versione 0

Equazioni differenziali – 0

```
Simplify[DSolve[{y'[x] == e^(-y[x]^2)/(2 x^3 y[x]),
    y[1] == -Sqrt[Log[3]]},
  y[x], x]]
```

$$\left\{\left\{y[x] \to -\sqrt{\text{Log}\left[\frac{7}{2} - \frac{1}{2x^2}\right]}\right\}\right\}$$

```
Solve[7/2 - 1/(2 x^2) == 1, x]
```

$$\left\{\left\{x \to -\frac{1}{\sqrt{5}}\right\}, \left\{x \to \frac{1}{\sqrt{5}}\right\}\right\}$$

Funzioni di due variabili, punti critici – 0

```
f[x_, y_] := x^2 + y^2 + 2 y; {f[0, 1], f[-1, 3]}
```

```
{3, 16}
```

Integrale doppio – 0

```
f[x_, y_] := x * e^(3 y^2 - 2 y^3);
Print[Integrate[f[x, y], {x, y, Sqrt[y]}]];
Print[Integrate[f[x, y], {x, y, Sqrt[y]}, {y, 0, 1}]]
```

$$-\frac{1}{2} e^{(3-2y)y^2} (-1+y)\, y$$

$$\frac{1}{12}(-1+e)$$

Numeri complessi – 0

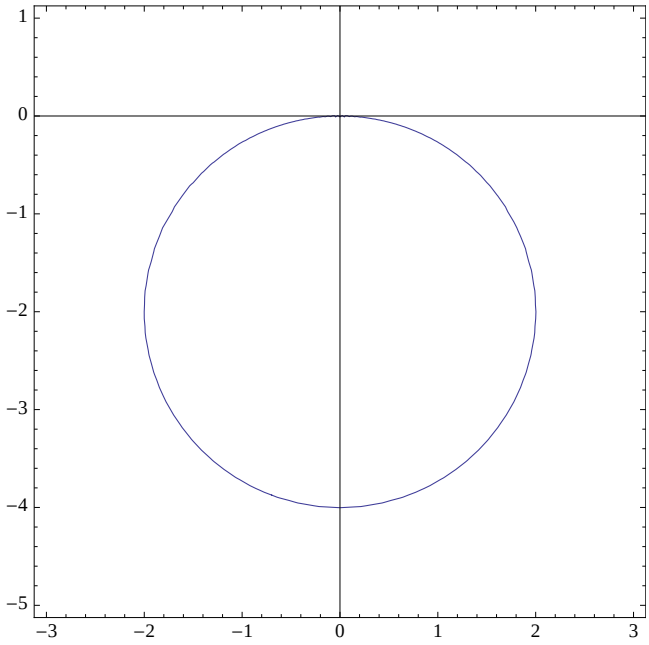
```
In[7]:= w = 2 e^((-3 π i)/4) - 2 i; Print[{Re[w], Im[w], Simplify[Abs[w]]}];
        Print[Simplify[Im[1 / w]]]
```

$$\left\{-\sqrt{2}, -2-\sqrt{2}, 2\sqrt{2+\sqrt{2}}\right\}$$

$$\frac{1}{4}$$

In[12]:=
```
ContourPlot[-y/(x^2 + y^2) == 1/4, {x, -3, 3}, {y, -5, 1}, Axes → True]
```

Out[12]=



Matrici, autovalori – 0

In[231]:=
```
a[k_] := {{7, -5}, {6, k}}; Print[MatrixForm[a[k]]];
v = {{5}, {6}}; Print[MatrixForm[v]];
Print[MatrixForm[a[k].v]];
b[k_] := Transpose[{Flatten[v], Flatten[a[k].v]}];
Print[MatrixForm[b[k]]];
Solve[Det[b[k]] == 0, k]
aa = a[-4]; Print[MatrixForm[aa]];
Print[Eigenvalues[aa]];
Print[Eigenvectors[aa]];
r = Transpose[Eigenvectors[aa]]; Print[MatrixForm[r]];
s = Inverse[r];
Print[MatrixForm[s]];
Print[MatrixForm[s.aa.r]];
```

$$\begin{pmatrix} 7 & -5 \\ 6 & k \end{pmatrix}$$

$$\begin{pmatrix} 5 \\ 6 \end{pmatrix}$$

$$\begin{pmatrix} 5 \\ 30 + 6\,k \end{pmatrix}$$

$$\begin{pmatrix} 5 & 5 \\ 6 & 30 + 6\,k \end{pmatrix}$$

Out[236]= $\{\{k \to -4\}\}$

$$\begin{pmatrix} 7 & -5 \\ 6 & -4 \end{pmatrix}$$

$\{2, 1\}$

$\{\{1, 1\}, \{5, 6\}\}$

$$\begin{pmatrix} 1 & 5 \\ 1 & 6 \end{pmatrix}$$

$$\begin{pmatrix} 6 & -5 \\ -1 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}$$

versione 1

Equazioni differenziali – 1 (non è capace!)

```
Simplify[DSolve[{y'[x] == e^(4 y[x]^2) / (8 x^2 y[x]),
    y[1] == -Sqrt[Log[2]]},
  y[x], x]]
```

Solve::ifun : Inverse functions are being used by Solve, so some
solutions may not be found; use Reduce for complete solution information. >>

Solve::ifun : Inverse functions are being used by Solve, so some
solutions may not be found; use Reduce for complete solution information. >>

Solve::ifun : Inverse functions are being used by Solve, so some
solutions may not be found; use Reduce for complete solution information. >>

General::stop : Further output of Solve::ifun will be suppressed during this calculation. >>

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

$$\left\{\left\{y[x] \to \frac{1}{2} i \sqrt{\text{Log}\left[-\frac{15}{16}+\frac{1}{x}\right]}\right\}\right\}$$

```
Solve[-15/16 + 1/x == 1, x]
```

$$\left\{\left\{x \to \frac{16}{31}\right\}\right\}$$

Funzioni di due variabili, punti critici – 1

```
f[x_, y_] := x^2 + y^2 - 2 x; {f[-1, 0], f[-3, -1]}
```

```
{3, 16}
```

Integrale doppio – 1

```
f[x_, y_] := x * e^(3 y^2 - 4 y^3);
Print[Integrate[f[x, y], {x, 2 y, Sqrt[2 y]}]];
Print[Integrate[f[x, y], {x, 2 y, Sqrt[2 y]}, {y, 0, 1/4}]]
```

$$e^{(3-4y)\,y^2}\left(y-2y^2\right)$$

$$\frac{1}{6}\left(-1+e^{1/8}\right)$$

Numeri complessi – 1

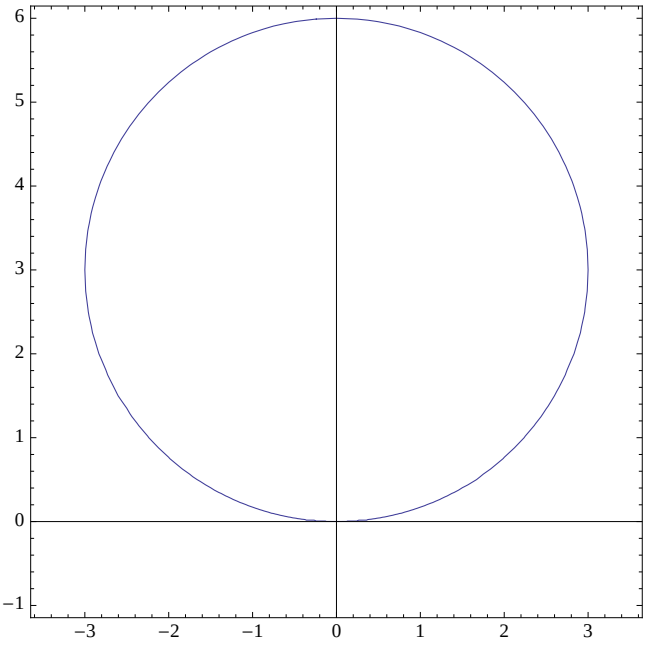
In[186]:=
```
w = 3 e^(3 π i / 4) + 3 i; Print[{Re[w], Im[w], Simplify[Abs[w]]}];
Print[Simplify[Im[1 / w]]]
```

$$\left\{-\frac{3}{\sqrt{2}},\ 3+\frac{3}{\sqrt{2}},\ 3\sqrt{2+\sqrt{2}}\right\}$$

$$-\frac{1}{6}$$

In[191]:=
```
ContourPlot[-y / (x^2 + y^2) == -1 / 6, {x, -3.5, 3.5}, {y, -1, 6}, Axes → True]
```

Out[191]=



Matrici, autovalori – 1

In[244]:=
```
a[k_] := {{7, -6}, {4, k}}; Print[MatrixForm[a[k]]];
v = {{3}, {2}}; Print[MatrixForm[v]];
Print[MatrixForm[a[k].v]];
b[k_] := Transpose[{Flatten[v], Flatten[a[k].v]}];
Print[MatrixForm[b[k]]];
Solve[Det[b[k]] == 0, k]
aa = a[-3]; Print[MatrixForm[aa]];
Print[Eigenvalues[aa]];
Print[Eigenvectors[aa]];
r = Transpose[Eigenvectors[aa]]; Print[MatrixForm[r]];
s = Inverse[r];
Print[MatrixForm[s]];
Print[MatrixForm[s.aa.r]];
```

$$\begin{pmatrix} 7 & -6 \\ 4 & k \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} 9 \\ 12 + 2\,k \end{pmatrix}$$

$$\begin{pmatrix} 3 & 9 \\ 2 & 12 + 2\,k \end{pmatrix}$$

Out[249]= $\{\{k \to -3\}\}$

$$\begin{pmatrix} 7 & -6 \\ 4 & -3 \end{pmatrix}$$

$\{3, 1\}$

$\{\{3, 2\}, \{1, 1\}\}$

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

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

$$\begin{pmatrix} 3 & 0 \\ 0 & 1 \end{pmatrix}$$