versione 0

Equazioni differenziali – 0

```
DSolve[{y'[x] == -1/((2 y[x] + 1) * (x - 2)), y[1] == -2},
 y[x], x]
```

DSolve::bvnul :
For some branches of the general solution, the given boundary conditions lead to an empty solution.
≫

$$\left\{\left\{y[x] \to \frac{1}{2}\left(-1-\sqrt{9-4\,\text{Log}[2-x]}\right)\right\}\right\}$$

Funzioni di due variabili, punti critici – 0

```
g[t_, y_] := t + y^2 + 4 y;
f[x_, y_] := g[x^2, y]
Print[Expand[f[x, y]]];
grad = Expand[{∂x f[x, y], ∂y f[x, y]}];
Print[grad];
Print[Solve[grad == {0, 0}, {x, y}]];
H[x_, y_] = {{∂x,x f[x, y], ∂x,y f[x, y]}, {∂y,x f[x, y], ∂y,y f[x, y]}};
Print[Simplify[MatrixForm[H[x, y]]]];
h[y_] := g[(16 - y^2)/8, y]; Print[Expand[h[y]]]
Print[h'[y]];
Print[h[-16/7]]
```

$x^2 + 4\,y + y^2$

$\{2\,x,\ 4 + 2\,y\}$

$\{\{x \to 0,\ y \to -2\}\}$

$$\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$$

$$2 + 4\,y + \frac{7\,y^2}{8}$$

$$4 + \frac{7\,y}{4}$$

$$-\frac{18}{7}$$

Integrale doppio – 0

```
f[x_, y_] := e^(2 y - y^2) / x;
Print[Simplify[{∫_(e^y)^e f[x, y] dx,
    ∫_0^1 ∫_(e^y)^e f[x, y] dx dy}]];
∫_0^1 (1 - y) e^(2 y - y^2) dy
```

```
{e^-(-2+y) y If[(1/(-1 + e^(1-y)) ∉ Reals || Re[1/(-1 + e^(1-y))] ≤ -1 || Re[1/(-1 + e^(1-y))] ≥ 0) &&
    (e^y ∉ Reals || 0 < Re[e^y] < e || Re[e^y] > e), 1 - Log[e^y],
  Integrate[1/x, {x, e^y, e}, Assumptions → !((e^y/(e - e^y) ∉ Reals || Re[e^y/(e - e^y)] ≤ -1 || Re[e^y/(e - e^y)] ≥ 0) &&
      (e^y ∉ Reals || 0 < Re[e^y] < e || Re[e^y] > e))]], 1/2 (-1 + e)}
```

```
1/2 (-1 + e)
```

Numeri complessi – 0

In[1]:=
```
z1 = √3 + i; z2 = 1 - √3 i;
```

In[4]:=
```
Expand[z1^6 / z2]
```

Out[4]=
$$-\frac{64}{1-i\sqrt{3}}$$

Matrici, autovalori – 0

In[5]:=
```
a = {{0, 1}, {-1, 0}}; MatrixForm[a]
```

Out[5]//MatrixForm=
$$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

In[20]:=
```
Eigenvalues[a]
```

Out[20]=
```
{i, -i}
```

In[24]:=
```
Eigenvectors[a]
```

Out[24]=
```
{{-i, 1}, {i, 1}}
```

In[25]:=
```
s1 = Transpose[%]; MatrixForm[s1]
```

Out[25]//MatrixForm=
$$\begin{pmatrix} -i & i \\ 1 & 1 \end{pmatrix}$$

In[26]:=
```
s = Inverse[s1]; MatrixForm[s1]
```

Out[26]//MatrixForm=
$$\begin{pmatrix} -i & i \\ 1 & 1 \end{pmatrix}$$

In[27]:=
```
MatrixForm[s.a.s1]
```

Out[27]//MatrixForm=
$$\begin{pmatrix} i & 0 \\ 0 & -i \end{pmatrix}$$