

Problem 4

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

$$x, \quad xe^x$$

Solution

The Wronskian of these two functions is

$$\begin{aligned} W &= \begin{vmatrix} x & xe^x \\ \frac{d}{dx}(x) & \frac{d}{dx}(xe^x) \end{vmatrix} \\ &= \begin{vmatrix} x & xe^x \\ 1 & e^x + xe^x \end{vmatrix} \\ &= x(e^x + xe^x) - xe^x(1) \\ &= xe^x + x^2e^x - xe^x \\ &= x^2e^x. \end{aligned}$$