

**Quiz 5, Math 246, Professor David Levermore**  
**Thursday, 8 October 2020**

**This formative assessment helps you see how well you understand the material. To get an accurate assessment please do not use books, notes, or electronic aids. Show your reasoning for full credit. Good luck!**

(1) [3] Given that  $x = c_1 e^{2t} + c_2 t e^{2t}$  is a general solution of the equation  $x'' - 4x' + 4x = 0$ , find the natural fundamental set of solutions to this equation associated with  $t = 0$ .

(2) [5] Give a real general solution to the equation

$$(D^2 - 6D + 13)^2 (D + 4)^3 y = 0, \quad \text{where } D = \frac{d}{dt}.$$

(3) [2] Give a real general solution to the equation

$$v'' + 4v' + 3v = 30e^{2t},$$

given that  $v = 2e^{2t}$  is a solution to it and that  $e^{-t}$  and  $e^{-3t}$  are a fundamental set of solutions to the associated homogeneous equation.