

Problem 3

In each of Problems 1 through 6, find the Wronskian of the given pair of functions.

$$e^{-2t}, \quad te^{-2t}$$

Solution

The Wronskian of these two functions is

$$\begin{aligned} W &= \begin{vmatrix} e^{-2t} & te^{-2t} \\ \frac{d}{dt}(e^{-2t}) & \frac{d}{dt}(te^{-2t}) \end{vmatrix} \\ &= \begin{vmatrix} e^{-2t} & te^{-2t} \\ -2e^{-2t} & e^{-2t} - 2te^{-2t} \end{vmatrix} \\ &= e^{-2t}(e^{-2t} - 2te^{-2t}) - te^{-2t}(-2e^{-2t}) \\ &= e^{-4t} - 2te^{-4t} + 2te^{-4t} \\ &= e^{-4t}. \end{aligned}$$