

$$\text{DSolve}[x^2 y[x]^3 + x (1 + y[x]^2) y'[x] == 0, y[x], x]$$

Solve::ifun:

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

$$\left\{ \left\{ y[x] \rightarrow -\frac{1}{\sqrt{\text{ProductLog}[e^{x^2-2C[1]}]}} \right\}, \left\{ y[x] \rightarrow \frac{1}{\sqrt{\text{ProductLog}[e^{x^2-2C[1]}]}} \right\} \right\}$$

$$\text{DSolve}\left[1 + \left(\frac{x}{y[x]} - \text{Sin}[y[x]]\right) y'[x] == 0, y[x], x\right]$$

$$\text{Solve}\left[x == \frac{C[1]}{y[x]} + \frac{\text{Sin}[y[x]] - \text{Cos}[y[x]] y[x]}{y[x]}, y[x]\right]$$

$$\text{DSolve}\left[(x^2 + 3xy + y^2) - x^2 y' == 0 /. \{y' \rightarrow y'[x], y \rightarrow y[x]\}, y[x], x\right]$$

$$\left\{ \left\{ y[x] \rightarrow \frac{-x - x C[1] - x \text{Log}[x]}{C[1] + \text{Log}[x]} \right\} \right\}$$

$$\text{DSolve}\left[y' == \frac{2y - x + 5}{2x - y - 4} /. \{y' \rightarrow y'[x], y \rightarrow y[x]\}, y[x], x\right]$$

$$\left\{ \left\{ y[x] \rightarrow 2(-2 + x) + 1 / \left(-\frac{1}{3(-1 + x)} + \left(2^{1/3} \left(-729 + 729 \text{Cosh}\left[\frac{3C[1]}{8}\right] - 1458x \text{Cosh}\left[\frac{3C[1]}{8}\right] + 729x^2 \text{Cosh}\left[\frac{3C[1]}{8}\right] + 729 \text{Sinh}\left[\frac{3C[1]}{8}\right] - 1458x \text{Sinh}\left[\frac{3C[1]}{8}\right] + 729x^2 \text{Sinh}\left[\frac{3C[1]}{8}\right] \right) \right) / \left(81(-1 + x) \left(-1 + \text{Cosh}\left[\frac{3C[1]}{8}\right] - 2x \text{Cosh}\left[\frac{3C[1]}{8}\right] + x^2 \text{Cosh}\left[\frac{3C[1]}{8}\right] + \text{Sinh}\left[\frac{3C[1]}{8}\right] - 2x \text{Sinh}\left[\frac{3C[1]}{8}\right] + x^2 \text{Sinh}\left[\frac{3C[1]}{8}\right] \right) \right) \left(-39366 + 78732 \text{Cosh}\left[\frac{3C[1]}{8}\right] - 157464x \text{Cosh}\left[\frac{3C[1]}{8}\right] + 78732x^2 \text{Cosh}\left[\frac{3C[1]}{8}\right] - 39366 \text{Cosh}\left[\frac{3C[1]}{4}\right] + 157464x \text{Cosh}\left[\frac{3C[1]}{4}\right] - 236196x^2 \text{Cosh}\left[\frac{3C[1]}{4}\right] + 157464x^3 \text{Cosh}\left[\frac{3C[1]}{4}\right] - 39366x^4 \text{Cosh}\left[\frac{3C[1]}{4}\right] + 78732 \text{Sinh}\left[\frac{3C[1]}{8}\right] - 157464x \text{Sinh}\left[\frac{3C[1]}{8}\right] + 78732x^2 \text{Sinh}\left[\frac{3C[1]}{8}\right] - 39366 \text{Sinh}\left[\frac{3C[1]}{4}\right] + 157464x \text{Sinh}\left[\frac{3C[1]}{4}\right] - 236196x^2 \text{Sinh}\left[\frac{3C[1]}{4}\right] + 157464x^3 \text{Sinh}\left[\frac{3C[1]}{4}\right] - 39366x^4 \text{Sinh}\left[\frac{3C[1]}{4}\right] \right) + \sqrt{4 \left(-729 + 729 \text{Cosh}\left[\frac{3C[1]}{8}\right] - 1458x \text{Cosh}\left[\frac{3C[1]}{8}\right] + \right.} \right. \right.$$

$$\begin{aligned}
& 729 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 729 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 1458 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + \\
& 729 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right]^3 + \left(-39366 + 78732 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 157464\right. \\
& x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + \\
& 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - 236196 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 \\
& x^3 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 78732 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - \\
& 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 39366 \\
& \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 236196 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + \\
& \left. 157464 x^3 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right]\right)^2 \Big)^{1/3} - \\
& \left(-39366 + 78732 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2\right. \\
& \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \\
& 236196 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x^3 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \\
& 39366 x^4 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 78732 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + \\
& 78732 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - \\
& 236196 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x^3 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + \\
& \left.\sqrt{4\left(-729 + 729 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 1458 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 729 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] +\right.}\right. \\
& \left.729 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 1458 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + 729 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right]\right)^3 + \\
& \left(-39366 + 78732 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 78732\right. \\
& x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \\
& 236196 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x^3 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \\
& 39366 x^4 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 78732 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 157464 x \\
& \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + \\
& \left. 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 236196 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] +\right.
\end{aligned}$$

$$\begin{aligned}
 & 1458 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 729 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 729 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - \\
 & 1458 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + 729 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] \Big) \Big) \Big) / \\
 & \left(81 \times 2^{2/3} (-1 + x) \left(-1 + \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 2 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + \right. \right. \\
 & \left. \left. \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 2 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] \right) \right. \\
 & \left. \left(-39366 + 78732 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + \right. \right. \\
 & 78732 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \\
 & 236196 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x^3 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \\
 & 39366 x^4 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 78732 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + \\
 & 78732 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - \\
 & 236196 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x^3 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] \Big) + \\
 & \sqrt{\left(4 \left(-729 + 729 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 1458 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + \right. \right. \\
 & 729 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 729 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 1458 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + \\
 & 729 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] \Big)^3 + \left(-39366 + 78732 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 157464 \right. \\
 & x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + \\
 & 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - 236196 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 \\
 & x^3 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 78732 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - \\
 & 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 39366 \\
 & \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 236196 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + \\
 & \left. \left. \left. 157464 x^3 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] \right)^2 \right)^{1/3} \right) + \\
 & \left((1 + i \sqrt{3}) \left(-39366 + 78732 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + \right. \right. \\
 & \left. \left. 78732 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \right. \right.
 \end{aligned}$$

$$\begin{aligned}
 & 236196 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 x^3 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - \\
 & 39366 x^4 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 78732 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + \\
 & 78732 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - \\
 & 236196 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x^3 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + \\
 & \sqrt{\left(4 \left(-729 + 729 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 1458 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + \right. \right. \\
 & \quad 729 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 729 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 1458 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + \\
 & \quad \left. 729 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right]\right)^3 + \left(-39366 + 78732 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 157464 \right. \\
 & \quad \left. x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 39366 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + \right. \\
 & \quad \left. 157464 x \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - 236196 x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 157464 \right. \\
 & \quad \left. x^3 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Cosh}\left[\frac{3 C[1]}{4}\right] + 78732 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - \right. \\
 & \quad \left. 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + 78732 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 39366 \right. \\
 & \quad \left. \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + 157464 x \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 236196 x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] + \right. \\
 & \quad \left. \left. 157464 x^3 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right] - 39366 x^4 \operatorname{Sinh}\left[\frac{3 C[1]}{4}\right]\right)^2\right)^{1/3}} / \\
 & \left. \left(162 \times 2^{1/3} (-1 + x) \left(-1 + \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] - 2 x \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + x^2 \operatorname{Cosh}\left[\frac{3 C[1]}{8}\right] + \right. \right. \right. \\
 & \quad \left. \left. \left. \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] - 2 x \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right] + x^2 \operatorname{Sinh}\left[\frac{3 C[1]}{8}\right]\right)\right)\right) \right\}
 \end{aligned}$$

DSolve $\left[\left\{y' == \frac{y^3}{1 - 2 x y^2} \right\} /. \{y' \rightarrow y'[x], y \rightarrow y[x]\}, y[0] == 1\right], y[x], x]$

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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. >>

$$\left\{ \left\{ y[x] \rightarrow -\frac{i \sqrt{\text{ProductLog}[-2x]}}{\sqrt{2} \sqrt{x}} \right\} \right\}$$

$$\text{DSolve}\left[\left\{y' = \frac{x^2 - 1}{y^2 + 1} \text{ /. } \{y' \rightarrow y'[x], y \rightarrow y[x]\}, y[-1] == 1\right\}, y[x], x\right]$$

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$$\left\{ \left\{ y[x] \rightarrow \left(-2^{2/3} + 2^{2/3} \left(2 - 3x + x^3 + \sqrt{8 - 12x + 9x^2 + 4x^3 - 6x^4 + x^6} \right)^{2/3} \right) / \right. \right. \\ \left. \left. \left(2 \left(2 - 3x + x^3 + \sqrt{8 - 12x + 9x^2 + 4x^3 - 6x^4 + x^6} \right)^{1/3} \right) \right\} \right\}$$

$$\text{DSolve}\left[y' = \frac{2y + \sqrt{x^2 - y^2}}{2x} \text{ /. } \{y' \rightarrow y'[x], y \rightarrow y[x]\}, y[x], x\right]$$

$$\left\{ \left\{ y[x] \rightarrow x + 2x \text{ Sinh}\left[\frac{1}{4} (2C[1] + i \text{Log}[x])\right]^2 \right\} \right\}$$

DSolve[

$$0 == (\text{Cos}[2y] - \text{Sin}[x]) - 2 \text{Tan}[x] \text{Sin}[2y] y' \text{ /. } \{y' \rightarrow y'[x], y \rightarrow y[x]\}, y[x], x]$$

Solve::ifun :

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

$$\left\{ \left\{ y[x] \rightarrow -\frac{1}{2} \text{ArcCos}\left[\frac{1}{4} (-1 - 2C[1] - \text{Cos}[2x]) \text{Csc}[x]\right] \right\}, \right. \\ \left. \left\{ y[x] \rightarrow \frac{1}{2} \text{ArcCos}\left[\frac{1}{4} (-1 - 2C[1] - \text{Cos}[2x]) \text{Csc}[x]\right] \right\} \right\}$$

$$\text{DSolve}\left[x^2 y' + 2xy - y^3 == 0 \text{ /. } \{y' \rightarrow y'[x], y \rightarrow y[x]\}, y[x], x\right]$$

$$\left\{ \left\{ y[x] \rightarrow -\frac{\sqrt{5} \sqrt{x}}{\sqrt{2 + 5x^5 C[1]}} \right\}, \left\{ y[x] \rightarrow \frac{\sqrt{5} \sqrt{x}}{\sqrt{2 + 5x^5 C[1]}} \right\} \right\}$$