



Wolfram|Alpha **Pro**
makes life easier.

Unlock **Pro**

 **WolframAlpha**[®] computational intelligence™


solve $y''-y=\cosh(x)$



 NATURAL LANGUAGE

 MATH INPUT

 EXTENDED KEYBOARD

 EXAMPLES

 UPLOAD

 RANDOM

Input interpretation

solve $y''(x) - y(x) = \cosh(x)$

$\cosh(x)$ is the hyperbolic cosine function

Result

☒ Step-by-step solution

$$y(x) = c_1 e^x + c_2 e^{-x} - \frac{1}{4} e^{-x} x + \frac{e^x x}{4}$$

ODE classification

second-order linear ordinary differential equation

Alternate forms

$$y(x) + \cosh(x) = y''(x)$$

$$y''(x) - y(x) = \frac{e^{-x}}{2} + \frac{e^x}{2}$$

Plots of sample individual solutions

DISCOVER
WHAT'S
POSSIBLE
with Wolfram|Alpha

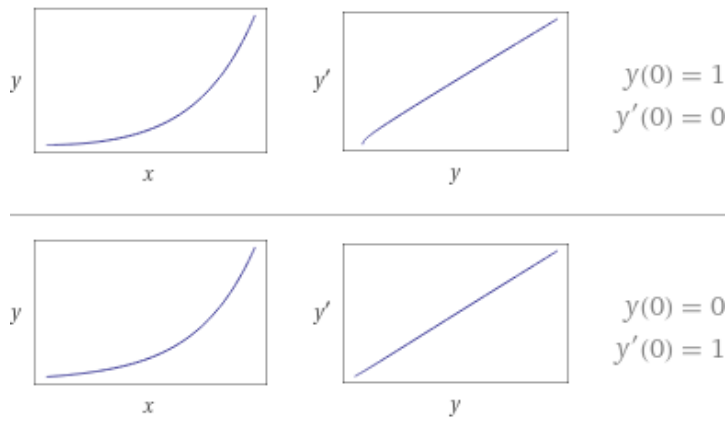
Take the Tour

The same Wolfram
technology that powers
Wolfram|Alpha...

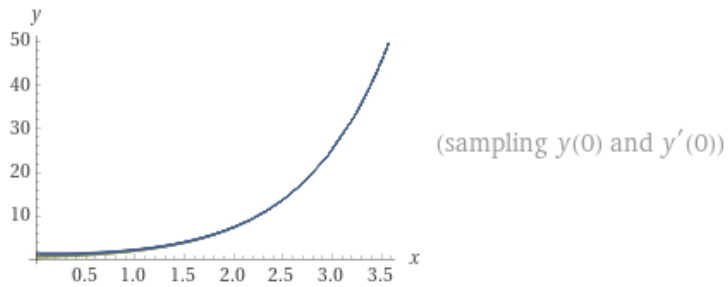
**Can Also Power
Your Apps**



JUST USE
WOLFRAM



Sample solution family



Possible Lagrangian

$$\mathcal{L}(y', y, x) = \frac{1}{2} (2 y \cosh(x) + y^2 + (y')^2)$$

[Download Page](#)
POWERED BY THE **WOLFRAM LANGUAGE**

Related Queries:

- $= y''(t) + \sin(y(t))=0, y(0) \dots$
- $= (x-1) y''(x) - x y'(x) + y \dots$
- $= y' + x y' + 2x^2 = 0$
- $= y' = y/(1 + x + y)$
- $= \arcsin(x) dx = \arccos \dots$



Have a question about
using Wolfram|Alpha?
[Contact Pro Premium
Expert Support »](#)



[Give us your feedback »](#)

[Pro](#) [Mobile Apps](#) [Products](#) [Business](#) [API & Developer Solutions](#) [LLM Solutions](#)

[Resources & Tools](#) [About](#) [Contact](#) [Connect](#) [f](#) [t](#) [t](#) [in](#)

©2023 Wolfram Alpha LLC [Terms](#) [Privacy](#)



WOLFRAM

[wolfram.com](#) [Wolfram Language](#) [Mathematica](#) [Wolfram Demonstrations](#) [Wolfram for Education](#) [MathWorld](#)