Вольфрам Математика

In[2]:= (*smthng*)

In[3]:= x1 = 5

Out[3]= 5

In[6]:= $x^2\, x$

Out[6]= x^3

In[7]:= $\tilde{x}$

Out[7]= $\tilde{x}$

In[11]:= $\frac{(x^2 - 1)}{x - 1}$ // FullSimplify
упростить в полном объёме

Out[11]=

$1 + x$

In[14]:= $D\left[\frac{1}{\text{Cos}[\pi\, x]}, x\right]$ // FullSimplify
дифференцировать упростить в полном объёме

Out[14]=

$\pi\, \text{Sec}[\pi\, x]\, \text{Tan}[\pi\, x]$

In[15]:= $\partial_x (\pi\, \text{Sec}[\pi\, x]\, \text{Tan}[\pi\, x])$
секанс тангенс

Out[15]=

$\pi^2\, \text{Sec}[\pi\, x]^3 + \pi^2\, \text{Sec}[\pi\, x]\, \text{Tan}[\pi\, x]^2$

In[20]:= $D\left[\frac{1}{\text{Cos}[\pi\, x] + y}, \{x, 5\}\right]$ // FullSimplify
дифференцировать упростить в полном объёме

Out[20]=

$$\frac{1}{8\, (y + \text{Cos}[\pi\, x])^6} \pi^5 \left(723 + 8\, y^2 \left(-27 + y^2\right) + 4\, y \left(201 - 52\, y^2\right) \text{Cos}[\pi\, x] + 4 \left(-59 + 66\, y^2\right) \text{Cos}[2\, \pi\, x] - 52\, y\, \text{Cos}[3\, \pi\, x] + \text{Cos}[4\, \pi\, x]\right) \text{Sin}[\pi\, x]$$

In[21]:= $D\left[\frac{1}{\text{Cos}[\pi\, x] + y}, \{x, 5\}\right]$ // Simplify
дифференцировать упростить

Out[21]=

$$\frac{1}{8\, (y + \text{Cos}[\pi\, x])^6} \pi^5 \left(723 - 216\, y^2 + 8\, y^4 - 4\, y \left(-201 + 52\, y^2\right) \text{Cos}[\pi\, x] + 4 \left(-59 + 66\, y^2\right) \text{Cos}[2\, \pi\, x] - 52\, y\, \text{Cos}[3\, \pi\, x] + \text{Cos}[4\, \pi\, x]\right) \text{Sin}[\pi\, x]$$

In[22]:=
```
Series[Log[1 + x], {x, 0, 3}]
```
разло··· натуральный логарифм

Out[22]=

$$x - \frac{x^2}{2} + \frac{x^3}{3} + O[x]^4$$

In[23]:=
```
Integrate[x^2, x]
```
интегрировать

Out[23]=

$$\frac{x^3}{3}$$

In[24]:=
```
Integrate[Exp[-x^2], {x, -Infinity, Infinity}]
```
интегриро··· показательная ф··· бесконечн··· бесконечность

In[27]:=
```
Sqrt[π] // N
```
численное приближение

Out[27]=

1.77245

In[28]:=
```
NIntegrate[Exp[-x^2], {x, -Infinity, Infinity}]
```
квадратурно·· показательная ф··· бесконечн··· бесконечность

Out[28]=

1.77245

In[29]:=
```
NSum[1/n^2, {n, 1, Infinity}]
```
численная оценка··· бесконечность

Out[29]=

1.64493

In[30]:=
```
Sum[1/n^2, {n, 1, Infinity}]
```
сумма бесконечность

In[31]:=
```
π^2/6 // N
```
численное приближение

Out[31]=

1.64493

In[33]:=
```
Sqrt[x^2] // FullSimplify
```
упростить в полном объёме

Out[33]=

$$\sqrt{x^2}$$

In[34]:=
```
Assuming[x > 0, Sqrt[x^2] // FullSimplify]
```
предполагая упростить в полно

Out[34]=

x

```
Assuming[{x ∈ ℝ, y > 0}, Sqrt[x^2 y^2] // FullSimplify]
```
предполагая — упростить в полно

Out[35]=

$y\,\mathrm{Abs}[x]$

In[36]:= ∂_x (y Abs[x])

абсолютно

Out[36]=

$y\,\mathrm{Abs}'[x]$

In[39]:=
```
$Assumptions = x ∈ ℝ
```
исходные посылки

Out[39]=

$x \in \mathbb{R}$

In[40]:= $\sqrt{x^2}$ // FullSimplify

упростить в полном объёме

Out[40]=

Abs[x]

In[41]:=
```
$Assumptions = True
```
исходные посылки — истина

Out[41]=

True

```
DSolve[{y'[x] == y[x], y[0] == 2}, y[x], x]
```
решить дифференциальные уравнения

Out[51]=

$\{\{y[x] \to 2\,e^{x}\}\}$

```
DSolve[{y'[x] == y[x], y[0] == 2}, y[x], x]
```
решить дифференциальные уравнения

In[63]:= DSolve$\left[\left\{x'[t] == y[t],\ y'[t] == -x[t],\ x[0] == 0,\ y\left[\frac{\pi}{3}\right] == \frac{\mathrm{Sqrt}[3]}{\alpha}\right\},\ \{x[t], y[t]\},\ t\right]$

решить дифференциальные уравнения

Out[63]=

$$\left\{\left\{x[t] \to \frac{2\sqrt{3}\,\mathrm{Sin}[t]}{\alpha},\ y[t] \to \frac{2\sqrt{3}\,\mathrm{Cos}[t]}{\alpha}\right\}\right\}$$

In[62]:=
```
Clear[y]
```
очистить

Size of Moscow »

Result

2562.8 km^2

Assuming "Size" is referring to cities | Use as referring to administrative divisions instead

Assuming area | Use city population instead

Assuming Moscow (Russia) | Use Moscow (Idaho, USA) or more instead

Input interpretation

Moscow CITY [area]

Moscow, Tsentralniy	area

Result

Show non-metric

2562.8 km^2

2562.8 km^2 (square kilometers)

Unit conversions

☑ Step-by-step solution

2.5628×10^9 m^2

2.563×10^9 m^2 (square meters)

25.628 Ma

25.628 Ma (megaares)

0.025628 Ga

0.025628 Ga (gigaares)

989.51 mi^2

989.51 mi^2 (square miles)

2.7586×10^{10} ft^2

2.759×10^{10} ft^2 (square feet)

Wolfram|Alpha Step-by-step solution ×

Unit conversions

Convert to square meters ▾

25.628 Ma (megaares)

0.025628 Ga (gigaares)

989.51 mi^2 (square miles)

2.759×10^{10} ft^2 (square feet)

Convert 2562.8 km^2 (square kilometers) to square meters:

2562.8 km^2

Convert from square kilometers to square meters:

Answer:

$$2562.8\ \text{km}^2 = \frac{2562.8\ \text{km}^2}{1} \times \frac{1 \times 10^6\ \text{m}^2}{1\ \text{km}^2} = 2.5628 \times 10^9\ \text{m}^2$$

Comparisons as area

$\approx$ ($0.12 \approx 1/8$) $\times$ total area of Wales (8022.82 mi^2)

≈ 0.82 $\times$ total area of Rhode Island (1212 mi^2)

$\approx$ area of forest flattened by the asteroid explosion over Tunguska in 1908 ($\approx$ 2000 km^2)

Corresponding quantities

Radius r of a circle from $A = \pi r^2$:
- 29 km (kilometers)
- 18 miles

Radius r of a sphere from $A = 4\pi r^2$:
- 14 km (kilometers)
- 8.9 miles

Edge length a of a square from $A = a^2$:
- 51 km (kilometers)
- 31 miles

Out[66]=

2562.8 km^2

In[67]:=

```
DSolve[{x'[t] == y[t], y'[t] == -x[t], x[0] == 0, y[π/3] == Sqrt[3]/α}, {x[t], y[t]}, t]
```

Wolfram|Alpha doesn't know how to interpret your input. ?

WolframAlpha

In[68]:=

```
DSolve[{y′[x] == y[x], y[0] == 2}, y[x], x]
```

Using closest Wolfram|Alpha interpretation: **Derivative[1][y][x] == y[x]**

Input

$y'(x) = y(x)$

Separable equation

$$\frac{y'(x)}{y(x)} = 1$$

ODE classification

first-order linear ordinary differential equation

Differential equation solution

Step-by-step solution

$y(x) = c_1 e^x$

Wolfram|Alpha Step-by-step solution

Differential equation solution

Solve as a separable equation

Solve the separable equation $\frac{dy(x)}{dx} = y(x)$:

Divide both sides by $y(x)$:

$$\frac{\frac{dy(x)}{dx}}{y(x)} = 1$$

Integrate both sides with respect to x:

$$\int \frac{\frac{dy(x)}{dx}}{y(x)} \, dx = \int 1 \, dx$$

Evaluate the integrals:

$\log(y(x)) = x + c_1$, where c_1 is an arbitrary constant.

Solve for $y(x)$:

$y(x) = e^{x+c_1}$

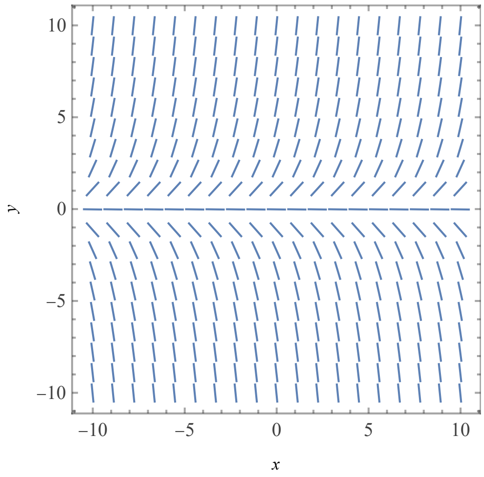
Simplify the arbitrary constants:

Answer:

$$y(x) = c_1 e^x$$

Slope field

Fewer points | More points | Slope field



Differential equation series solution about x = 0

$$c_1 + c_1 x + \frac{c_1 x^2}{2} + \frac{c_1 x^3}{6} + \frac{c_1 x^4}{24} + \frac{c_1 x^5}{120} + O(x^6)$$

(converges everywhere)

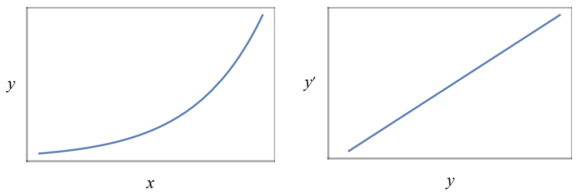
Differential equation infinite series expansion

$$\sum_{n=0}^{\infty} \frac{c_1 x^n}{n!}$$

(converges everywhere)

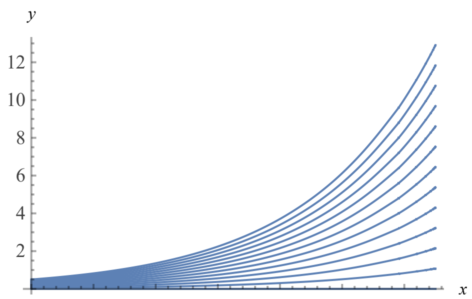
n! is the factorial function »

Plots of sample individual solution



$y(0) = 1$

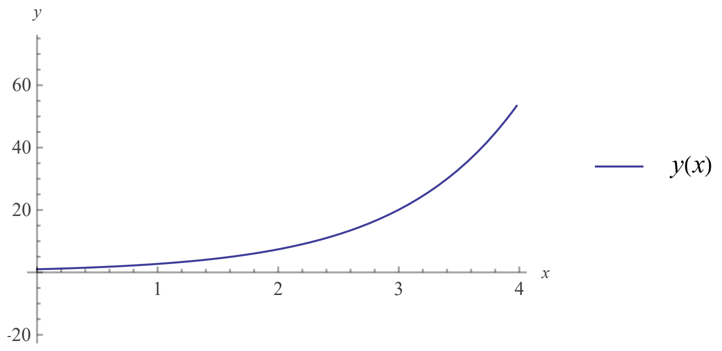
Sample solution family



(sampling $y(0)$)

Interactive differential equation solution plots

$y(0) = 1.$



Initial conditions:

$y(0)$

More controls

WolframAlpha

In[70]:=

Integrate of exp(-x^2) from 0 to Inf

Definite integral

More digits

$$\int_0^\infty \exp(-x^2)\, dx = \frac{\sqrt{\pi}}{2} \approx 0.886227$$

Indefinite integral

$$\int \exp(-x^2)\, dx = \frac{1}{2} \sqrt{\pi}\, \text{erf}(x) + \text{constant}$$

erf(x) is the error function »

WolframAlpha

In[71]:=
```
f[x_] := x^2 + 1
```

In[74]:=
```
f[2]
```

Out[74]=
```
5
```

In[75]:=
```
g[x_, y_] := y Exp[x]
```
показате

In[78]:=
```
#^2 & /@ {1, 2, 3, 4}
```

Out[78]=
```
{1, 4, 9, 16}
```

In[79]:=
$$x^2\,\mathrm{Exp}[-x]\,\frac{\mathrm{Sin}\left[\mathrm{Pi}\,\frac{x}{2}\right]}{1+\frac{x^3}{3}}$$
показательная функция

In[80]:=
$$\mathrm{Series}\left[\frac{e^{-x}\,x^2\,\mathrm{Sin}\left[\frac{\pi x}{2}\right]}{1+\frac{x^3}{3}},\ \{x,\ 1,\ 2\}\right]$$
разложить в ряд

Out[80]=
$$\frac{3}{4\,e}+\frac{3\,(x-1)}{16\,e}-\frac{3\left(23+2\,\pi^2\right)\,(x-1)^2}{64\,e}+O[x-1]^3$$

$$\left(x^2\,\mathrm{Exp}[-\alpha\,x]\,\frac{\mathrm{Sin}\left[\mathrm{Pi}\,\frac{x}{2}\right]}{1+\beta\,\frac{x^3}{3}}\ //\ \mathrm{Series}[\#,\ \{x,\ 1,\ 1\}]\ \&\right)\ /.\ \{\alpha\to 1,\ \beta\to 2\}\ c$$
показательная функция разложить в ряд

Out[88]=
$$\frac{3}{5\,e}-\frac{3\,(x-1)}{25\,e}+O[x-1]^2$$

In[87]:=
$$\mathrm{Assuming}\left[\alpha\to 1,\ \left(x^2\,\mathrm{Exp}[-\alpha\,x]\,\frac{\mathrm{Sin}\left[\mathrm{Pi}\,\frac{x}{2}\right]}{1+\beta\,\frac{x^3}{3}}\ //\ \mathrm{Series}[\#,\ \{x,\ 1,\ 1\}]\ \&\right)\right]$$
предполагая показательная функция разложить в ряд

Out[87]=
$$\frac{3\,e^{-\alpha}}{3+\beta}-\frac{3\,\left(e^{-\alpha}\,(-6+3\,\alpha+\beta+\alpha\,\beta)\right)\,(x-1)}{(3+\beta)^2}+O[x-1]^2$$