ABOUT SOME BASIC PRINCIPLES OF TEACHING MATHEMATICS

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Abstract: *this article is devoted to questions on some basic principles of teaching mathematics. To develop the creative abilities of students, tasks should be chosen that allow them to develop their content, enabling them to explore, very, generalize. The student tries to memorize the least understandable material by heart. Training should arouse interest in the subject. The highest degree of interest is hobby. When enthusiastic lessons cause strong positive emotions, the inability to participate in them is perceived as deprivation.*
Keywords: *principle, teaching mathematics, interest in the subject, degree of interest, positive emotions.*

О НЕКОТОРЫХ ОСНОВНЫХ ПРИНЦИПАХ ПРЕПОДАВАНИЯ МАТЕМАТИКИ

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Аннотация: *данная статья посвящена вопросам о некоторых основных принципах преподавания математики. Для развития творческих способностей студентов должны быть выбраны задачи, которые позволяют развивать их содержание, давая возможность исследовать, обобщать. Студент пытается наизусть запомнить наименее понятный материал. Обучение должно вызывать интерес к предмету. Наивысшая степень интереса - это увлечение. Когда восторженные уроки вызывают сильные положительные эмоции, невозможность участвовать в них воспринимается как лишение.*
Ключевые слова: *принцип, преподавания математики, интерес к предмету, степень интереса, положительные эмоции.*

The teaching should not be given too easily, so that the ease of teaching does not work out students habits of work out students habits of working with stress and overcoming difficulties, and this is one of the most important human qualities. A person without such a habit can not be a full-fledged worker.

To develop the creative abilities of students should be selected tasks that allow the development of their content, giving the opportunity to explore, very, generalize.

If the requirements imposed on the student are too much for him, then this entails such consequences: The student is looking for a superficial connection. The aim of mastering an object is replaced by another goal to be able to repeat the necessary formulations when checking. The student tries to memorite by heart the insufficiently understandable material. This the formulism that makes the knowledge obtained unstable, that is, completely useless, students looking for workarounds. In addition to the foot that training does not reach the goal, it also inflicts moral damage. Teaching should arouse interest in the subject [1].

The highest degree of interest is fascination. When enthusiastic lessons generate strong positive emotions, the impossibility to engage is perceived as deprivation. When solving various problems on the topic of computing certain integrals, it is advisable to adhere to the following recommendation, which has almost no exceptions.

Consider examples. 1-example. Calculate the integral

$$\int_0^{\frac{\pi}{2}} \frac{2\sin x + 3\cos x}{2\cos x + 3\sin x}dx$$

Solition. We represent the numerator of the integrand in the form.

$$2\sin x + 3\cos x = a\left(2\cos x + 3\sin x\right) + b\left(2\cos x + 3\sin x\right)'$$

For the definition of *a* and *b* by the system. $3a - 2b = 2, \;\; 2a + 3b = 3$, from which

$$a=\frac{12}{13},\quad b=\frac{5}{13}$$

In this way,

$$\int_0^{\frac{\pi}{2}}\frac{2\sin x+3\cos x}{2\cos x+3\sin x}dx=\frac{1}{13}\int_0^{\frac{\pi}{2}}\left(2+\frac{5\left(2\cos x+3\sin x\right)}{2\cos x+3\sin x}\right)dx=\frac{1}{13}\left(6\pi+5\ln\left(2\cos x+3\sin x\right)\Big|_0^{\frac{\pi}{2}}\right)=$$

$$=\frac{6\pi+5\ln 1,5}{13}$$

2-example. Calculate the integral

$$\int_{-1}^{1}\frac{x^2}{e^x+1}dx$$

Solition. We make the change of variable by formula $x=-t$, then

$$J=\int_{-1}^{1}\frac{x^2}{e^x+1}dx=-\int_{-1}^{1}\frac{(-t)^2}{e^{-t}+1}dt=\int_{-1}^{1}\frac{t^2\cdot e^t}{e^t+1}dt$$

$$2J=\int_{-1}^{1}\frac{x^2}{e^x+1}dx+\int_{-1}^{1}\frac{x^2e^x}{e^x+1}dx=\int_{-1}^{1}x^2dx=2\int_0^1 x^2dx=2\cdot\frac{x^3}{3}\Big|_0^1=\frac{2}{3},\ 2J=\frac{2}{3},\ J=\frac{1}{3}$$

In this way $\int_{-1}^{1}\frac{x^2}{e^x+1}dx=\frac{1}{3}$

This problem is generalized if the function $f(x)$ is even, then

$$\int_{-b}^{b}\frac{f(x)}{a^x+1}dx=\int_0^b f(x)dx$$

Prove. We make the change of variable by formula $x=-t$, then

$$J=\int_{-b}^{b}\frac{f(x)}{a^x+1}dx=-\int_{-b}^{b}\frac{f(-t)}{a^{-t}+1}dt=\int_{-b}^{b}\frac{a^tf(t)}{a^t+1}dt$$

So

$$2J=\int_{-b}^{b}\frac{f(x)}{a^x+1}dx+\int_{-b}^{b}\frac{a^xf(x)}{a^x+1}dx=\int_{-b}^{b}f(x)dx=2\int_0^b f(x)dx$$

From which follows the equality to be proved.

This process has no end. The history of mathematics is full of examples of how long known results appear from a new, more general point of view.

3-example. Calculate the integral.

Solition. We make the change of variable by formula $x=-t$, then

$$J=\int_0^{\frac{\pi}{4}}\ln(1+tgx)dx=\int_{\frac{\pi}{4}}^{0}\ln\left(1+tg\left(\frac{\pi}{4}-t\right)\right)(-dt)=\left.\begin{matrix}\frac{\pi}{4}-x=t\\ dx=-dt\end{matrix}\right|=\int_0^{\frac{\pi}{4}}\ln\left(1+\frac{1-tgt}{1+tgt}\right)dt=$$

$$=\int_0^{\frac{\pi}{4}}\ln\frac{2}{1+tgt}dt=\int_0^{\frac{\pi}{4}}\left[\ln 2-\ln\left(1+tgt\right)\right]dt=t\cdot\ln 2\Big|_0^{\frac{\pi}{4}}-J$$

$$2J=\frac{\pi}{4}\ln 2$$

$$J=\frac{\pi}{8}\ln 2$$

This process has no end. The history of mathematics is full of examples of how long known results appear from a new, more general point of view.

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