the values of xy and z must be chosen so that V is the largest.
We use the above theorems. It is known that when $x > 0, y > 0, z > 0$,

$V = xyz$ and $V^2 = (xyz)^2$ reach the maximum values at the same time.
Therefore, when $xy = xz = yz$, the product $V^2 = (xy)\cdot(yz)\cdot(xz)$ reaches its maximum value when $xy + yz + xz = \frac{S}{2}$ is constant. It follows that it is $x = y = z$. This means that the cube has the largest capacity among right-angled parallelepipeds with the same full surface.

It is important to solve simple problems as much as possible in the circle, to move from simple to more complex problems and to teach to solve them. Below is a simple problem that can be suggested to the reader in its various forms.

Problem. There is a square plywood with side a**.** The same squares are cut from the four ends of the square, and the rest is made into an open box. When the side of the truncated square is part of the side of the given square, what is the maximum size of the box?

Solution. Let x be the truncated square side (Figure 1)

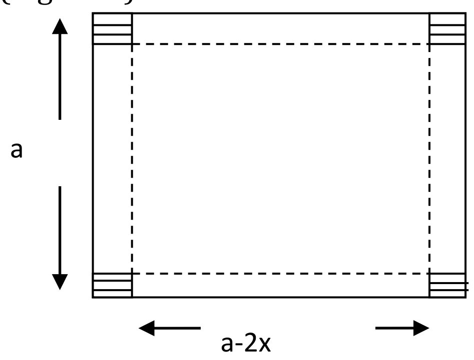

Figure 1.

Then the box size is $y = x(a-2x)^2$. To find the maximum value of this, we make the following changes to the form:
$4y = 4x(a-2x)(a-2x)$.
Since the factors sum
$4x + (a-2x) + (a-2x) = 2a$ is constant, 4y reaches its maximum value when $4x = a-2x$.

$4x = a-2x$; $x = \frac{a}{6}$, $y_{\max} = \frac{2}{27}a^3$.

This means that the box has the largest size when the side of the cut square is $\frac{1}{6}$ of the side of the given square.

From the above, it can be seen that problem-solving in mathematics a lesson broaden students' horizons, broadens their interrelationships understanding between mathematics and special subjects, and increases their interest in the profession. This will develop the professional competence of future teachers.

REFERENCES

1) A.G.Hikmatov. Extreme issues in school mathematics course. T: Teacher. 1970
2) R.Kh.Vafayev, J.Kh. Khusanov, K.KH. Fayziyev, Yu.Y.Khamroyev. Fundamentals of Algebra and Analysis (for Academic Lyceums and Vocational Colleges). T: Teacher. 2003
3) Sh.O.Alimov and others. Fundamentals of Algebra and Analysis (for grades 10-11 in high school). T: Teacher. 1996.