versione 0

Equazioni differenziali – 0

```
Simplify[DSolve[{4 y''[x] + y'[x] == 2 x + 3, y[4] == 1, y'[4] == 6},
  y[x], x]]
```

$\{\{y[x] \to 17 - 12\, e^{1-\frac{x}{4}} - 5\, x + x^2\}\}$

Funzioni di due variabili, punti critici – 0

```
g[t_, y_] := 4 t/(4 y - 5); f[x_, y_] := g[x^2, y]; f[x, y]
```

$$\frac{4\, x^2}{-5 + 4\, y}$$

```
f1[y_] := g[1 - y^2, y]; Together[f1[y]]
```

$$-\frac{4\,(-1 + y^2)}{-5 + 4\, y}$$

```
Together[f1'[y]]
```

$$-\frac{8\,(2 - 5\, y + 2\, y^2)}{(-5 + 4\, y)^2}$$

```
Solve[f1'[y] == 0, y]
```

$$\{\{y \to \frac{1}{2}\}, \{y \to 2\}\}$$

```
f2[y_] := g[1 - y^2 - 2 y, y]; Together[f2[y]]
```

$$-\frac{4\,(-1 + 2\, y + y^2)}{-5 + 4\, y}$$

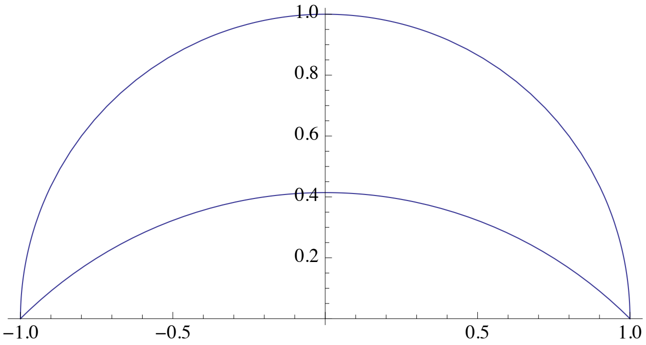
```
Together[f2'[y]]
```

$$-\frac{8\,(-3 - 5\, y + 2\, y^2)}{(-5 + 4\, y)^2}$$

```
Solve[f2'[y] == 0, y]
```

$$\{\{y \to -\frac{1}{2}\}, \{y \to 3\}\}$$

```
aa = ParametricPlot[{Cos[t], Sin[t]}, {t, 0, Pi}];
ab = ParametricPlot[{√2 Cos[t], -1 + √2 Sin[t]}, {t, Pi / 4, 3 Pi / 4}];
Show[aa, ab]
```

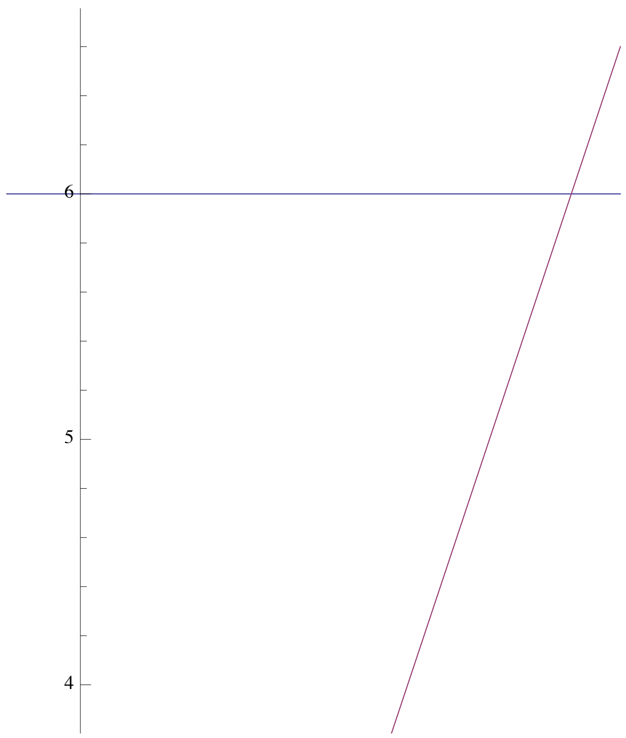


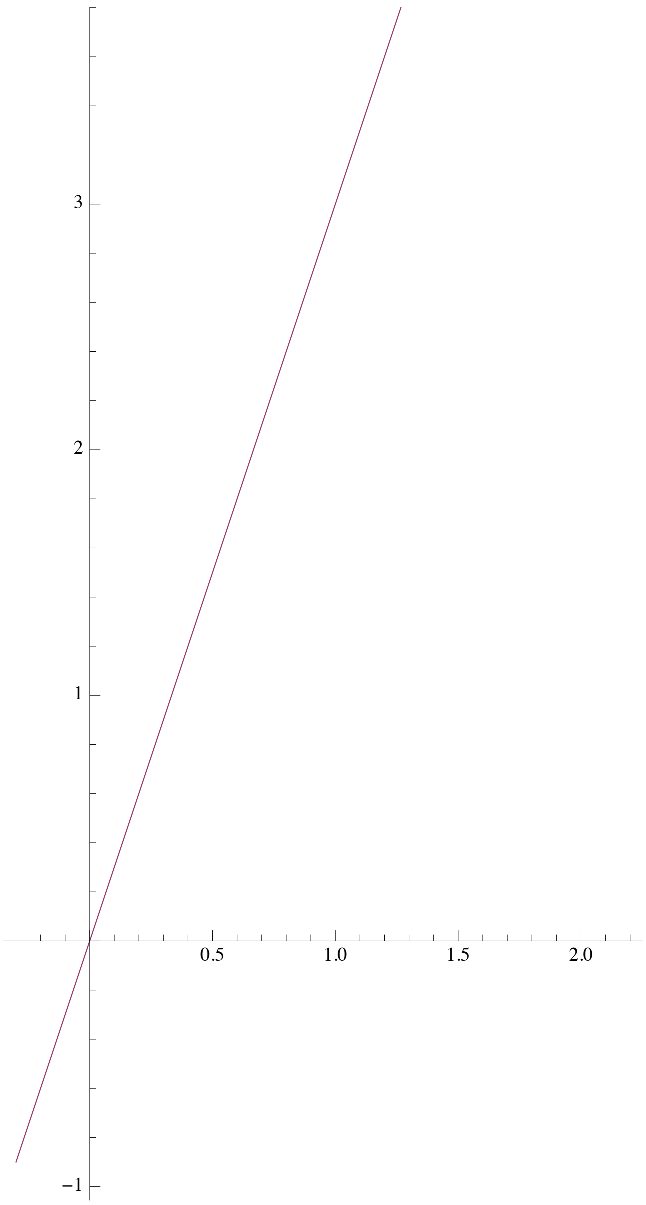

```
Simplify[{f1[0], f1[1 / 2], f2[√2 - 1]}]
```

$\left\{-\frac{4}{5}, -1, 0\right\}$

Integrale doppio – 0

```
Plot[{6, 3 x}, {x, -.3, 2.2}, AspectRatio → Automatic]
```






```
f[x_, y_] := x/(y + 2);
Simplify[{∫_0^(y/3) f[x, y] dx,
  ∫∫_0^(y/3) f[x, y] dx dy,
  ∫_0^6 ∫_0^(y/3) f[x, y] dx dy}]
```

$$\left\{\frac{y^2}{18\ (2+y)},\ \frac{1}{36}\left(-12-4\ y+y^2+8\ \text{Log}[2+y]\right),\ \frac{1}{9}\ (3+\text{Log}[16])\right\}$$

```
f[x_, y_] := x/(y + 3);
Assuming[y ∈ Reals && y > 0 && x ∈ Reals && x > 0 && x < 2, Simplify[{∫_{3x}^{6} f[x, y] dy,
  ∫∫_{3x}^{6} f[x, y] dy dx,
  ∫_0^2 ∫_{3x}^{6} f[x, y] dy dx}]]
```

$$\left\{x \operatorname{Log}\left[\frac{3}{1+x}\right],\ \frac{1}{4}(-1+x)\left(-1+x+2(1+x)\operatorname{Log}\left[\frac{3}{1+x}\right]\right),\ \frac{\operatorname{Log}[3]}{2}\right\}$$

Numero complesso – 0

In[2]:=
```
z = -√2 + √2 i; Print[{Abs[z], Arg[z]}]; Print[z^9]
```

$$\left\{2,\ \frac{3\pi}{4}\right\}$$

$$(-256+256\,i)\sqrt{2}$$

Matrice, autovalori… – 0

In[3]:=
```
a = (3  0  -1
     0  2   0
    -3  0   1); Print[{Eigenvalues[a], Eigenvectors[a]}]
```

{{4, 2, 0}, {{-1, 0, 1}, {0, 1, 0}, {1, 0, 3}}}

versione 1

Equazioni differenziali – 0

```
Simplify[DSolve[{4 y''[x] + y[x] == 2 x^2 + 3, y[π] == 1, y'[π] == 6},
  y[x], x]]
```

$$\left\{\left\{y[x] \to -13 + 2x^2 + 4(-3+2\pi)\operatorname{Cos}\left[\frac{x}{2}\right] - 2\left(-7+\pi^2\right)\operatorname{Sin}\left[\frac{x}{2}\right]\right\}\right\}$$

Funzioni di due variabili, punti critici – 0

```
g[t_, y_] := 4 t/(4 y - 5); f[x_, y_] := g[x^2, y]; f[x, y]
```

$$\frac{4x^2}{-5+4y}$$

```
f1[y_] := g[1 - y^2, y]; Together[f1[y]]
```

$$-\frac{4\left(-1+y^2\right)}{-5+4y}$$

```
Together[f1'[y]]
```

$$-\frac{8\left(2-5y+2y^2\right)}{(-5+4y)^2}$$

```
Solve[f1'[y] == 0, y]
```

$$\left\{\left\{y \to \frac{1}{2}\right\},\ \{y \to 2\}\right\}$$

```
f2[y_] := g[1 - y^2 - 2 y, y]; Together[f2[y]]
```

$$-\frac{4\left(-1+2\,y+y^{2}\right)}{-5+4\,y}$$

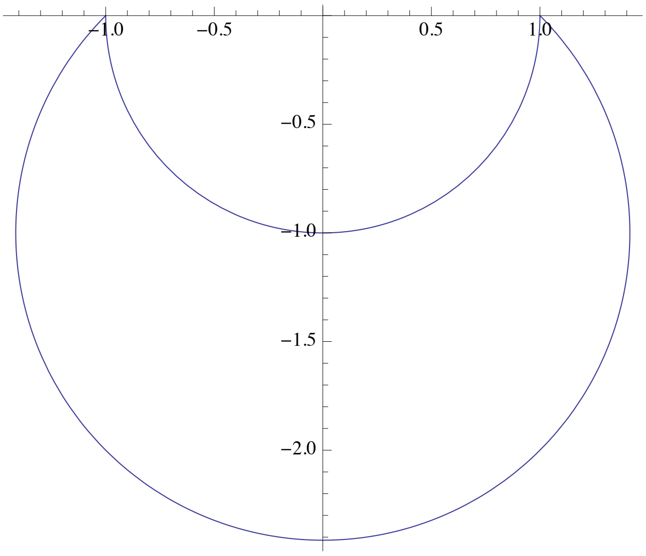
```
Together[f2'[y]]
```

$$-\frac{8\left(-3-5\,y+2\,y^{2}\right)}{(-5+4\,y)^{2}}$$

```
Solve[f2'[y] == 0, y]
```

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

```
aa = ParametricPlot[{Cos[t], Sin[t]}, {t, 0, -Pi}];
ab = ParametricPlot[{√2 Cos[t], -1 + √2 Sin[t]}, {t, 3 Pi / 4, 9 Pi / 4}];
Show[ab, aa]
```

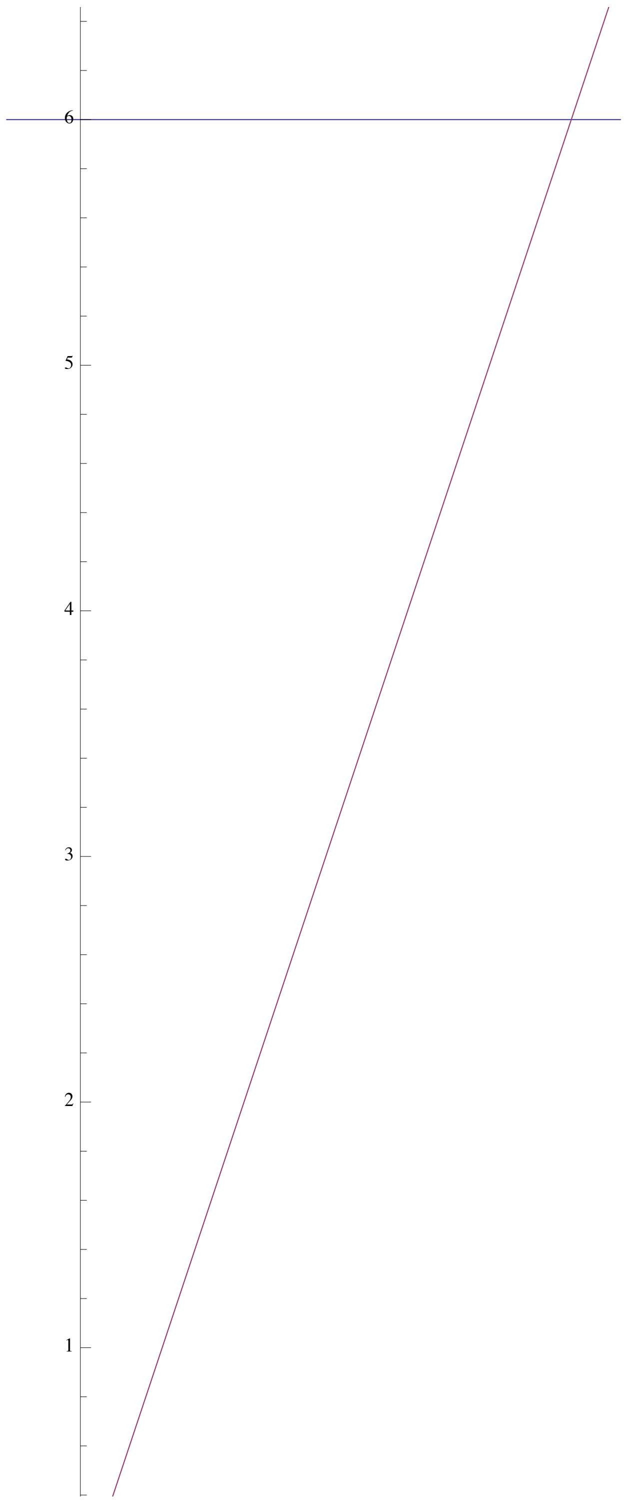


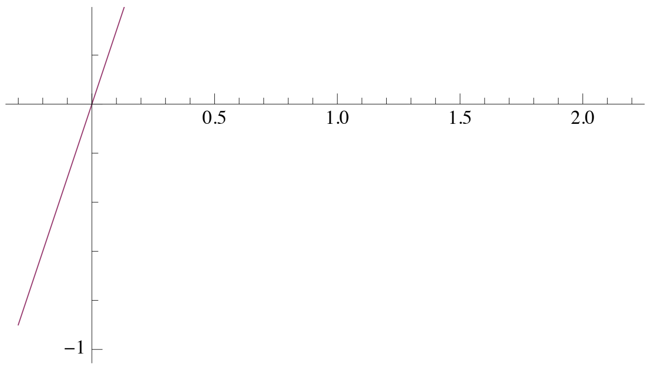

```
Simplify[{f1[0], f2[-1 / 2], f2[-√2 - 1]}]
```

$$\left\{-\frac{4}{5}, -1, 0\right\}$$

Integrale doppio – 0

```
Plot[{6, 3 x}, {x, -.3, 2.2}, AspectRatio → Automatic]
```


6
5
4
3
2
1



$$f[x\_, y\_] := \frac{y}{x+3};$$

$$\text{Assuming}\Big[y \in \text{Reals} \,\&\&\, y > 0,\ \text{Simplify}\Big[\Big\{\int_{3x}^{6} f[x, y]\, dy,\ \int\int_{3x}^{6} f[x, y]\, dy\, dx,\ \int_0^2\int_{3x}^{6} f[x, y]\, dy\, dx\Big\}\Big]\Big]$$

$$\Big\{-\frac{9\,(-4 + x^2)}{2\,(3 + x)},\ -\frac{9}{4}\,(-27 - 6\,x + x^2 + 10\,\text{Log}[3 + x]),\ 9\,\Big(2 - 9\,\text{ArcCoth}[4] + \text{Log}\Big[\frac{25}{9}\Big]\Big)\Big\}$$

$$f[x\_, y\_] := \frac{y}{x+3};$$

$$\text{Assuming}\Big[y \in \text{Reals} \,\&\&\, y > 0,\ \text{Simplify}\Big[\Big\{\int_{0}^{y/3} f[x, y]\, dx,\ \int\int_{0}^{y/3} f[x, y]\, dx\, dy,\ \int_0^6\int_{0}^{y/3} f[x, y]\, dx\, dy\Big\}\Big]\Big]$$

$$\Big\{y\,\text{Log}\Big[\frac{9 + y}{9}\Big],\ \frac{1}{4}\,(9 + y)\,\Big(27 - y + 2\,(-9 + y)\,\text{Log}\Big[\frac{9 + y}{9}\Big]\Big),\ 18 - \frac{45}{2}\,\text{Log}\Big[\frac{5}{3}\Big]\Big\}$$

Numero complesso – 0

In[2]:= $z = -\sqrt{2} + \sqrt{2}\, i$; Print[{Abs[z], Arg[z]}]; Print[z^9]

Matrice, autovalori… – 0

In[4]:= $a = \begin{pmatrix} -4 & 0 & -1 \\ 0 & 2 & 0 \\ 4 & 0 & 1 \end{pmatrix}$; Print[{Eigenvalues[a], Eigenvectors[a]}]

```
{{-3, 2, 0}, {{-1, 0, 1}, {0, 1, 0}, {-1, 0, 4}}}
```