



Problem:

Investigate linear dependence for the following system of functions: $x, 0, e^x$.

Solution:

$$y_1 = x, y_2 = 0, y_3 = e^x.$$

Using the definition of linear dependence $\alpha_1 y_1 + \alpha_2 y_2 + \alpha_3 y_3 = 0$, let's take $\alpha_1 = \alpha_3 = 0, \alpha_2 \neq 0 \Rightarrow 0 \cdot x + \alpha_2 \cdot 0 + 0 \cdot e^x \equiv 0$ when $x \in (-\infty, +\infty)$, \Rightarrow the functions are linearly dependent (not all coefficients of the linear combination are equal to zero).

Answer: linearly dependent