



# Wolfram|Alpha Step-by-Step Solution

Wolfram|Alpha Input:

## STEP 1

Solve the linear equation  $\frac{dy(x)}{dx} - y(x) = 0$ :

## STEP 2

Let  $\mu(x) = e^{\int -1 dx} = e^{-x}$ .

Multiply both sides by  $\mu(x)$ :

$$e^{-x} \frac{dy(x)}{dx} - e^{-x} y(x) = 0$$

## STEP 3

Substitute  $-e^{-x} = \frac{d}{dx}(e^{-x})$ :

$$e^{-x} \frac{dy(x)}{dx} + \frac{d}{dx}(e^{-x}) y(x) = 0$$

## STEP 4

Apply the reverse product rule  $f \frac{dg}{dx} + g \frac{df}{dx} = \frac{d}{dx}(f g)$  to the left-hand side:

$$\frac{d}{dx}(e^{-x} y(x)) = 0$$

## STEP 5

Integrate both sides with respect to  $x$ :

$$\int \frac{d}{dx}(e^{-x} y(x)) dx = \int 0 dx$$

## STEP 6

Evaluate the integrals:

$e^{-x} y(x) = c_1$ , where  $c_1$  is an arbitrary constant.

STEP 7

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Divide both sides by  $\mu(x) = e^{-x}$ :

Answer:

$$y(x) = c_1 e^x$$



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