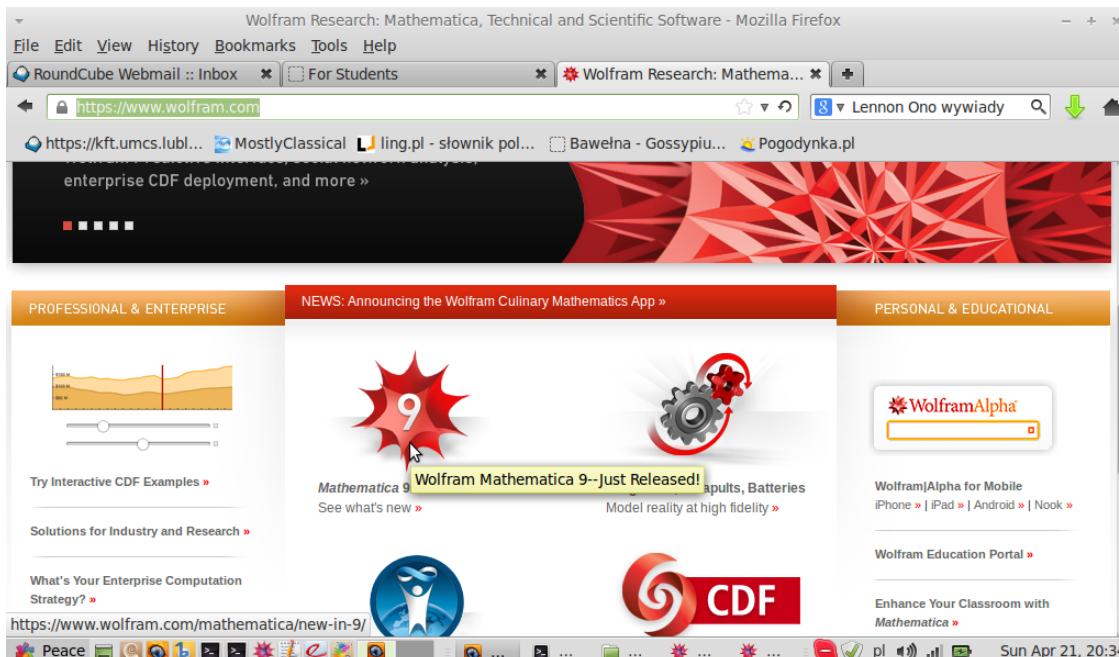


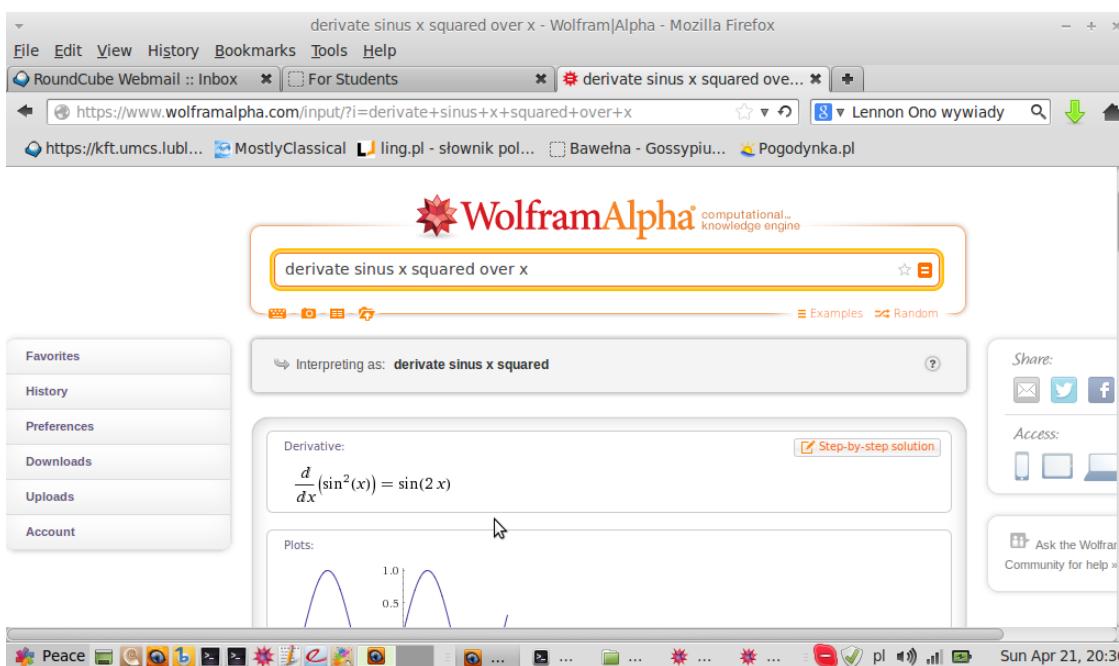
Podstawy *Mathematica*.

Linki

```
In[2]:= Import["/home/marek/Documents/praca/studenci/MathematicaOverview/WolframCom.png"]
```



```
Out[2]=
```



```
In[4]:= Import["/home/marek/Documents/praca/studenci/MathematicaOverview/Maxima.png"]
```

Maxima, a Computer Algebra System - Mozilla Firefox

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maxima.sourceforge.net maxima

https://kft.umcs.lublin.pl/ MostlyClassical ling.pl - słownik pol... Bawelna - Gossypiu... Pogodynka.pl

Español · Русский

Out[4]=

Maxima is a system for the manipulation of symbolic and numerical expressions, including differentiation, integration, Taylor series, Laplace transforms, ordinary differential equations, systems of linear equations, polynomials, and sets, lists, vectors, matrices, and tensors. Maxima yields high precision numeric results by using exact fractions, arbitrary precision integers, and variable precision floating point numbers. Maxima can plot functions and data in two and three dimensions.

The Maxima source code can be compiled on many systems, including Windows, Linux, and MacOS X. The source code for all systems and precompiled binaries for Windows and Linux are available at the [SourceForge file manager](#).

Maxima is a descendant of Macsyma, the legendary computer algebra system developed in the late 1960s at the [Massachusetts Institute of Technology](#). It is the only system based on that effort still publicly available and with an active user community, thanks to its open source nature. Macsyma was revolutionary in its day, and many later systems, such as Maple and Mathematica, were inspired by it.

The Maxima branch of Macsyma was maintained by [William Schelter](#) from 1982 until he passed away in 2001. In 1998 he obtained [permission to release the source code under the GNU General Public License \(GPL\)](#). It was his efforts and skill which have made the survival of Maxima possible, and we

Sun Apr 21, 20:38

```
Import["/home/marek/Documents/praca/studenci/MathematicaOverview/MojaStrona.png"]
```

Marek Pietrow, homepage - Mozilla Firefox

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RoundCube Webmail :: Inbox Marek Pietrow, homepage Mathematica Tutorial

kft.umcs.lublin.pl/mrk/ Bory Tucholskie

https://kft.umcs.lublin.pl/ MostlyClassical ling.pl - słownik pol... Bawelna - Gossypiu... Pogodynka.pl

M. Gryziński

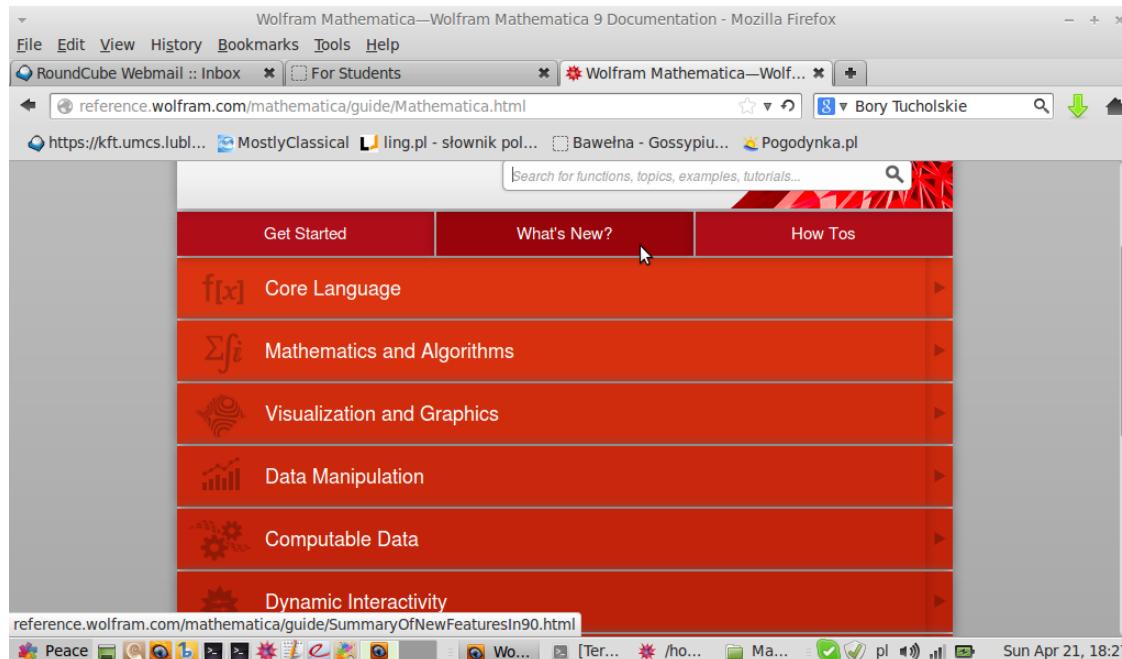
employed in Physics Department, M. Curie-Skłodowska University, Lublin, Poland
degree: PhD
e-mail: mrk@kft.umcs.lublin.pl

publications for students

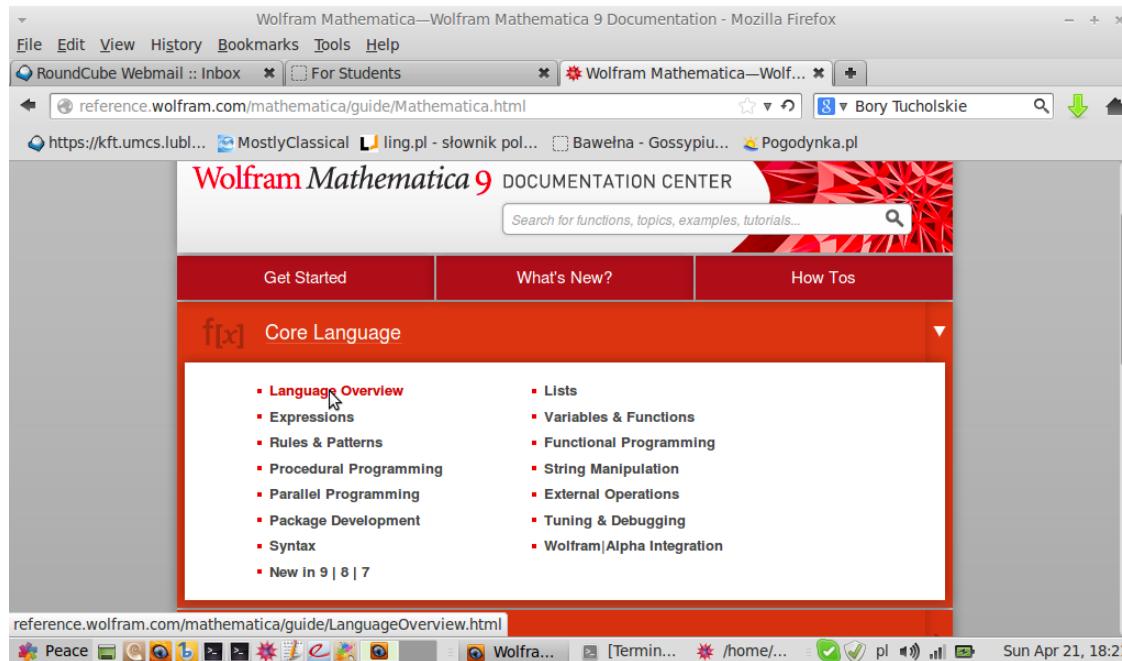
Proudly committed to 60+

Peace Marek ... Termin... /home... Sun Apr 21, 18:19

```
Import["/home/marek/Documents/praca/studenci/MathematicaOverview/WolframGuide1.png"]
```



```
Import["/home/marek/Documents/praca/studenci/MathematicaOverview/WolframGuide2.png"]
```



Proste operacje

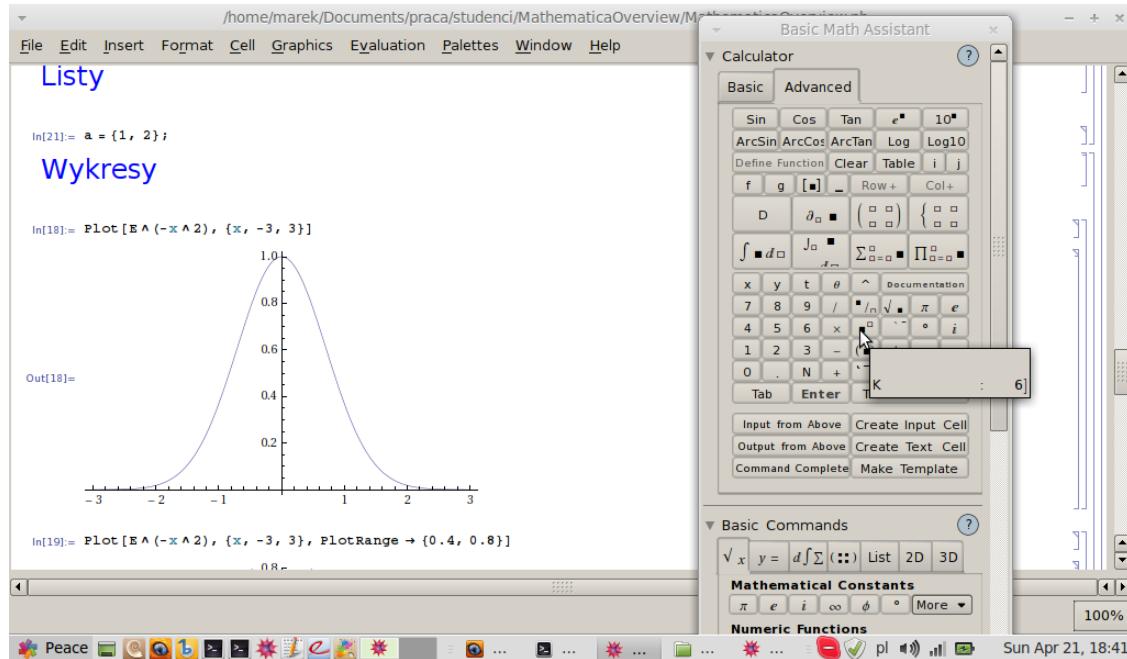
a
a

```
a = 1
a
1
1

N[Pi]
3.14159
N[Pi, 200]
3.1415926535897932384626433832795028841971693993751058209749445923078164062862089986280348:
25342117067982148086513282306647093844609550582231725359408128481117450284102701938521105:
5596446229489549303820

Simplify[(2 * x^2 - 2) / 2]
-1 + x^2
```

```
Import["/home/marek/Documents/praca/studenci/MathematicaOverview/Palety.png"]
```



```
Expand[(x^2 + 1)^3]
```

```
1 + 3 x^2 + 3 x^4 + x^6
```

```
TrigFactor[Cos[\alpha + \beta]]
```

```
Cos[\alpha + \beta]
```

```

Solve[x^3 - 2*x^2 - 1 == 0, x]
{ {x → 2/3 + 1/3 (43/2 - 3 Sqrt[177]/2)^1/3 + 1/3 (1/2 (43 + 3 Sqrt[177]))^1/3}, 
  {x → 2/3 - 1/6 (1 + I Sqrt[3]) (43/2 - 3 Sqrt[177]/2)^1/3 - 1/6 (1 - I Sqrt[3]) (1/2 (43 + 3 Sqrt[177]))^1/3}, 
  {x → 2/3 - 1/6 (1 - I Sqrt[3]) (43/2 - 3 Sqrt[177]/2)^1/3 - 1/6 (1 + I Sqrt[3]) (1/2 (43 + 3 Sqrt[177]))^1/3} }

Limit[1/x, x → -Infinity]
0

Sum[(1/3)^n, {n, 1, Infinity}]
1
2

Sum[i^2, {i, 0, n}]
1/6 n (1 + n) (1 + 2 n)

funkcja = Sin[x^2 + 2] * y^2 - Log[x * y];
TraditionalForm[funkcja]
D[funkcja, x]
y^2 sin(x^2 + 2) - log(x y)

- 1/x + 2 x y^2 Cos[2 + x^2]

D[funkcja, {x, 3}]
D[funkcja, x, y, x]
- 2/x^3 + y^2 (-8 x^3 Cos[2 + x^2] - 12 x Sin[2 + x^2])

4 y Cos[2 + x^2] - 8 x^2 y Sin[2 + x^2]

Integrate[x * E^(-x^2 - x), x]
Integrate[x * E^(-x^2 - x), {x, -3, 1}]
NIntegrate[x * E^(-x^2 - x), {x, -3, 1}]
Integrate[x * E^(-x^2 - x), {x, -Infinity, Infinity}]
- 1/2 e^-x^(1+x) - 1/4 e^{1/4} Sqrt[π] Erf[1/2 + x]
- 2 + 2 e^4 + e^{25/4} Sqrt[π] (Erf[3/2] + Erf[5/2])
- 4 e^6
- 1.18485
- 1/2 e^{1/4} Sqrt[π]

```

```

DSolve[y''[x] == y[x] + 1, y[x], x]
{{y[x] \rightarrow -1 + e^x C[1] + e^-x C[2]}}

DSolve[{y''[x] == y[x] + 1, y[0] == 1, y'[0] == 2}, y[x], x]
{{y[x] \rightarrow -1 + 2 e^x} }

TraditionalForm[D[f[x, t], x] == -2 * D[f[x, t], t]]
DSolve[D[f[x, t], x] == -2 * D[f[x, t], t], f[x, t], {x, t}]
f^(1,0)(x, t) = -2 f^(0,1)(x, t)

{{f[x, t] \rightarrow C[1] [t - 2 x]}}

```

Listy

```

a = {1, 2};

Append[a, 50]

{1, 2, 50}

b = {2, 40, 100};
NowaListal = Join[a, b]
NowaLista2 = Union[a, b]

{1, 2, 2, 40, 100}

{1, 2, 40, 100}

Length[b]

3

Position[NowaListal, 2]

{{2}, {3} }

Clear[a, b]

Map[f, {a, b}]

{f[a], f[b]}

macierz1 = {{1, 2}, {3, 4}};
MatrixForm[%]


$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$


macierz2 = Table[i + j, {j, 2}, {i, 3}]

{{2, 3, 4}, {3, 4, 5} }

MatrixForm[%]


$$\begin{pmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \end{pmatrix}$$


```

```

MatrixForm[Table[i + j, {i, 3}, {j, 2}]]  


$$\begin{pmatrix} 2 & 3 \\ 3 & 4 \\ 4 & 5 \end{pmatrix}$$
  

macierz3 = Table[i, {i, 2}, {j, 2}]  

{{1, 1}, {2, 2}}  

macierz1 + macierz3  

macierz1.macierz3  

{{2, 3}, {5, 6}}  

{{5, 5}, {11, 11}}  

MatrixForm[macierz2]  


$$\begin{pmatrix} 2 & 3 \\ 3 & 4 \\ 4 & 5 \end{pmatrix}$$
  

(* inaczej Part[] *)  

macierz2[[2]][[1]]  

3

```

Reguły i wzorce, funkcje

```

Sin[x] /. {x → 3}  

Sin[3]  

x  

x  

x = 3;  

x  

3  

Clear[x]  

fun[x_] := x^2 + Sin[x]  

fun[y]  

fun[3]  

y^2 + Sin[y]  

9 + Sin[3]  

x  

x  

f[abc_] := Module[{x = abc}, out = Sin[x]; out]
f[1 / 2]
Sin[1/2]

```

Rekurencje

```
Do[Print[i, " Ala ma kota"], {i, 0, 3}]
```

0 Ala ma kota
 1 Ala ma kota
 2 Ala ma kota
 3 Ala ma kota

```
przyklad1[x_] := If[x > 0, Print["Tak"], Print["Nie"]]
```

```
przyklad1[1.1]
```

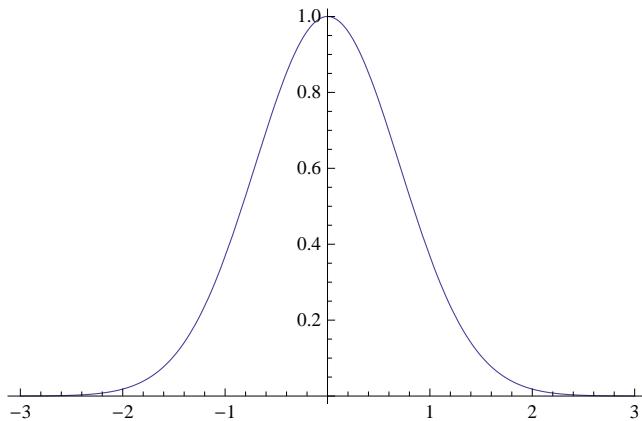
Tak

```
In[1]:= For[i = 1, i < 5, i++, Print[i]]
```

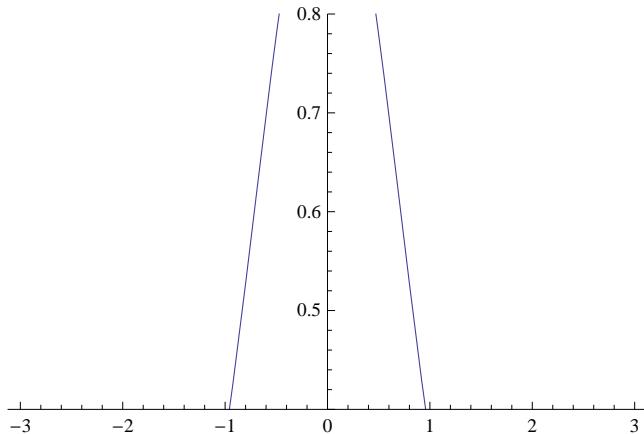
1
 2
 3
 4

Wykresy

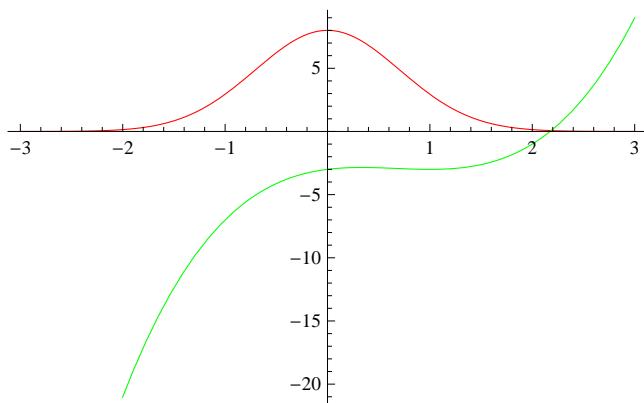
```
Plot[E^(-x^2), {x, -3, 3}]
```



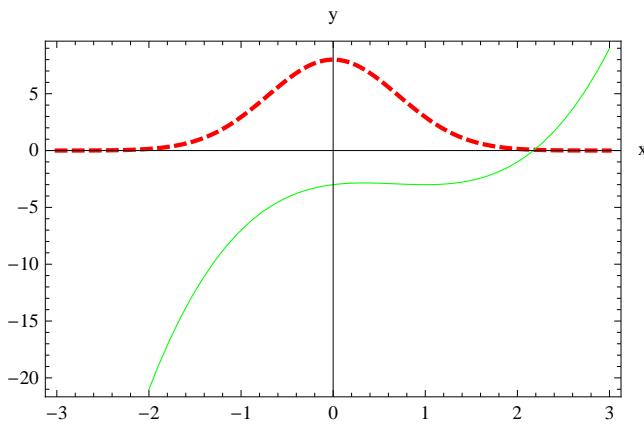
```
Plot[E^(-x^2), {x, -3, 3}, PlotRange -> {0.4, 0.8}]
```



```
Plot[{8 * E^(-x^2), x^3 - 2 * x^2 + x - 3}, {x, -3, 3}, PlotStyle -> {Red, Green}]
```



```
Plot[{8 * E^(-x^2), x^3 - 2 * x^2 + x - 3}, {x, -3, 3}, PlotStyle -> {{Red, Thick, Dashed}, Green}, Frame -> True, AxesLabel -> {"x", "y"}]
```



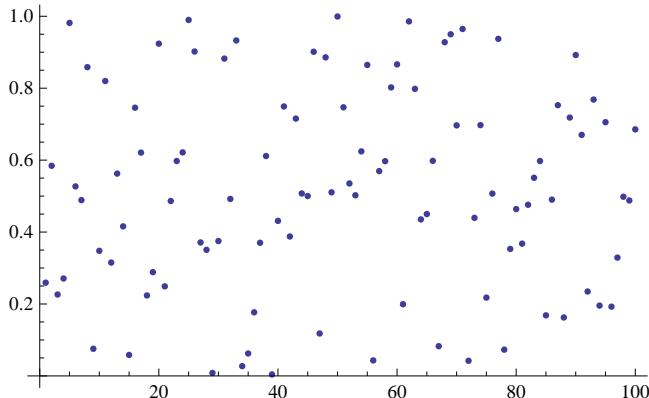
```

lista = Table[{i, Random[]}, {i, 100}]

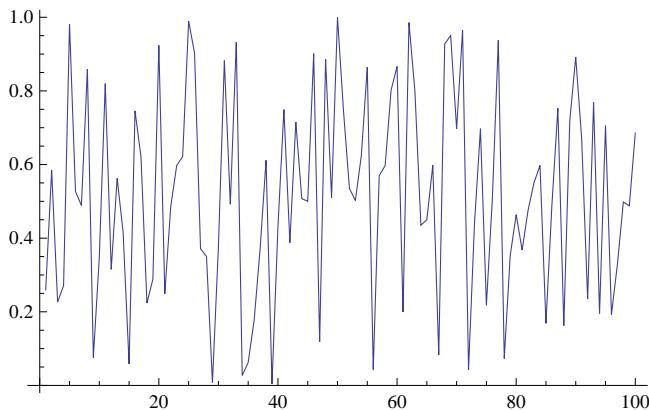
{{1, 0.259319}, {2, 0.584314}, {3, 0.226401}, {4, 0.270956}, {5, 0.981543}, {6, 0.526948},
{7, 0.48881}, {8, 0.858567}, {9, 0.0754608}, {10, 0.347852}, {11, 0.819917}, {12, 0.315194},
{13, 0.562546}, {14, 0.415788}, {15, 0.0583075}, {16, 0.745769}, {17, 0.620956},
{18, 0.223735}, {19, 0.28856}, {20, 0.923768}, {21, 0.249058}, {22, 0.486314},
{23, 0.59751}, {24, 0.621568}, {25, 0.989738}, {26, 0.902}, {27, 0.371108}, {28, 0.350612},
{29, 0.00819579}, {30, 0.375052}, {31, 0.882298}, {32, 0.492045}, {33, 0.932735},
{34, 0.0271994}, {35, 0.0623817}, {36, 0.176851}, {37, 0.370189}, {38, 0.611411},
{39, 0.00407428}, {40, 0.431082}, {41, 0.749233}, {42, 0.387676}, {43, 0.715514},
{44, 0.507313}, {45, 0.500175}, {46, 0.901362}, {47, 0.118005}, {48, 0.885746},
{49, 0.510437}, {50, 0.999362}, {51, 0.746896}, {52, 0.535133}, {53, 0.502241}, {54, 0.62431},
{55, 0.864598}, {56, 0.0430887}, {57, 0.569506}, {58, 0.597111}, {59, 0.802216},
{60, 0.866238}, {61, 0.199317}, {62, 0.985699}, {63, 0.798142}, {64, 0.435156},
{65, 0.450084}, {66, 0.598023}, {67, 0.0826276}, {68, 0.927843}, {69, 0.949909},
{70, 0.696661}, {71, 0.964623}, {72, 0.0420972}, {73, 0.439473}, {74, 0.697299},
{75, 0.217726}, {76, 0.506964}, {77, 0.937232}, {78, 0.0729893}, {79, 0.353128},
{80, 0.463875}, {81, 0.367726}, {82, 0.475879}, {83, 0.550912}, {84, 0.597637},
{85, 0.168409}, {86, 0.490179}, {87, 0.75277}, {88, 0.162481}, {89, 0.718325}, {90, 0.892156},
{91, 0.670142}, {92, 0.234638}, {93, 0.768416}, {94, 0.195495}, {95, 0.705519},
{96, 0.192541}, {97, 0.328943}, {98, 0.498195}, {99, 0.487793}, {100, 0.685577}}

```

```
ListPlot[lista]
```

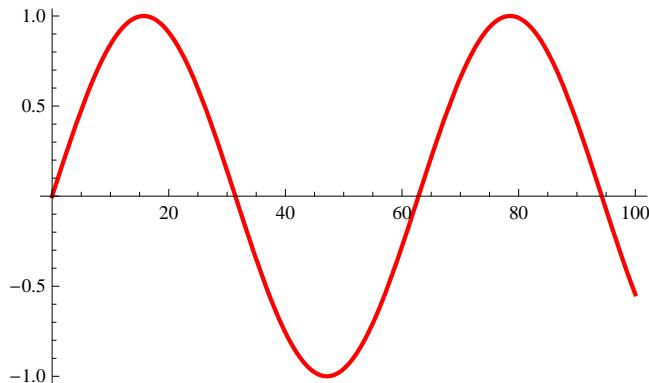


```
AlaMaKota1 = ListPlot[lista, PlotJoined → True]
```

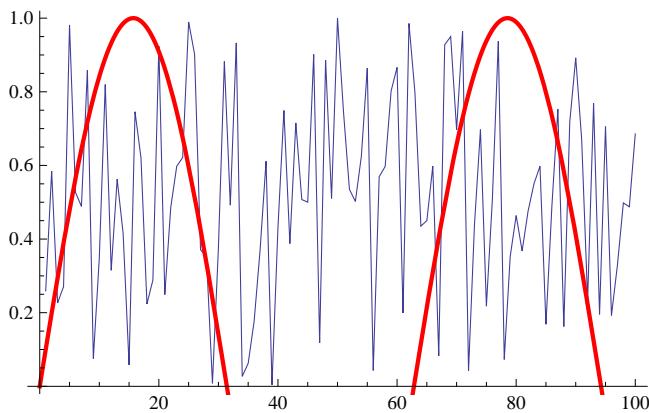


```
Plot3D[E^(- (x^2 + 2 * (y^2 / 3 - Sin[4 * y]) / 3)), {x, -3, 3}, {y, -3, 3}, PlotRange → {0, 2}]
```

```
AlaMaKota2 = Plot[Sin[1/10*x], {x, 0, 100}, PlotStyle -> {Red, Thick}]
```



```
Show[{AlaMaKota1, AlaMaKota2}]
```



```
In[5]:= Import["/home/marek/Documents/praca/studenci/MathematicaOverview/Manipulate.png"]
```

