

Math 307 Quiz 3

February 18, 2016

Problem 1. Find the general solution of

$$y'' - 4y' - 21y = 0.$$

Solution 1. The characteristic polynomial is $r^2 - 4r - 21$, which factors as $(r - 7)(r + 3)$. The roots are therefore 7 and -3 , and the general solution is thus

$$y = C_1 e^{7t} + C_2 e^{-3t}.$$

Problem 2. Write down the definition of a collection of functions $\{f_1(x), \dots, f_n(x)\}$ being linearly dependent.

Solution 2. The collection of functions $\{f_1(x), \dots, f_n(x)\}$ are linearly dependent if there exists constants c_1, c_2, \dots, c_n not all zero such that

$$c_1 f_1(x) + c_2 f_2(x) + \dots + c_n f_n(x) = 0.$$