
Which of the following best describes the purpose of 'reduction of order'?

- A. Given one solution of a 2nd-order homogeneous linear differential equation, find another (linearly independent) solution.
- B. Given two solutions of a 2nd-order homogeneous linear differential equation, determine whether they are linearly independent.
- C. Determine whether a linear differential equation is homogeneous or nonhomogeneous.

2. (1 point)

Consider the differential equation $y'' - y = 0$, and suppose we know that $y_1 = e^x$ is a solution.

(a) For our differential equation, what is the function $P(x)$ with it in the form $y'' + P(x)y' + Q(x)y = 0$? [Choose/0/1/-1]

(b) Plugging in P and y_1 into $y_1 \int \frac{e^{-\int P dx}}{(y_1)^2} dx$ gives (after manipulating the constant) [Choose/A/B/C], where

A. 0 B. $e^x \int \frac{e^{-\int e^x dx}}{e^{x^2}} dx$ C. $e^x \int \frac{c_1}{e^{2x}} dx$

(c) Solving the integral from part (b) gives (after manipulating the constant) [Choose/A/B/C], where

A. 0 B. $c_1 e^{-x} + c_2 e^x$ C. e^{-x}

(d) We deduce that the second solution can be taken to be [Choose/A/B/C], where

A. 0 B. $y_2 = x e^x$ C. $y_2 = e^{-x}$

3. (1 point)

Enter a value for π
