Opakovanie príkazov

Výrazy

Pozor na vykonávanie operácii: + - * / ^ Sqrt[]

In[1]:=

```
x^2-5x+6/x^2+2x-15
```

Out[1]=

```
          6              2
-15 + ------ - 3 x + x
        2
       x
```

In[2]:=

```
(x^2-5x+6)/(x^2+2x-15)
```

Out[2]=

```
                2
 6 - 5 x + x
----------------------
                2
-15 + 2 x + x
```

Zjednodušovanie výrazu:

In[3]:=

```
(x^2-5x+6)/(x^2+2x-15)//Simplify
```

Out[3]=

```
-2 + x
----------
5 + x
```

Dosadzovací operátor:

In[4]:=

```
(x^2-5x+6)/(x^2+2x-15)/.x->-2
```

Out[4]=

```
  4
-(-)
  3
```

Posledný vstup a jeho numerická hodnota:

In[5]:=

```
%//N
```

Out[5]=

```
-1.33333
```

Predposledný vstup a jeho numerická hodnota:

In[6]:=

```
%%//N
```

Out[6]=

```
-1.33333
```

Vstup/Výstup c.14 - jeho numerická hodnota:

In[8]:=

```
%5//N
```

Out[8]=

```
-1.33333
```

Odmocnovanie:

In[9]:=
```
Sqrt[14]
```
Out[9]=
```
Sqrt[14]
```
In[10]:=
```
Sqrt[14.]
```
Out[10]=
```
3.74166
```

Pozor na prioritu operácií:

In[12]:=
```
64^1/3
```
Out[12]=
```
64
---
3
```
In[13]:=
```
64^(1/3)
```
Out[13]=
```
4
```

Dva rozne sposoby umocnovania konstanty e:

In[14]:=
```
E^(x+3)
```
Out[14]=
```
 3 + x
E
```
In[15]:=
```
Exp[x+3]
```
Out[15]=
```
 3 + x
E
```

Goniometrické funkcie

Preddefinované grécke písmeno Pi:
(Uhly zadávame v radiánoch)

In[16]:=
```
Cos[Pi/4]
```
Out[16]=
```
    1
----------
Sqrt[2]
```
In[17]:=
```
Cos[Pi/4]//N
```
Out[17]=
```
0.707107
```

In[18]:=

```
Tan[Pi/4]
```

Out[18]=

```
1
```

Logaritmy

Prirodzený logaritmus:

In[19]:=

```
Log[125]
```

Out[19]=

```
Log[125]
```

In[20]:=

```
Log[125]//N
```

Out[20]=

```
4.82831
```

Desiatkový logarimus:

In[21]:=

```
Log[10,48]//N
```

Out[21]=

```
1.68124
```

In[22]:=

```
Log[100,458]
```

Out[22]=

$$\frac{\text{Log}[458]}{\text{Log}[100]}$$

Numerická hodnota logaritmu:

In[23]:=

```
Log[100,458]//N
```

Out[23]=

```
1.33043
```

Funkcie

In[24]:=

```
f[x_]=Sqrt[9-x^2]
```

Out[24]=

$$\text{Sqrt}[9 - x^2]$$

In[25]:=

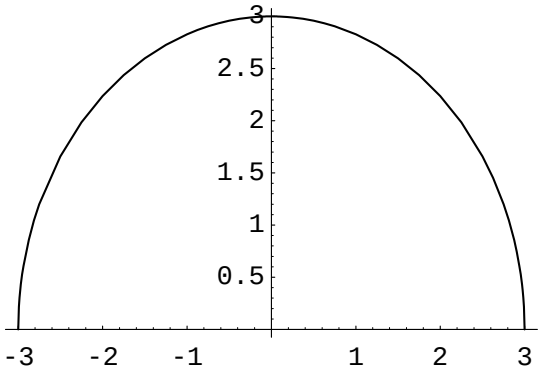
```
f[2.9]
```

Out[25]=

```
0.768115
```

In[26]:=

```
Plot[f[x],{x,-3,3}]
```

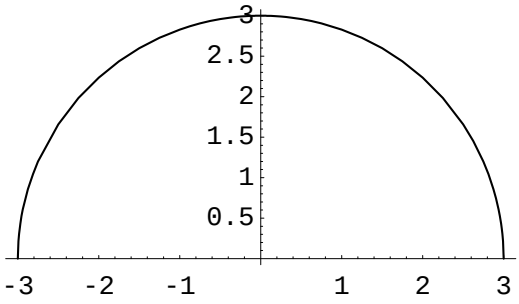


Out[26]=

```
-Graphics-
```

In[27]:=

```
Plot[f[x],{x,-3,3},AspectRatio->Automatic]
```

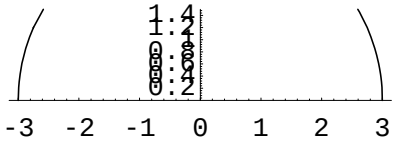


Out[27]=

```
-Graphics-
```

In[28]:=

```
Plot[f[x],{x,-3,3},AspectRatio->Automatic,
PlotRange->{0,1.5}]
```

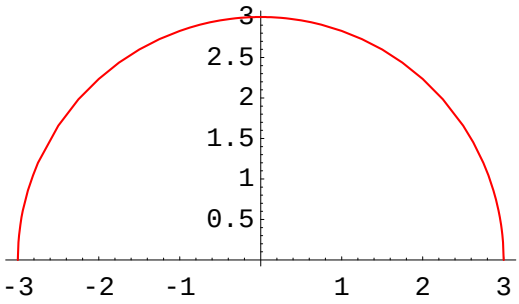


Out[28]=

```
-Graphics-
```

In[29]:=

```
g1=Plot[f[x],{x,-3,3},AspectRatio->Automatic,
PlotStyle->RGBColor[1,0,0]]
```

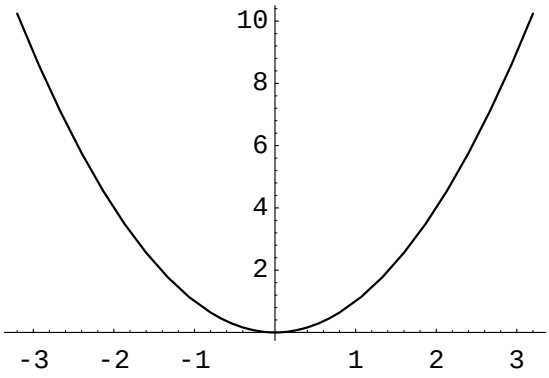


Out[29]=

```
-Graphics-
```

In[30]:=

```
g2=Plot[x^2,{x,-3.2,3.2}]
```

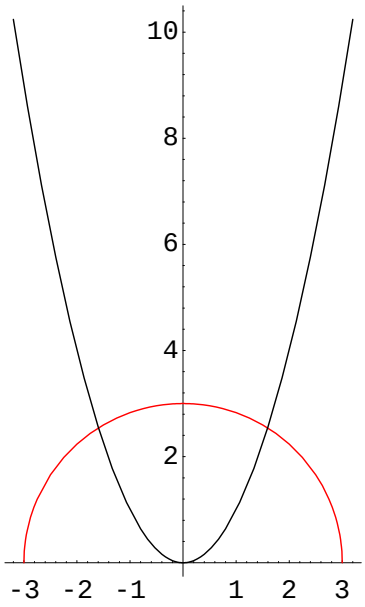


Out[30]=

```
-Graphics-
```

In[31]:=

```
Show[g1,g2]
```



Out[31]=

```
-Graphics-
```

In[32]:=

```
Clear[f]
```

In[33]:=

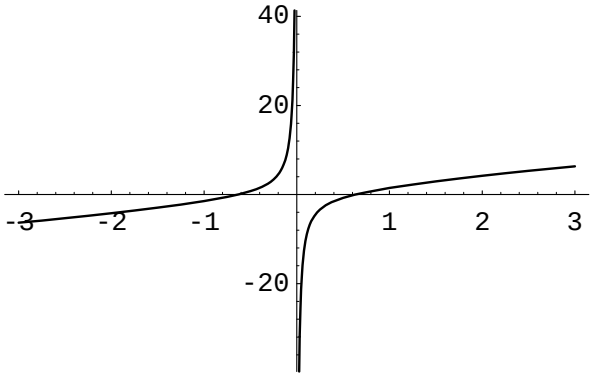
```
h[x_]=2x-Cos[x]/x
```

Out[33]=

$$2x - \frac{\text{Cos}[x]}{x}$$

In[34]:=

```
Plot[h[x],{x,-3,3}]
```



Out[34]=

```
-Graphics-
```

Limita funkcie

In[35]:=

```
Limit[h[x],x->2]//N
```

Out[35]=

```
4.20807
```

In[36]:=

```
Limit[h[x],x->-Infinity]//N
```

Out[36]=

```
-Infinity
```

In[37]:=

```
Limit[h[x],x->Infinity]//N
```

Out[37]=

```
Infinity
```

In[38]:=

```
Limit[h[x],x->0,Direction->1]//N
```

Out[38]=

```
Infinity
```

In[39]:=

```
Limit[h[x],x->0,Direction->-1]//N
```

Out[39]=

```
-Infinity
```

Derivácie funkcie

In[40]:=

```
D[h[x],x]
```

Out[40]=

$$2 + \frac{\text{Cos}[x]}{x^2} + \frac{\text{Sin}[x]}{x}$$

In[41]:=

```
h'[x]
```

Out[41]=

$$2 + \frac{\text{Cos}[x]}{x^2} + \frac{\text{Sin}[x]}{x}$$

In[42]:=

```
D[h[x],x,x]
```

Out[42]=

$$\frac{-2\,\text{Cos}[x]}{x^3} + \frac{\text{Cos}[x]}{x} - \frac{2\,\text{Sin}[x]}{x^2}$$

In[43]:=

```
h''[x]
```

Out[43]=

$$\frac{-2\,\text{Cos}[x]}{x^3} + \frac{\text{Cos}[x]}{x} - \frac{2\,\text{Sin}[x]}{x^2}$$

In[44]:=

```
D[h[x],{x,2}]
```

Out[44]=

$$\frac{-2\,\text{Cos}[x]}{x^3} + \frac{\text{Cos}[x]}{x} - \frac{2\,\text{Sin}[x]}{x^2}$$

In[45]:=

```
D[h[x],{x,5}]//Simplify
```

Out[45]=

$$(120\,\text{Cos}[x] - 60\,x^2\,\text{Cos}[x] + 5\,x^4\,\text{Cos}[x] + 120\,x\,\text{Sin}[x] - 20\,x^3\,\text{Sin}[x] + x^5\,\text{Sin}[x]) / x^6$$

Neurcity integrál:

In[46]:=

```
Integrate[x^5-Tan[x]+1/x,x]
```

Out[46]=

$$\frac{x^6}{6} + \text{Log}[x] + \text{Log}[\text{Cos}[x]]$$

In[48]:=

```
Integrate[x^5-Tan[x]+1/x,x]//Simplify
```

Out[48]=

$$\frac{x^6}{6} + \text{Log}[x] + \text{Log}[\text{Cos}[x]]$$

In[50]:=

```
Integrate[3/(x^2+4),{x,0,2}]
```

Out[50]=

$$\frac{3\,\pi}{8}$$

In[51]:=

```
Integrate[3/(x^2+4),{x,0,2}]//N
```

Out[51]=

```
1.1781
```

In[52]:=

```
Integrate[Cos[x]^2,{x,0,Pi/2}]
```

Out[52]=

$$\frac{\pi}{4}$$

In[53]:=

```
Integrate[Cos[x]^2,{x,0,Pi/2}]//N
```

Out[53]=

```
0.785398
```

Riešenie rovníc

1. Kvadratická rovnica

In[55]:=

```
Solve[5x^2+3x-7==0,x]
```

Out[55]=

$$\left\{\left\{x \to \frac{-3-\sqrt{149}}{10}\right\}, \left\{x \to \frac{-3+\sqrt{149}}{10}\right\}\right\}$$

In[56]:=

```
Solve[5x^2+3x-7==0,x]//N
```

Out[56]=

```
{{x -> -1.52066}, {x -> 0.920656}}
```

In[57]:=

```
Solve[5x^2-3x+7==0,x]//N
```

Out[57]=

```
{{x -> 0.3 - 1.14455 I}, {x -> 0.3 + 1.14455 I}}
```

In[58]:=

```
Solve[x^2-4x+4==0,x]//N
```

Out[58]=

```
{{x -> 2.}, {x -> 2.}}
```

In[59]:=

2. Transcendentná rovnica

In[60]:=

```
Solve[E^(x+3)-x^2==0,x]//N
```

```
Solve::tdep: The equations appear to involve transcendental
     functions of the variables in an essentially non-algebraic
     way.

Solve::tdep: The equations appear to involve transcendental
     functions of the variables in an essentially non-algebraic
     way.
```

Out[60]=

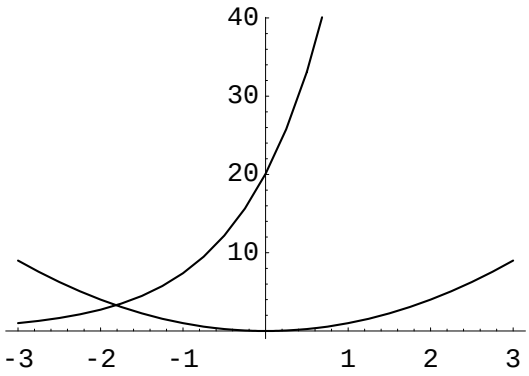
```
                3. + x        2
Solve[2.71828         - 1. x  == 0, x]
```

Pozor ! Túto rovnicu nemožeme riešit pomocou príkazu Solve[], ale pomocu FindRoot[] - hladanie korenov

Rovnicu najskor riesime graficky:

In[61]:=

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



Out[61]=

```
-Graphics-
```

In[62]:=

```
FindRoot[E^(x+3)-x^2==0,{x,-2}]//N
```

Out[62]=

```
{x -> -1.81159}
```

Systém n-lineárnych rovníc o n-neznámych

In[63]:=

```
Solve[{x+y+z==3,x-2y+3z==1,2x-y-z==0},{x,y,z}]//N
```

Out[63]=

```
{{x -> 1., y -> 1.2, z -> 0.8}}
```

In[64]:=

```
Solve[{x+y+z==3,x-2y+3z==1,2x-y+4z==0},{x,y,z}]//N
```

Out[64]=

```
{}
```

In[65]:=

```
Solve[{x-2y+2z==-9,3x+5y+4z==10,5x+12y+6z==29},
{x,y,z}]//N
```

Out[65]=

```
{{x -> -2.27273 - 1.63636 z, y -> 3.36364 + 0.181818 z}}
```