

The most attractive mathematical formulas

Work performed:
Artemov Stanislav
Stepanova Alexandra
Group №04503

Neuroscientists from the UK conducted an experiment in which 15 mathematicians were asked to evaluate the beauty of mathematical formulas by offering them a list of 60 pieces.



As discovered by neuroscientists, viewing beautiful formulas, from the point of view of mathematicians, evokes a response in the prefrontal cortex of the brain responsible for complex cognitive functions and emotions.

$x^3 + x^2 + y^3 + z^3 + xyz - C = 0$
 $\text{grad} f = \left(\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y} \right)$
 $\text{tg} x \cdot \text{cotg} x = 1$
 $2x^2yy' + y^2 = 2$
 $x_1 = -11p, x_2 = -p, x_3 = 7p, p \in \mathbb{R}$

$Y_{i+1} = Y_i + b \cdot k_2$
 $B = \begin{pmatrix} 2 & 1 & -1 & 0 \\ 3 & 0 & 1 & 2 \end{pmatrix}$
 $a^2 = b^2 + c^2 - 2bc \cos \alpha$
 $\text{tg} \frac{x}{2} = \frac{1 - \cos x}{\sin x} = \frac{\sin x}{1 + \cos x}$

$\sum_{i=0}^n (p_2(x_i) - y_i)^2$
 $\text{tg} 2x = \frac{2 \text{tg} x}{1 - \text{tg}^2 x}$
 $\text{tg} x = \frac{\sin x}{\cos x}$
 $\lambda x - y + z = 1$
 $x + \lambda y + z = \lambda$
 $x + y + 2z = \lambda^2$

$x_2 = \begin{pmatrix} -x \\ \beta \\ -\beta \\ \beta \end{pmatrix}$
 $\iint_M z \, dx \, dy \, dz = \int_0^{2\pi} \left(\int_0^1 \left(\int_{\frac{1}{2}}^1 r \, dr \right) d\theta \right) dp$
 $\lim_{n \rightarrow \infty} \frac{\sqrt{n^3+1} + n}{3\sqrt[3]{n^2+2n-1}}$
 $\frac{a}{\sin \alpha} = \frac{b}{\sin \beta} = \frac{c}{\sin \gamma}$
 $y = \sqrt[3]{x+1}; x = \text{tg} t$
 $x_1 = \begin{pmatrix} \alpha + \beta + \gamma \\ \beta \end{pmatrix}$
 $(1+e^x)yy' = e^x$
 $y(1) = 1$
 $F_3 = 2x \cdot yz - 1 = 1$
 $x_1 = \begin{pmatrix} 2p \\ -p \\ 0 \end{pmatrix}$
 $y = x^2, y = x^3$

$2 \arctg x - x = 0, I = (1, 10)$
 $\int_{-\pi/2}^{\pi/2} \sin^4 x \cdot \cos^3 x \, dx$
 $\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$
 $\frac{\partial z}{\partial x} = 2; \frac{\partial z}{\partial y} = 0$
 $\vec{n} = (F_x; F_y; F_z)$
 $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 0$
 $\sin 2x = 2 \sin x \cdot \cos x$
 $\frac{\partial (f)}{\partial x} = 16 - x^2 + 16y^2 - 4z > 0$
 $A = \begin{pmatrix} x & 1+x^2 & 1 \\ y & 1+y^2 & 1 \\ z & 1+z^2 & 1 \end{pmatrix}, x=0, y=1, z=2$
 $A = [1; 0; 3]$
 $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{5x} = \frac{2}{5}$
 $|x| + |y| \neq 0; p \neq 0$
 $\lim_{h \rightarrow +\infty} \left(1 + \frac{1}{h} \right)^h$
 $\lambda_2 = i\sqrt{14}$
 $\int R(x, \frac{\sqrt{ax+b}}{cx+d}) dx$
 $\frac{\sin x}{x} \leq \frac{x}{x} = 1$
 $\eta_1 = \lambda_1^2 - 3\lambda_1 + 1 = 0$
 $e^z - xyz = e; A[0; e; 1]$
 $\frac{2x}{x^2 + 2y^2} = 2 \Rightarrow z = \frac{1}{x} \text{ or } \text{sh} \frac{\sqrt{2}}{2}$
 $\sin(x+y) = \sin x \cos y + \cos x \sin y$
 $Y' - \frac{Y}{x+2} = 0; y(0) = 1$
 $\cos p = \frac{(1, 0) \cdot (\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}})}{\sqrt{\frac{1}{12} + \frac{1}{48}}}$

$\vec{p}_2 = \sqrt{0,16}$
 $C = \begin{pmatrix} 0,1 \\ 1,0 \end{pmatrix}$
 $a^2 + b^2 = c^2$
 $\alpha, \beta, \gamma \in \mathbb{C}$
 $f(x) = 2^{-x} + 1, \varepsilon = 0.005$
 $\lambda_2 = i\sqrt{14}$
 $\sin^2 x + \cos^2 x = 1$
 $A+B+C=8$
 $-3A-7B+2C=-10,3$
 $-18A+6B-3C=15$

1. Fermat's grand theorem

$$a^n + b^n = c^n, \quad n > 2$$

2. Basic Trigonometric Identity

$$\cos^2 \theta + \sin^2 \theta = 1$$

3. The Gauss-Bonnet formula

$$\int_M K dA + \int_{\partial M} k_g ds = 2\pi\chi(M)$$

4. Cantor's theorem for natural numbers

$$2^{|S|} > |S|$$

5. Euler's formula

$$e^{ix} = \cos x + i \sin x$$

6. Euler's identity

$$1 + e^{i\pi} = 0$$