```
(*Zadatak 1*)
DSolve[{y'[x] == y[x]}, y[x], x]
```

$$\{\{y[x] \to e^x C[1]\}\}$$

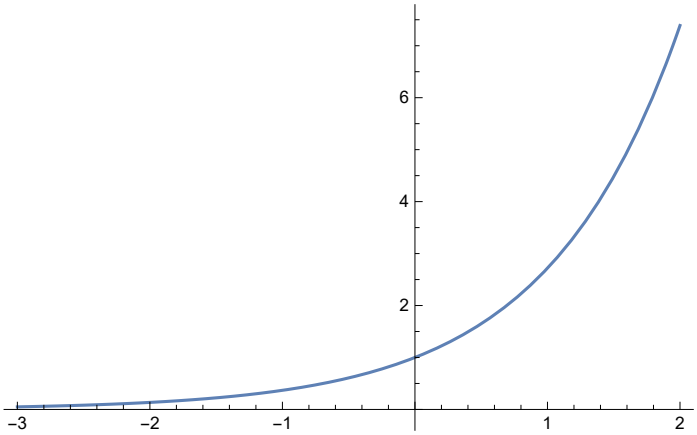
```
DSolve[{y'[x] == y[x], y[0] == 1}, y[x], x]
```

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

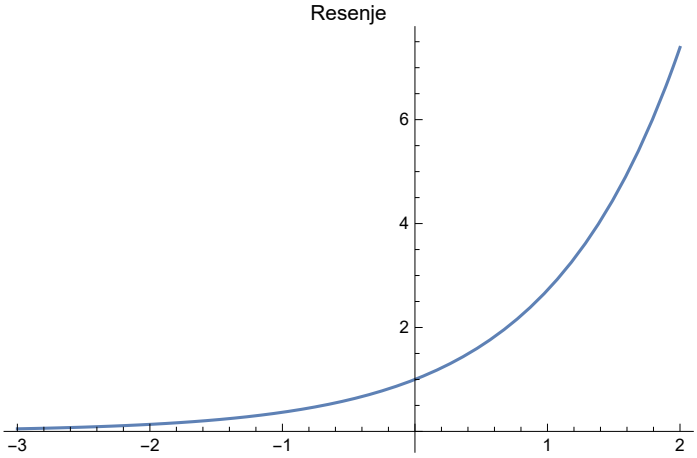
```
sol = DSolve[{y'[x] == y[x], y[0] == 1}, y[x], x]
```

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

```
Plot[y[x] /. sol, {x, -3, 2}]
```




```
Show[Plot[y[x] /. sol, {x, -3, 2}],
 PlotLabel → HoldForm[Resenje], LabelStyle → {GrayLevel[0]}]
```




```
(*Zadatak 2*)
sol = DSolve[y'[x] + 5 y[x] == 1, y, x]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\}, \frac{1}{5} + e^{-5x} C[1]\right]\right\}\right\}$$

```
m = sol[[1]]
```

$$\left\{y \to \text{Function}\left[\{x\}, \frac{1}{5} + e^{-5x} C[1]\right]\right\}$$

```
y[x] /. m
```

$$\frac{1}{5} + e^{-5x} C[1]$$

```
(*Zadatak 3*)
sol = DSolve[y'[x] == -y[x] / x, y, x]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\}, \frac{C[1]}{x}\right]\right\}\right\}$$

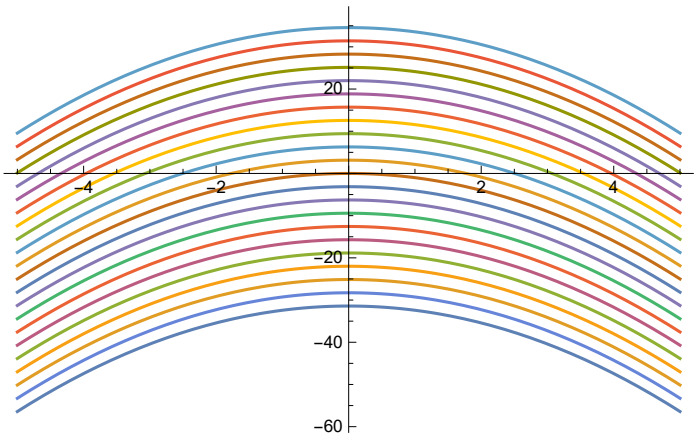
```
Plot[Evaluate[y[x] /. sol /. C[1] → 1], {x, 100}]
```

ReplaceAll: {C[1] → 1} is neither a list of replacement rules nor a valid dispatch table, and so cannot be used for replacing.

Plot: Range specification {x, 100} is not of the form {x, xmin, xmax}.

$$\text{Plot}\left[\left\{\frac{C[1]}{x}\right\} /. C[1] \to 1, \{x, 100\}, \text{PlotRange} \to \text{All}\right]$$

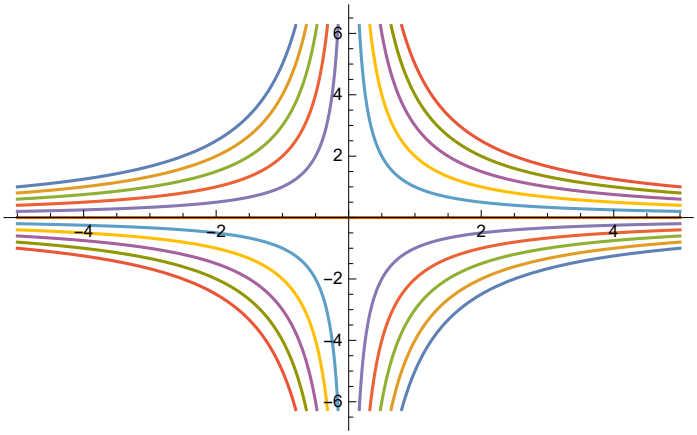
```
Plot[Evaluate[{-x^2 + 2 π C[1], π - x^2 + 2 π C[1]} /. C[1] → Range[-5, 5]], {x, -5, 5}]
```




```
sol = DSolve[y'[x] == -y[x] / x, y, x]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\}, \frac{C[1]}{x}\right]\right\}\right\}$$

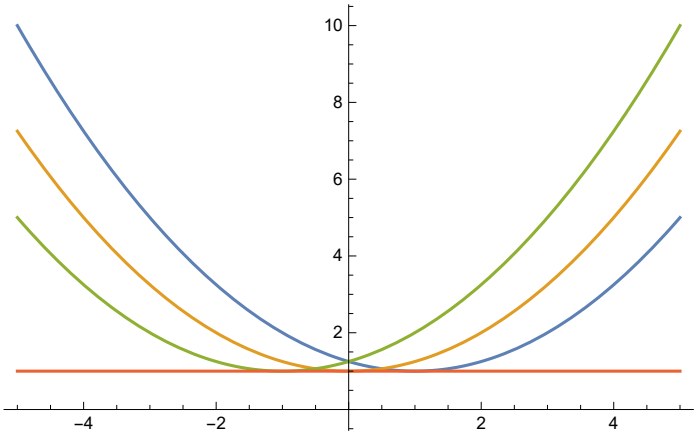
```
Plot[Evaluate[y[x] /. sol /. C[1] → Range[-5, 5]], {x, -5, 5}]
```




```
sol = DSolve[y'[x] == Sqrt[y[x] - 1], y, x]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\}, \frac{1}{4}\left(4 + x^2 + 2\,x\,C[1] + C[1]^2\right)\right]\right\}\right\}$$

```
(*Kada nacrtamo i resenje y=
 1 vidimo da dodiruje svako resenje iz familije opstih resenja*)
Plot[{Evaluate[y[x] /. sol /. C[1] → Range[-1, 1]], 1}, {x, -5, 5}, AxesOrigin → {0, 0}]
```

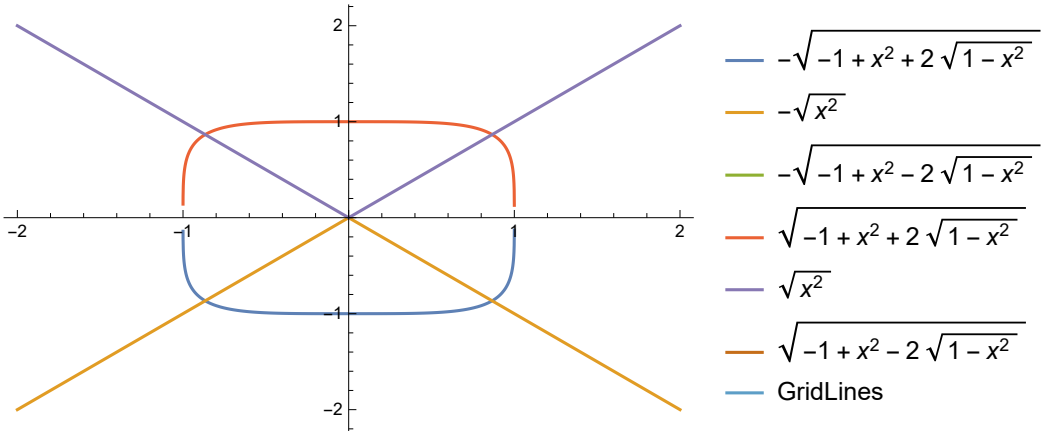



```
(*Zadatak 4*)
sol = DSolve[y'[x] == -(x * Sqrt[1 - y[x]^2]) / (y[x] * Sqrt[1 - x^2]), y, x]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\}, -\sqrt{x^2 - 2\sqrt{1-x^2}\;C[1] - C[1]^2}\;\right]\right\},\right.$$

$$\left.\left\{y \to \text{Function}\left[\{x\}, \sqrt{x^2 - 2\sqrt{1-x^2}\;C[1] - C[1]^2}\;\right]\right\}\right\}$$

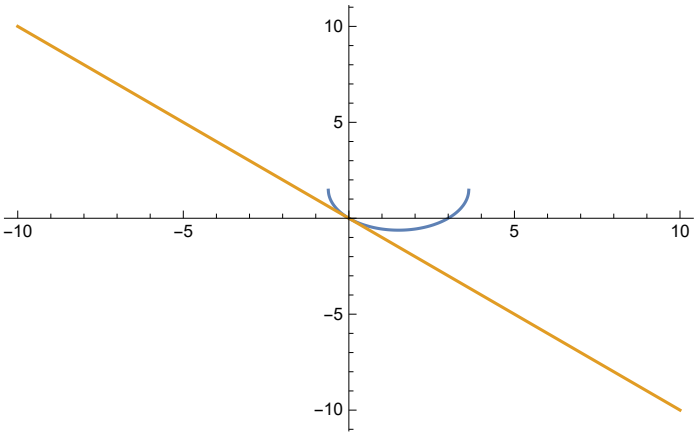
```
Plot[{Evaluate[y[x] /. sol /. C[1] → Range[-1, 1]], GridLines → {{{1, Black}}, None}},
 {x, -2, 2}, PlotLegends → "Expressions"]
```




```
(*Zadatak 5*)
sol = DSolve[y'[x] == (y[x]^2 - 2 * x * y[x] - x^2) / (y[x]^2 + 2 x * y[x] - x^2), y, x]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\}, \frac{1}{2}\left(e^{C[1]} - \sqrt{e^{2C[1]} + 4\,e^{C[1]}\,x - 4x^2}\right)\right]\right\},\right.$$
$$\left.\left\{y \to \text{Function}\left[\{x\}, \frac{1}{2}\left(e^{C[1]} + \sqrt{e^{2C[1]} + 4\,e^{C[1]}\,x - 4x^2}\right)\right]\right\}\right\}$$

```
(*Singularno resenje je y=-x*)Plot[{1/2 (3 - Sqrt[9 + 12 x - 4 x^2]), (-x)}, {x, -10, 10}]
```



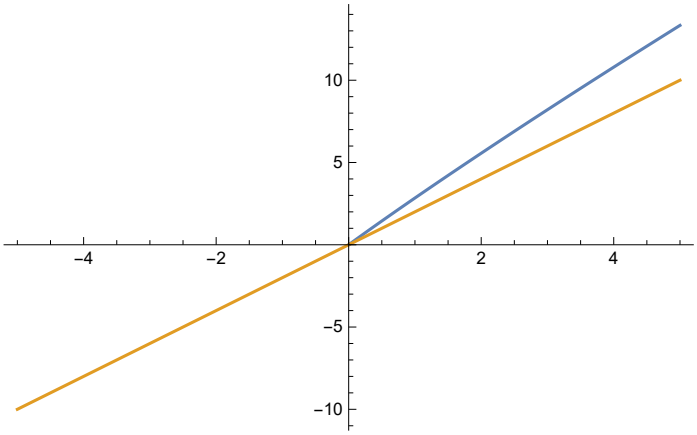
```
(*Zadatak 5*)
eqn = {y'[x] == (2 * y[x] - 2 * x - Sqrt[x * y[x] - 2 * x^2]) / x}
sol = DSolve[eqn, y, x]
```

$$\left\{y'[x] == \frac{-2x + 2y[x] - \sqrt{-2x^2 + x\,y[x]}}{x}\right\}$$

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

$$\left\{\left\{y \to \text{Function}\left[\{x\}, e^{-C[1]}\, x \left(3\, e^{C[1]} - 2\, e^{\frac{C[1]}{2}} \sqrt{x} + x\right)\right]\right\}\right\}$$

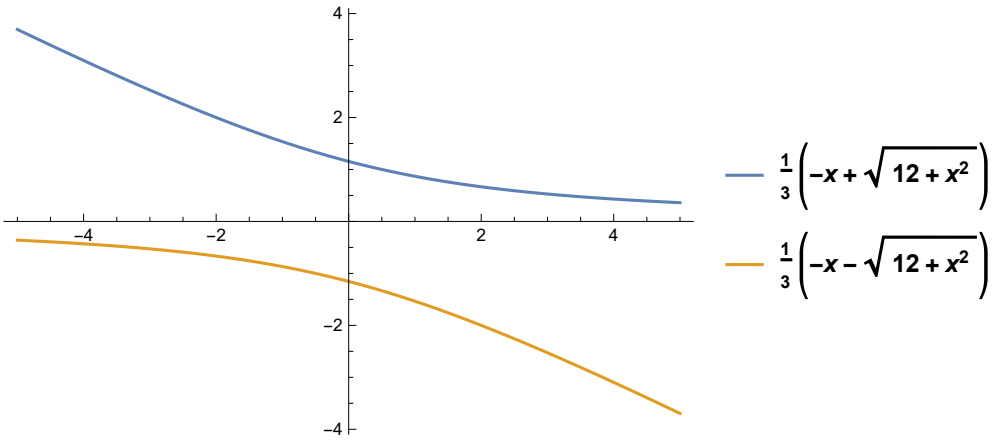
```
Plot[Evaluate[{y[x] /. sol /. C[1] → 5, 2 x}], {x, -5, 5}]
```




```
(*Zadatak 6*)
sol = DSolve[y'[x] == (y[x]^2) / (x * y[x] - 4), y, x]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\}, -\frac{-x + \sqrt{x^2 - 8\,C[1]}}{2\,C[1]}\right]\right\}, \left\{y \to \text{Function}\left[\{x\}, \frac{x + \sqrt{x^2 - 8\,C[1]}}{2\,C[1]}\right]\right\}\right\}$$

```
Plot[Evaluate[y[x] /. sol /. C[1] → -3/2], {x, -5, 5}, PlotLegends → "Expressions"]
```



$$\frac{1}{3}\left(-x+\sqrt{12+x^2}\right)$$

$$\frac{1}{3}\left(-x-\sqrt{12+x^2}\right)$$

```
Clear[sol]
```

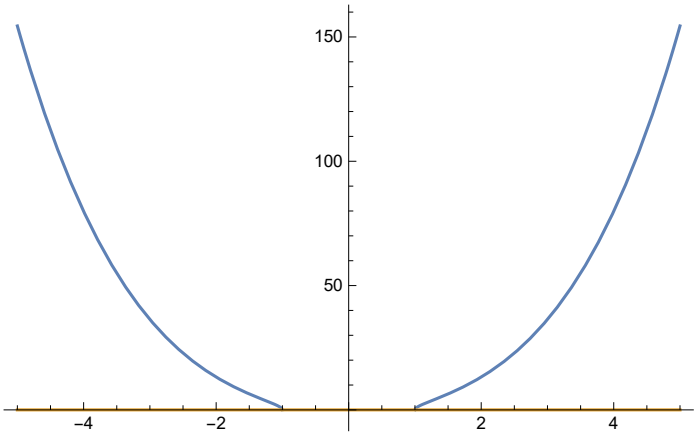
```
(*Zadatak 7*)
sol = DSolve[y'[x] == (x * Sqrt[y[x]] * (1 - x^2 - Sqrt[y[x]])) / (1 - x^2), y[x], x]
```

$$\left\{\left\{y[x] \to \frac{1}{9}\left(1 - 2x^2 + x^4 - 6\left(-1 + x^2\right)^{1/4} C[1] + 6x^2\left(-1 + x^2\right)^{1/4} C[1] + 9\sqrt{-1 + x^2}\, C[1]^2\right)\right\}\right\}$$

```
sol[[1]]
```

$$\left\{y[x] \to \frac{1}{9}\left(1 - 2x^2 + x^4 - 6\left(-1 + x^2\right)^{1/4} C[1] + 6x^2\left(-1 + x^2\right)^{1/4} C[1] + 9\sqrt{-1 + x^2}\, C[1]^2\right)\right\}$$

```
Plot[Evaluate[{y[x] /. sol /. C[1] → 2, 0}], {x, -5, 5}, PlotRange → All]
```



```
(*Zadatak 8*)
sol = DSolve[y'[x] + (x / (1 - x^2)) * y[x] == x * Sqrt[y[x]], y, x]
m = sol[[1]] /. C[1] → 2
k = y'[2] /. m
n = y[2] /. m
t[x_] := k * (x - 2) + n
Plot[Evaluate[{y[x] /. m, t[x]}], {x, -4, 4}, PlotRange → {-4, 4}, PlotStyle → Thick,
 Epilog → {PointSize[Large], Point[{2, n}]}, PlotLegends → "Expressions"]
```

$$\left\{\left\{y \to \text{Function}\left[\{x\},\ \frac{1}{9}\left(1 - 2x^2 + x^4 - 6\left(-1 + x^2\right)^{1/4} C[1] + 6x^2\left(-1 + x^2\right)^{1/4} C[1] + 9\sqrt{-1 + x^2}\ C[1]^2\right)\right]\right\}\right\}$$

$$\left\{y \to \text{Function}\left[\{x\},\ \frac{1}{9}\left(1 - 2x^2 + x^4 - 6\left(-1 + x^2\right)^{1/4} 2 + 6x^2\left(-1 + x^2\right)^{1/4} 2 + 9\sqrt{-1 + x^2}\ 2^2\right)\right]\right\}$$

$$\frac{1}{9}\left(24 + 60 \times 3^{1/4} + 24\sqrt{3}\right)$$

$$\frac{1}{9}\left(9 + 36 \times 3^{1/4} + 36\sqrt{3}\right)$$