versione 0

Equazioni differenziali – 0

```
Simplify[DSolve[{
    y'[x] == 2 x / Sqrt[2 y[x] + 1], y[5] == 4
  }, y[x], x]]
```

$$\text{Simplify}\left[\text{DSolve}\left[\left\{ y'[x] == \frac{2x}{\sqrt{2\,y[x]+1}},\ y[5] == 4 \right\},\ y[x],\ x\right]\right]$$

DSolve::bvnul :
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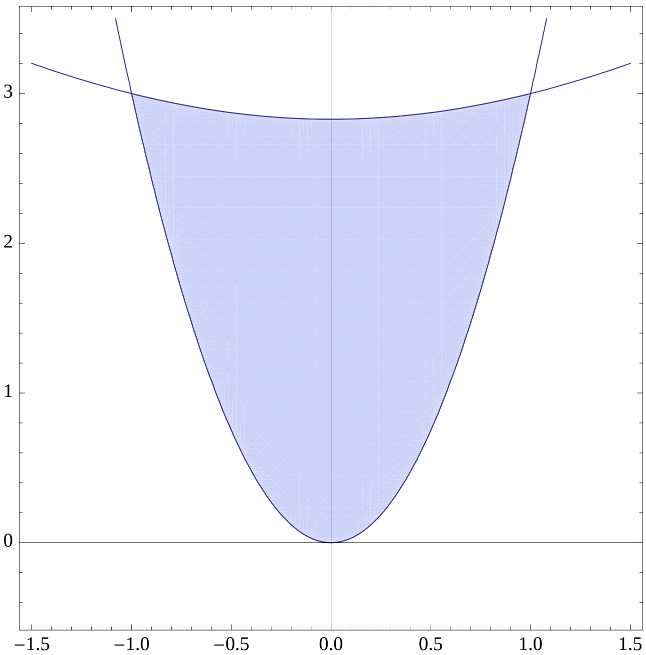
$$\left\{\left\{y[x] \to \frac{1}{2}\left(-1+3^{2/3}\left(\left(-34+x^2\right)^2\right)^{1/3}\right)\right\},\ \left\{y[x] \to \frac{1}{2}\left(-1+3^{2/3}\left(\left(-16+x^2\right)^2\right)^{1/3}\right)\right\}\right\}$$

Funzioni di due variabili, punti critici – 0

```
aa = RegionPlot[{3 y^2 - 24 < 3 x^2 < y}, {x, -1.5, 1.5}, {y, -0.5, 3.5}, MaxRecursion → 10, Axes → True];
ab = ContourPlot[{x^2 - y^2 + 8 == 0}, {x, -1.5, 1.5}, {y, -0.5, 3.5}];
ac = ContourPlot[{3 x^2 - y == 0}, {x, -1.5, 1.5}, {y, -0.5, 3.5}];
Show[aa, ab, ac]
```



la funzione è $f(x, y) = 9\,x^2 - y^3$

In[1]:=
```
h[t_, y_] := 9 t - y^3; f[x_, y_] := h[x^2, y];
Print[f[x, y]];
g1[y_] := h[y/3, y]; Print[{g1[y], g1'[y]}]
```

$9\,x^2 - y^3$

$\{3\,y - y^3,\ 3 - 3\,y^2\}$

```
Print[{g1[0], g1[1], g1[3]}]
```

{0, 2, -18}

In[4]:=
```
g2[y_] := h[-8 + y^2, y]; Print[{g2[y], g2'[y]}]
```

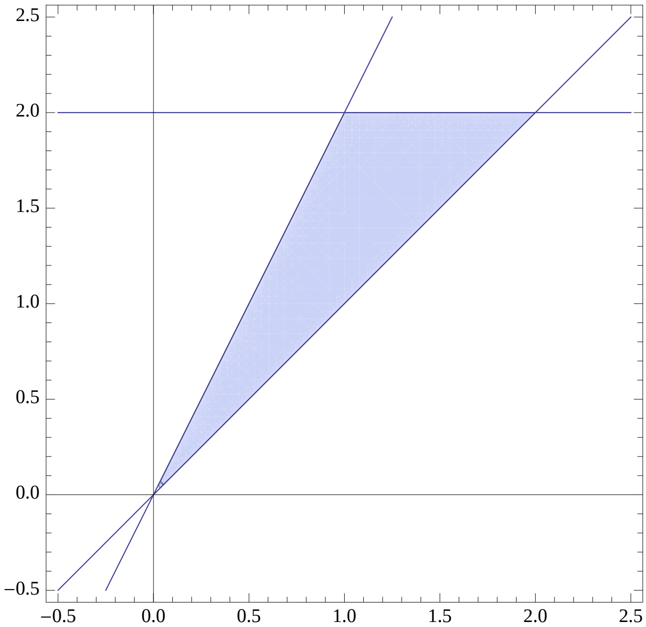
$\{-y^3 + 9\,(-8 + y^2),\ 18\,y - 3\,y^2\}$

In[5]:= `Print[{g2[√8], g2[3]}]`

$\{-16\sqrt{2}, -18\}$

Integrale doppio – 0

```
aa = RegionPlot[{y/2 < x < y && y < 2}, {x, -0.5, 2.5}, {y, -0.5, 2.5}, MaxRecursion → 10, Axes → True];
ab = ContourPlot[{x - y == 0}, {x, -0.5, 2.5}, {y, -0.5, 2.5}];
ac = ContourPlot[{2 - y == 0}, {x, -0.5, 2.5}, {y, -0.5, 2.5}];
ad = ContourPlot[{y/2 == x}, {x, -0.5, 2.5}, {y, -0.5, 2.5}];
Show[aa, ab, ac, ad]
```



$\int_{\frac{y}{2}}^{y} e^{y^2}\, dx$

$\frac{e^{y^2}\, y}{2}$

$\int_0^2 \int_{\frac{y}{2}}^{y} e^{y^2}\, dx\, dy$

$\frac{1}{4}\left(-1 + e^4\right)$

Numeri complessi – DA FARE

`{Abs[(-i - √3)], Arg[(-i - √3)]}`

$\left\{2, -\frac{5\pi}{6}\right\}$

`{Abs[(-i - √3)^9], Arg[(-i - √3)^9]}`

$\left\{512, \frac{\pi}{2}\right\}$

`Solve[z^3 == (-i - √3)^9, z]`

$\{\{z \to -8\, i\}, \{z \to 8\, (-1)^{1/6}\}, \{z \to 8\, (-1)^{5/6}\}\}$

$$\text{Print}\Big[\text{Table}\Big[\Big\{\text{Abs}\Big[\big(-i-\sqrt{3}\big)^9\Big]^{\frac{1}{3}} * \text{Cos}\Big[\frac{1}{3}\,\text{Arg}\Big[\big(-i-\sqrt{3}\big)^9\Big] + \frac{2\,k\,\pi}{3}\Big],\ \text{Abs}\Big[\big(-i-\sqrt{3}\big)^9\Big]^{\frac{1}{3}} * \text{Sin}\Big[\frac{1}{3}\,\text{Arg}\Big[\big(-i-\sqrt{3}\big)^9\Big] + \frac{2\,k\,\pi}{3}\Big]\Big\},\ \{k,\ 0,\ 2\}\Big]\Big]$$

$$\left\{\left\{4\sqrt{3},\ 4\right\},\ \left\{-4\sqrt{3},\ 4\right\},\ \{0,\ -8\}\right\}$$

Matrici, autovalori – Da fare

$$A = \frac{1}{4}\begin{pmatrix} 13 & -3\sqrt{3} \\ -3\sqrt{3} & 7 \end{pmatrix};$$

```
Print[Eigenvalues[A]]; Print[Orthogonalize[Eigenvectors[A]]]
```

{4, 1}

$$\left\{\left\{-\frac{\sqrt{3}}{2},\ \frac{1}{2}\right\},\ \left\{\frac{1}{2},\ \frac{\sqrt{3}}{2}\right\}\right\}$$

$$m = \begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix};\ \text{MatrixForm}[\text{Transpose}[m].A.m]$$

$$\begin{pmatrix} 1 & 0 \\ 0 & 4 \end{pmatrix}$$